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The Benefits of Buying Distressed Assets

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When companies in financial difficulty are forced to sell assets—especially real assets such as factories, business units, real estate, or the entire company—the news is often seen as negative all around. In these situations, referred to as "fire sales," companies are forced to sell assets below fair value,[1] and the spillover effects can be costly as well. These spillover costs, or "externalities," include plant closings and job losses that hurt employees, suppliers, and customers.[2] Fire sales can also depress the values of the assets of healthy companies in the same industry.[3]

The costs of fire sales have been analyzed in many academic studies, and they influence public policy debates, often resulting in pressure for governmental entities to bail out the firms in difficulty to avoid the associated costs—particularly, the spillover costs. In many countries, the government response to the COVID-19 pandemic has been to provide bailout funds through cash grants, loans and loan guarantees, and equity injections. One of the main policy objectives behind these bailouts and other emergency measures has been to avoid corporate bankruptcies and liquidations and the associated fire sales. For instance, in mid-March 2020, Carnival, the largest cruise-line operator in the world, was negotiating a cash injection with hedge funds. These negotiations came to an abrupt end when the Federal Reserve announced several emergency initiatives.[4]

In the United States alone, the federal government legislated $1.8 trillion in bailout funds for the private sector. These $1.8 trillion in bailout funds cover a variety of different bailout packages, including a general bailout program for small businesses and industry-specific bailouts, such as for the airline industry. In addition, the Federal Reserve has announced at least 12 programs, several of which are directly bailing out the private sector.[5] Notwithstanding these bailouts, the precarious financial position in which many companies find themselves as a result of the COVID-19 crisis will likely result in a large increase in bankruptcies and associated fire sales. The UCLA-LoPucki Bankruptcy Research Database,[6] for instance, shows an increase in bankruptcy filings by large publicly listed firms in the U.S. since March 2020 that is likely to result in an increase in fire sales in the short to medium term.

What is often underappreciated, however, is the size of the gains that occur in sales of distressed assets. In theory, it is not clear whether buyers gain. While there can be a redistribution of wealth from sellers to buyers, the sellers' losses can also reflect an inefficient reallocation to buyers that cannot use the assets as effectively as the sellers—and buyers that could use the assets more productively are sidelined because they do not have the resources to fund the acquisition.[7]

Understanding the gains of buyers in fire sales is important in light of the debate about whether bailouts should be

*This paper summarizes the findings of, and draws heavily on, the following articles: Jean-Marie Meier and Henri Servaes, 2019, The Bright Side of Fire Sales, *Review of Financial Studies*, 32:4228-4270; and Distressed Acquisitions, CEPR Discussion Paper No. DP10093. We are grateful to the editor, Don Chew, for many helpful comments and suggestions.

1 See Pulvino, T. C. 1998, Do asset fire sales exist? An empirical investigation of commercial aircraft transactions, *Journal of Finance* 53:939-78.

2 See Goolsbee, A. D., and A. B. Krueger, 2015, A retrospective look at rescuing and restructuring General Motors and Chrysler, *Journal of Economic Perspectives* 29:3-24.

3 See Benmelech, E., and N. K. Bergman, 2011, Bankruptcy and the collateral channel, *Journal of Finance* 66:337-78.

4 *Wall Street Journal* (2020): "How Fed Intervention Saved Carnival", April 26, https://www.wsj.com/articles/how-fed-intervention-saved-carnival-11587920400 (last accessed September 28, 2020).

5 For an analysis of the COVID-19 bailouts and a discussion of the Federal Reserve's emergency programs in response to the COVID-19 epidemic, see Meier, J.-M., and J. Smith, 2020, The COVID-19 Bailouts, Working Paper, University of Texas at Dallas.

6 See https://lopucki.law.ucla.edu/.

7 See Shleifer, A., and R. W. Vishny, 1992, Liquidation values and debt capacity: A market equilibrium approach, *Journal of Finance* 47:1343-66.

used as a tool to prevent fire sales, particularly since bailouts also impose severe costs on society. Not only is there a direct cash injection financed by taxpayers, but bailouts also create moral hazard[8] and can undermine trust in the political system if voters get the impression that "Wall Street" gets a bailout, while "Main Street" does not. After all, if companies know they will be bailed out in the future, they may as well borrow more today, pay out the proceeds as dividends, or use the funds to buy back their shares. The taxpayer stands by to pick up the pieces in case things fall apart.

There is also evidence that bailout funds are not always allocated fairly, but depend on the political connections of the potential recipients.[9] As just one example, in July 2020, the Republican speaker of the Ohio House of Representatives was arrested on racketeering charges related to a $1.5 billion bailout of two nuclear plants.[10] Finally, once bailout funds have been allocated, there may be some quid pro quo by the recipients in favor of the politicians that allocated the bailout funds in the first place.[11]

For corporate executives, our research is relevant in the sense that the M&A literature has struggled to identify characteristics of M&A transactions that are consistently associated with positive returns for buyers. If fire-sale acquisitions are consistently profitable for buyers, one implication of our work is that practitioners—beyond the specialized part of the private equity industry focused on distressed firms—should consider buying distressed assets.

In this article, we draw on our published study called "The Bright Side of Fire Sales" in which we analyzed 31 years of data on fire sales of real assets.[12] To study whether buyers gain in fire sales, we computed a market-based assessment of the wealth change achieved by buyers in mergers and acquisitions. We examined the stock price response of firms that acquire assets from distressed companies, both in complete acquisitions and the purchases of certain assets or divisions of distressed companies. We focused on a comprehensive set of 428 transactions involving distressed sellers and their buyers in the United States during the 31-year period 1982-2012. Transactions were identified as fire sales in two cases: if the seller was (1) in bankruptcy or liquidation at the time of the transaction or (2) undergoing a private debt restructuring that imposed a loss on creditors.

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Buyers in fire sales earn abnormal returns upon the announcement of acquisitions that are two percentage points higher than in regular acquisitions.

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The main finding of our study was that the returns to buyers—as reflected in the stock price response to the announcements of the acquisitions or asset purchases—were approximately two percentage points higher in fire sales than in regular M&A transactions. This finding holds when controlling for buyer and deal characteristics, and when focusing on public sellers, acquisitions of entire companies, and acquisitions of assets of companies. For the average buyer, the percentage gain in fire sales after controlling for buyer and deal characteristics translates into an increase in market value of $29.7 million over and above the increase experienced by the acquirers in normal acquisitions. Our findings also hold when we compare the returns earned by those companies that make both regular and fire-sale acquisitions during our sample period, and when we focus on acquisitions within a specific industry.

We also confirmed that buyers earn excess returns in fire sales when looking at the longer-term stock returns from just before the announcement through the completion of the transaction. Besides suggesting that such positive effects of fire sales are enduring or "permanent," this finding also rejects the possibility that fire sales are less likely to be completed than regular deals. Unlike earlier studies, which stress the costs to the sellers associated with fire sales, we show that buyers use such sales to increase shareholder wealth substantially.

Our study also sheds light on the way, or "mechanism" by which, fire sales benefit buyers. That mechanism appears to be the significant reduction in the sellers' bargaining power that characterizes most fire sales. We start by asking the question: why are the gains for buyers in fire sales not competed away, given that they are so large? We find that there are actually more contested acquisitions during fire sales, which means that the lack of *explicit* competi-

8 See Duchin, R., and D. Sosyura, 2014, Safer ratios, riskier portfolios: Banks' response to government aid, *Journal of Financial Economics* 113:1-28.

9 See Faccio, M., R. W. Masulis, and J. J. McConnell, 2006, Political connections and corporate bailouts, *Journal of Finance* 61:2597-635; Duchin, R. and D. Sosyura, 2012, The politics of government investment, *Journal of Financial Economics* 106:24-48.

10 *Wall Street Journal* (2020): "Larry Householder, Ohio's House Speaker, Arrested on Racketeering Charges", July 21, https://www.wsj.com/articles/larry-householder-ohios-house-speaker-arrested-on-racketeering-charges-11595350062 (last accessed September 28, 2020).

11 See Chavaz, M., and A. K. Rose, 2019, Political borders and bank lending in post-crisis America, *Review of Finance* 23:935-959.

12 See Meier, J.-M., and H. Servaes, 2019, The Bright Side of Fire Sales, *Review of Financial Studies*, 32:4228–4270. An earlier version of this paper was circulated under the title "Distressed Acquisitions" as CEPR Discussion Paper No. DP10093.

tion cannot explain our findings. But when we examined *implicit* competition for sellers by considering the number of potential buyers *from the same industry*, we find reduced buyer returns in fire sales in those industries with many large companies.

We also employed other proxies for bargaining power. We found that the returns to acquiring assets in fire sales turned out to be higher when other companies in the seller's industry had low liquidity and were financially constrained. We also found higher buyer returns during recessions, when there are fewer potential buyers with deep pockets. These elements are likely to be particularly relevant during the recession associated with the COVID-19 pandemic. Conversely, we found lower returns to buyers when there was a liquid M&A market in the seller's industry. Finally, buyer returns were higher when the seller's assets had fewer alternative uses. These factors all reduce the bargaining power of the sellers.

In the case of acquisitions from sellers that are in bankruptcy, we found that measures of creditor control, which reduce the seller's bargaining power, were associated with additional gains for the buyers. Thus, even within the sample of fire sales, our proposed mechanism has explanatory power for buyer returns. What we did not find, however, was that fire sales led to improvements in operating performance for the buyers after the acquisitions relative to regular transactions, or that fire sales were more or less successful based on news reports in the years after the transaction. This finding suggests that the positive buyer returns are attributable neither to the revelation of "good news" about the buyers themselves nor to a better "strategic fit," or the expectation of higher synergies, between buyers and sellers. Instead, these results support our argument that buyers purchase assets at a low, dislocated price. In sum, fire sales performed similarly to regular transactions in terms of profitability.

In addition, our study was designed to rule out a number of proposed alternative explanations for the key result that buyers gain substantially in fire sales, such as reward for risk-taking or, an informational advantage on the part of buyers.

We also computed the returns earned by the public sellers and the combined shareholder wealth gains associated with the acquisitions in our sample. The shareholders of distressed seller firms earned significantly lower returns than sellers in normal M&A transactions. One possibility is that at least part of the seller returns accrued to the debtholders of the selling firms; but as we discovered, not enough sellers in our sample had listed debt outstanding to allow us to investigate this possibility. Combined buyer and seller returns to shareholders were indistinguishable for fire sales versus those in regular acquisitions.[13] Finally, we found no differences between fire sales and regular transactions in the stock price responses of the seller's peers, its customers, and its suppliers. We did find declines in employment of 32 percentage points relative to what happens in regular acquisitions, but this is similar to the employment effects of bankruptcy restructurings not accompanied by asset sales documented in prior work.[14]

Overall, our analysis considered a large number of stakeholders that could be negatively affected by fire sales, but finds little evidence of such negative effects. The main effect of fire sales, as noted, is the wealth transfer from the selling to the buying companies. When viewed from a social welfare perspective, the alleged costs associated with fire sales of corporate assets appear to be considerably lower than previously thought based on studies that focus exclusively on the costs to the seller and its peers. Thus, from a policy perspective, these findings cast doubt on the efficacy of bailouts as a response to the potential losses associated with fire sales, especially in light of the moral hazard and the other distortions caused by bailouts.

Data Collection

Our data set began with all completed acquisitions listed on the SDC database that were announced over the period 1982-2012. The database includes not only full acquisitions but also acquisitions of ownership interests and assets. We then removed acquisitions that do not involve U.S. corporate buyers and sellers, and we required the buyer to be publicly listed to allow for a study of the effect of the takeover announcement on the share price of the buyer. For acquisitions of entire companies, the buyer had to own more than 50% of the firm after completion of the transaction and less than 50% before its initial announcement, and the size of the stake acquired had to be at least 50%. Finally, to include only transactions of importance to the buying firm, we removed deals for which the transaction value was less than 1% of the market value of the buyer, where market value is defined as book assets minus book equity plus market equity. Our final sample consisted of 21,850 acquisitions.

We combined three variables listed on the SDC database to assess whether a transaction was a fire sale: (1) the seller was or went bankrupt during the transaction; (2) the transaction

13 Of course, the seller's shareholders may well have anticipated a fire sale, in which case the possibility of the sale would already be reflected, at least in part, in the seller's share price. And to the extent that this is so, we would be overstating the seller's announcement returns and the combined gains. However, the fact that fire sales do not have worse post-acquisition operating performance or success rates is consistent with combined announcement returns that are similar to those of regular acquisitions.

14 See Bernstein, S., E. Colonnelli, and B. Iverson, 2019, Asset allocation in bankruptcy, *Journal of Finance* 74:5-53.

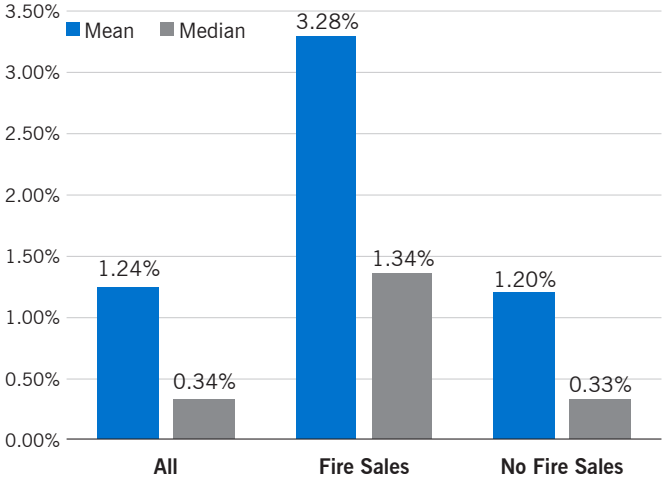
Table 1

Number of Transactions by Year and Type

Year	Total acquisitions	All fire sales	Asset fire sales	Company fire sales
1982	219	1	0	1
1983	382	1	0	1
1984	426	6	1	5
1985	244	4	4	0
1986	346	17	16	1
1987	272	13	11	2
1988	325	17	14	3
1989	371	23	20	3
1990	363	20	19	1
1991	399	22	18	4
1992	561	24	18	6
1993	748	19	15	4
1994	915	20	16	4
1995	999	12	9	3
1996	1,309	17	12	5
1997	1,737	18	17	1
1998	1,728	13	12	1
1999	1,290	11	9	2
2000	984	19	17	2
2001	699	27	24	3
2002	744	41	39	2
2003	712	16	16	0
2004	838	16	16	0
2005	895	10	10	0
2006	853	5	4	1
2007	783	3	2	1
2008	525	7	7	0
2009	386	7	5	2
2010	591	7	6	1
2011	614	8	7	1
2012	592	4	3	1
Total	21,850	428	367	61

Figure 1

Buyer Abnormal Returns in Fire Sales and Regular Acquisitions



was part of a liquidation plan; (3) the seller restructured its debt in a way that imposed a loss on its creditors. If any of these criteria were met, we classified the acquisition as a fire sale. The common element among these criteria is that *the seller's management was no longer fully in control of the decision-making process*, and thus may have been forced to sell the firm or some of its assets. We identified 428 of the 21,850 deals in our sample as fire-sale acquisitions based on the above criteria.

As reported in Table 1, the largest number of fire sales occurred in the late 1980s and early 1990s and at the start of the 2000s, after which their number dropped substantially. This does not imply that fire sales have become less relevant, however. In fact, we found no evidence of a decline in fire sales when we considered private as well as publicly listed buyers, which implies that more of the recent buyers in fire sales have been private entities, such as private equity firms and vulture funds. Of course, it is not possible to compute the returns of private bidders.

Abnormal Returns to Buyers

We began by estimating the cumulative abnormal returns earned by the buyers in our entire sample over the three-day period surrounding the announcement of the acquisitions. As reported in Figure 1, the abnormal returns were 1.24%, on average, which is similar to the 1.10% average reported by other studies of M&A.[15] The median return, at 0.34%, was also significantly positive. But when we split the sample into fire-sale acquisitions and other acquisitions, the results were striking: buyer returns were more than 2 percentage points higher, on average, in fire sales than in regular deals; and the difference in the medians was more than 1 percentage point. We also verified that these results hold for acquisitions of entire companies as well as acquisitions of assets. For example, whereas average buyer gains were 0.81% when they acquired entire companies not in distress, they averaged 4.76% when the sellers were distressed.

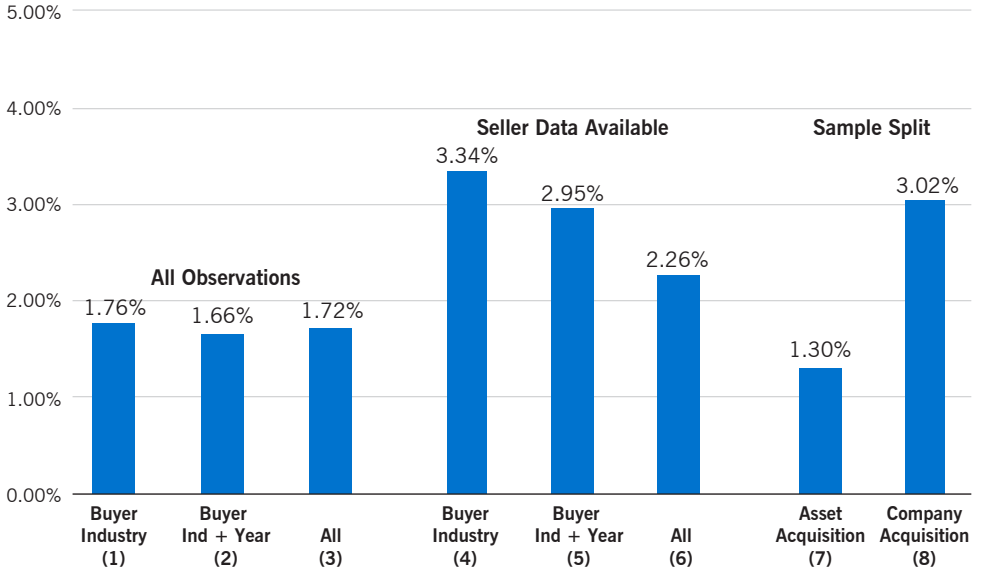
Next, we confirmed that the above results also hold when controlling for other factors that may affect the buyer return. As one example, because fire sales are more likely to be acquisitions of assets rather than acquisitions of entire companies,

15 See, for example, Netter, J., M. Stegemoller, and M. B. Wintoki, 2011, Implications of data screens on merger and acquisition analysis: A large sample study of mergers and acquisitions from 1992-2009, *Review of Financial Studies* 24:2316-57.

Figure 2

Extra Return in Fire Sales vs. Regular Acquisitions After Controlling for Various Factors and Subsample Returns

The first three bars refer to the complete sample. The second three bars refer to the sample for which seller data are also available. The last two bars refer to sample splits for acquisitions of assets and acquisitions of entire companies. The label at the bottom of the first six bars refers to the control variables employed in the regression model. The data label at the bottom of each bar indicates which controls variables are employed. The label at the bottom of the last two bars refers to the subsample for which the model is estimated. The models reported in bars (7) and (8) contain all controls variables.



this difference could explain the difference in returns. To make sure our result was not reflecting important differences between the kinds of companies or assets involved in fire sales, we estimated a regression model in which we controlled for a variety of other factors, including the buyer's industry and the year in which the transaction took place. We also accounted for whether the deals were tender offers, hostile or contested (multiple bidders), involved equity- or cash-only payments, the degree of industry relatedness, and finally whether the seller of the assets was public or private. In addition, we controlled for the size of the transaction relative to the size of the buyers, and for the buyers' leverage, profitability, and market assets-to-book assets (or q) ratios.

As can be seen in Figure 2, in each of the three models we used—the first controlling only for the buyer's industry, the second controlling also for the year of the transaction, and the third including all the control variables mentioned above—the returns earned by the buyers in fire sales were approximately 1.7 percentage points higher than those in regular transactions, which is only slightly smaller than the simple returns comparison displayed in Figure 1. As can also be seen in Figure 2, when we limited ourselves to transactions for which financial data on the seller were also available—a sample that consists of 4,571 transactions, 102 of which are fire sales—the fire sale effect was even larger, averaging 2.26% when we include all control variables. Finally, as shown in the last two bars in the figure, both acquisitions of assets and acquisitions of entire companies provided substantial excess returns for buyers in fire sales relative to regular transactions; the excess return was 1.3% for asset purchases and over 3% for acquisitions of entire companies. Overall, these regression findings confirm the persistence of the fire sale effect and indicate that it is not caused by differences in other factors.

From these analyses, we conclude that buyer abnormal returns are significantly higher when the transaction is a fire sale compared to a regular acquisition, and this result survives many robustness checks. While a large literature emphasized the cost to the sellers associated with fire sales, this new result illustrates that other firms can take advantage of these sales and earn excess returns for their shareholders in the process.

The Mechanism: Explaining the Fire Sale Effect

In the second part of our study, we examined why buyers gain more in fire sales than in normal acquisitions by conducting a

Table 2

Factors Influencing Excess Returns of Buyers in Fire Sales Relative to Regular Acquisitions

This table illustrates the additional effect on buyer returns in fire sales relative to regular acquisitions when the respective variable is increased from the 25th percentile of its distribution to the 75th percentile of its distribution, except for the recession variable which is increased from 0 to 1.

Variable	Effect on buyer returns in fire sales
(1) # firms in seller industry > transaction value	-0.51%
(2) Seller industry mean quick ratio	-0.54%
(3) Seller industry mean Kaplan-Zingales index	0.26%
(4) Recession	2.04%
(5) Seller industry M&A liquidity	-0.32%
(6) Seller industry asset redeployabiliy	-0.76%

number of tests in which we used a variety of proxies for the bargaining power of the seller. Our working hypothesis was that reduced bargaining power on the part of the seller leads to higher buyer returns.

Competition for distressed sellers

We started by exploring why the gains earned by buyers in fire sales were not competed away in bidding contests. We found a small positive correlation between the likelihood of the transaction being a fire sale and the presence of multiple bidders. But despite the higher incidence of competition and after controlling for this effect, buyers in fire sales still earned higher returns.

Next, we studied whether differences in returns could be attributed to the lack of *implicit*, or potential, competition. To measure implicit competition, we counted the number of companies operating in the seller's three-digit SIC code industry in the Compustat database. These are the firms that can make the best use of the seller's assets and therefore are able to pay the highest price. Implicit competition can be more important in fire sales than in regular transactions, because selling becomes more urgent when a firm is in distress; in regular transactions, potential sellers can simply walk away if the price is deemed inadequate. Though our regression analysis showed that returns to buyers decreased when there were more firms in their industry, this effect was no more pronounced in fire sales than in regular acquisitions.

One concern with simply counting the number of firms in the seller's industry is that some industry peers may be substantially smaller than the target, and so not in a position to buy it. To test this possibility, we counted the number of companies with book assets larger than the transaction value in the acquisition year. What we found, as reported in Table 2, is that increasing the number of such large potential buyers (from the 25th to the 75th percentile of the distribution) reduces the buyer returns for fire sales compared to regular transactions by 0.51 percentage points. This evidence confirmed our expectation that potential competition for distressed sellers affects the returns earned by the buyers.

Industry financial health and the gains from acquisitions

The literature on fire sales stresses the idea that other companies in the seller's industry may not be able to purchase distressed assets because these firms are also in a difficult financial position. We examined this possibility by incorporating the characteristics of the seller's industry in the model of buyer returns. We constructed two measures of the financial health of an industry: (a) the average quick ratio, which captures the liquidity in the industry, where the quick ratio is defined as (current assets – inventory) / current liabilities, and (b) an index of financial constraints developed by Steven Kaplan and Luigi Zingales (KZ index).[16] To the extent the buyers of distressed assets exhibit higher announcement returns because potential industry buyers do not have the means to make an acquisition, we would expect the effect to be more pronounced for acquisitions of firms in industries with low quick ratios and large financial constraints.

As can be seen in rows 2 and 3 of Table 2, an increase in the seller industry's quick ratio from its 25th percentile to its 75th percentile reduces the buyer's abnormal returns for fire sales by 0.54 percentage points relative to regular acquisitions, and the same increase in the seller industry's KZ index is associated with buyer returns that are 26 bps higher for fire sales. These results imply that the lack of liquidity in the seller's industry appears to be a stronger driver of buyer returns than financial constraints.

We also looked at the possible effect of the health of the entire economy on buyer returns in fire sales. Specifically, we studied whether the returns earned by buyers in fire sales were

16 The Kaplan-Zingales (KZ) index at time t is computed as: KZ index$_t$ = –1.001909 (Cash Flow$_t$/ PPE$_{t-1}$) + 0.2826389 q$_t$ + 3.139193 Debt$_t$/ (Debt$_t$ + Book Equity$_t$) – 39.3678 (Dividends$_t$/ PPE$_t$) – 1.314759 (Cash$_t$/ PPE$_t$), where Cash Flow is computed as Income Before Extraordinary Items + Depreciation and Amortization; q is computed as (Book Assets – Book Equity – Deferred Taxes + Market Equity) / Book Assets; and Debt is computed as Long-Term Debt + Debt in Current Liabilities. A higher KZ index implies that the firm is more financially constrained. We calculate these measures at the 3-digit SIC code level in the year of the acquisition, excluding the selling firm. See Kaplan, S. N., and L. Zingales, 1997, Do investment-cash flow sensitivities provide useful measures of financing constraints? *Quarterly Journal of Economics* 112:169-215; Lamont, O., C. Polk, and J. Saá-Requejo, 2001, Financial constraints and stock returns, *Review of Financial Studies* 14:529-54.

higher in recessions; and when doing so, we found that this is indeed the case, even after controlling for all other relevant buyer and deal characteristics. Whereas buyers of assets in fire sales earned 1.34 percentage points more than regular buyers during normal times, this difference reached 3.38 percentage points during recessionary periods.

In sum, our findings indicate that buyer returns in fire sales are particularly high when the overall financial health of the other firms in the industry is poor, and when the economy is in a recession. These are the circumstances under which the bargaining power of the seller is at its lowest because the most obvious buyers of the assets—other firms in the industry—are less able to participate in the bidding process. These results are likely to be particularly relevant in the current environment of the COVID-19 pandemic, when many firms face a liquidity crisis, and the economy overall is in a recession. Fire sales will likely increase, and companies with deep pockets will likely benefit in such acquisitions.

Asset redeployability

Yet another factor that could be important in the ability of the buyers to benefit from a transaction is the extent to which the acquired assets can be redeployed in other industries. Higher redeployability leads to more competition from firms outside of the seller's industry, limiting potential gains for buyers.

Constructing a proxy for redeployability is inherently difficult. We follow two approaches that have been proposed in the literature. One approach, pioneered by Frederik Schlingemann, René Stulz, and Ralph Walkling, is based on the liquidity of the market for corporate assets in an industry. They collect data on the value of all corporate control transactions in an industry from SDC and divide it by the book value of assets in that industry.[17] A second approach, proposed by Hyunseob Kim and Howard Kung employs data from the Bureau of Economic Analysis (BEA) capital flow table. For all the BEA asset categories, Kim and Kung first compute annually the fraction of all capital expenditures of listed firms spent by industries that use assets in that category. Then, for each industry, they value-weight the redeployability scores of each asset used by that industry by the importance of that asset in the industry's total capital spending.[18] This measure is well suited to capture alternative uses of assets. The disadvantage of this measure is that it is focused on the firm's property, plant, and equipment (PP&E), and does not really work well for firms that are not capital intensive. Therefore, we compute this measure only for the following capital-intensive industries: agriculture, construction, natural resources, manufacturing, transportation, and utilities.

As reported in row 5 in Table 2, we found strong evidence that fire-sale acquisitions in industries with a more liquid M&A market result in lower buyer returns; more specifically, an increase in the liquidity index from its 25th percentile to its 75th percentile is associated with a decline in buyer returns in fire sales of 32 bps. And as reported in row 6, we found that an increase in asset redeployability (using the Kim-Kung index) from its 25th to its 75th percentile leads to a decline in buyer returns in fire sales of 76 bps.

Overall, these findings provide strong evidence that buyer returns in fire sales are lower when the market for the seller's assets is more liquid and when the assets have more alternative uses.

The Effect of Changes in Chapter 11

In the third part of our study, our focus was the returns earned in fire sales by buyers who purchase assets out of bankruptcy. There are two reasons for looking at these transactions in particular. First, by studying bankruptcies, we can develop additional measures of the seller's bargaining power to further test our conjecture that differences in bargaining power are critical to explaining excess buyer returns. Second, there is an emerging consensus that the bargaining power between creditors and the debtor (or its management) in Chapter 11 has changed over time, from a more debtor-friendly arrangement in the 1980s to a more creditor-friendly one in the 1990s and 2000s.[19] We contributed to the discussion on the changing nature of Chapter 11, and to the literature on bankruptcy and the resolution of financial distress more generally by investigating whether differences in creditor control affect the pricing of M&A deals in bankruptcy.

Two advances are key to the changes in creditor control: Debtor-in-possession (DIP) financing and key employee retention plans (KERPs). Through DIP financing, companies in bankruptcy can obtain additional financing with superpriority over prebankruptcy debt claims. Several legal scholars[20] have argued that lenders have been able

17 See Schlingemann, F. P., R. M. Stulz, and R. A. Walkling, 2002, Divestitures and the liquidity of the market for corporate assets, *Journal of Financial Economics* 64:117-44.

18 See Kim, H., and H. Kung, 2017, The asset redeployability channel: How uncertainty affects corporate investment, *Review of Financial Studies* 30:245-80.

19 See, for example, Skeel, D. A., 2003, Creditors' ball: The new new corporate governance in Chapter 11, *University of Pennsylvania Law Review* 152:917-51; Ayotte, K., and E. R. Morrison, 2009, Creditor control and conflict in Chapter 11, *Journal of Legal Analysis* 1:511-51; Bharath, S. T., V. Panchapagesan, and I. M. Werner, 2010, The changing nature of Chapter 11, Working Paper, Arizona State University.

20 See Skeel, D. A., 2003, Creditors' ball: The new new corporate governance in Chapter 11, *University of Pennsylvania Law Review* 152:917-51; Baird, D. G., and R. K. Rasmussen, 2003, Reply: Chapter 11 at twilight, *Stanford Law Review* 56:673-99; Baird, D. G., and R. K. Rasmussen, 2010, Antibankruptcy, *Yale Law Journal* 119:648-99.

Table 3

Acquisition Success and Status of the Acquired Assets

Panels A and B document the post-acquisition success rate and disposition of the assets as obtained from Factiva and Google searches. Acquisitions are divided into three groups based on acquisition success: (a) success, (b) neutral, and (c) failure. Acquisitions are also divided into three groups based on disposition of the assets: (a) retained, (b) sold or partly sold, or (c) the acquired assets or firm are shut down or downsized.

A. Measuring acquisition success

	Fire sales	No fire sales
Success	163 (51.9%)	138 (53.5%)
Neutral	96 (30.6%)	74 (28.7%)
Failure	55 (17.5%)	46 (17.8%)
N	314 (100%)	258 (100%)

B. Rates of divestiture

	Fire sales	No fire sales
Retained	268 (85.4%)	200 (77.5%)
Shut down/downsized	20 (6.4%)	10 (3.9%)
Sold/partly sold	26 (8.3%)	48 (18.6%)
N	314 (100%)	258 (100%)

to use the terms of DIP loans to steer the reorganization process to their advantage, leading to more auctions of, and asset sales by, bankrupt companies. These types of transactions also have the potential to benefit debtholders at the expense of shareholders. Often, these sales are structured under Section 363 of the bankruptcy code, which allows bankrupt firms, upon approval of the bankruptcy court, to sell some or all of their assets on an accelerated basis, free and clear of all debts. Such transactions cannot be reversed upon appeal, thereby further reducing the uncertainty faced by the buyer.

KERP plans offer cash compensation and bonuses to existing management as an incentive to remain with the company through the restructuring. Importantly, such plans often reward executives for the speed with which the bankruptcy is resolved. These elements could lead to more asset sales that benefit the creditors of the firm (at the expense of the equity).

Note that DIP financing and KERPs have been available as part of bankruptcy reorganizations for a long time, but their adoption grew substantially during the 1990s, and the contractual features of KERPs are now also more aligned with the interests of creditors.

To assess whether these changes are related to buyer returns in fire sales by bankrupt firms, we constructed a creditor control variable that ranges from 0 to 2, depending on whether DIP financing and/or a KERP plan was in place. We then estimated a regression of buyer returns on the creditor control variable. To be consistent with prior work, we controlled for a large number of other features of the bankruptcy process in these regression models, such as the chapter of the bankruptcy code or whether a sale was conducted under section 363 of the bankruptcy code.

We found that, for our sample of 297 fire sales by bankrupt companies, each unit of creditor control increased buyer returns by 1.73 percentage points. Thus, even among fire sales, features that reduce seller bargaining power lead to additional buyer gains, providing further support for the mechanism behind our findings. These results also support the view that creditor control benefits buyers of assets in bankruptcy.

Operating Performance, Success, and Future Status of the Acquisitions

In the fourth part of our study, we looked at the post-merger operating performance of the buyers, at qualitative measures of the success or failure of the acquisition, and at the disposition of the acquired assets, i.e., whether they were retained or sold. We followed the assets for three years after the acquisition. Information on the success of the acquisition and what happens to the assets that were acquired are obtained from news searches on Factiva. We gathered this information for all fire sales as well as for a matching sample of regular transactions (matching on the following buyer characteristics: market value of equity, Tobin's q, market leverage, and profitability). We selected one matching firm for each fire sale transaction.

Operating performance was measured as the change in the buyer's industry-adjusted EBITDA/Assets from the year prior to the acquisitions up to three years after the acquisition closes. While M&A in general has been found to increase industry-adjusted ROA by 80 basis points or more,[21] we found no evidence that the return on assets in fire sales was any different from the operating returns in regular acquisitions. This suggests that the excess returns earned around the announcement of the acquisition by the buyers in fire sales are attributable not to expected performance improvements, but to their ability to secure lower prices.

21 See Harford, J., M. Humphery-Jenner, and R. Powell, 2012, The sources of value destruction in acquisitions by entrenched managers, *Journal of Financial Economics* 106:247-261.

Next, we studied whether the acquisitions are successful as reported in the media during the three-year period after the acquisition. Based on press reports and company financial releases in Factiva and on Google searches, we divided transactions into three groups: success, neutral, and failure. As reported in Panel A of Table 3, we found little difference between the media reporting of fire sales compared to regular acquisitions in terms of outcome. We also tracked what happens to the assets after the transactions; as can be seen in Panel B of Table 3, the majority of the assets in both kinds of transactions were retained and operated continuously, but the fraction of assets retained was even higher for fire sales (85%) than for regular acquisitions (78%), which implies that buyers were not earning abnormal returns based on the expectation that they would "flip" the assets at a profit.

We also examined the extent to which the announcement returns associated with the acquisition were related to the eventual success or failure of the transaction, and to whether the assets were divested. We found that the announcement returns of acquisitions that were deemed to be a failure after three years are 3.9 percentage points lower than otherwise. However, after controlling for the outcome, fire sales still yielded announcement returns that were 1.9 percentage points higher than those of regular acquisitions. We also found that acquisitions that were eventually shut down or downsized were associated with a stock price response of more than 5 percentage points below that of other transactions when those events were announced. These results indicate that the market is very good, both in fire sales and normal acquisitions, at predicting whether transactions will succeed or fail and whether they are ultimately divested, but this effect is independent of the fire sale effect.

Alternative Interpretations

The argument we developed thus far is that buyers earn excess returns in fire sales due to the weak bargaining position of the selling firm. We have also considered a number of alternative explanations for our results.

Better strategic fit between buyer and seller. It could be suggested that fire sales yield higher returns for buyers because these transactions promise greater synergies from, say, a better match between the buyers and the sellers. The analysis of the operating performance we just reviewed indicates that this is not the case because fire sales are not more successful than regular acquisitions, using both quantitative and qualitative measures of success. The results on combined buyer and seller returns, which we will discuss later, also do not support this argument. Moreover, when we added combined returns as an additional control in our regression of buyer returns, the fire-sale effect remained 1.93 percentage points. In short, our findings provided no evidence of differences in synergies across fire sales and regular transactions.

Compensation for risk-taking. Another possibility we explored was that the higher returns earned by buyers in fire sales were simply compensation for the higher risk associated with such transactions. However, if a specific asset is riskier, this should already be reflected in its fundamental value, while the abnormal buyer returns we document suggest that fire sales allow buyers to acquire assets *below* this fundamental value. In addition, when we added seller risk as an additional control in our regression models, it was never significant.

Revelation of news about the buyer. A third alternative is that a fire-sale acquisition reveals good news about the buyer, leading to an upward revision in its share price. However, the revelation of good news about the buyer would imply better subsequent operating performance, and we find no evidence for this. In addition, our findings persisted when we studied acquirers that made both fire sale and regular acquisitions over a two-year period. It would therefore be surprising if one acquisition were to reveal good news about the buyer, while the other would not. We also examine whether the effect of fire sales on buyer stock returns was larger for smaller firms, given that such firms have a larger information gap with the market, but we found no evidence that this is the case.

Better-informed buyers. Another argument is that buyers of assets in fire sales have better information about the value of these assets than anyone else and thus can benefit from this information when making the acquisition. However, if this were the case, we would expect buyers from outside the industry, who are likely to be less informed about the seller's assets, to earn lower returns. We find that buyers outside the industry earn roughly the same returns in fire sales as same-industry buyers.

In sum, none of the alternative explanations of the abnormal returns accruing to the shareholders of buyers in fire-sale transactions appear as plausible, or supported by our findings, as our analysis of the limited bargaining position of the seller's management in such distressed deals.

Seller and Combined Returns

Another benefit of our event study approach is that we can also investigate the wealth changes for the shareholders of the selling firms, and, as a consequence, the combined returns

Figure 3

Seller Abnormal Returns in Fire Sales and Regular Acquisitions

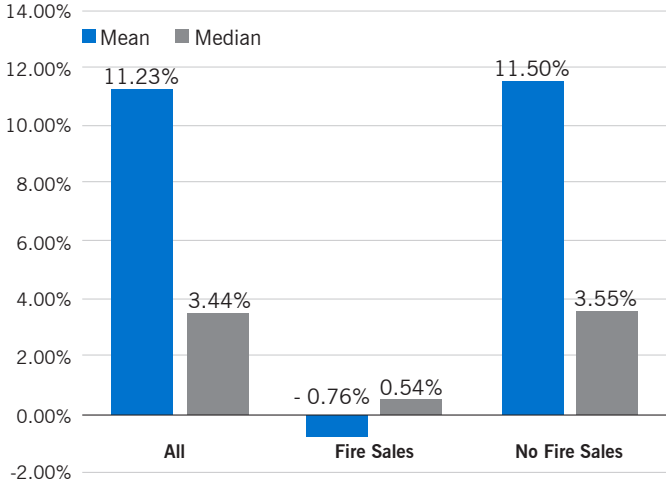
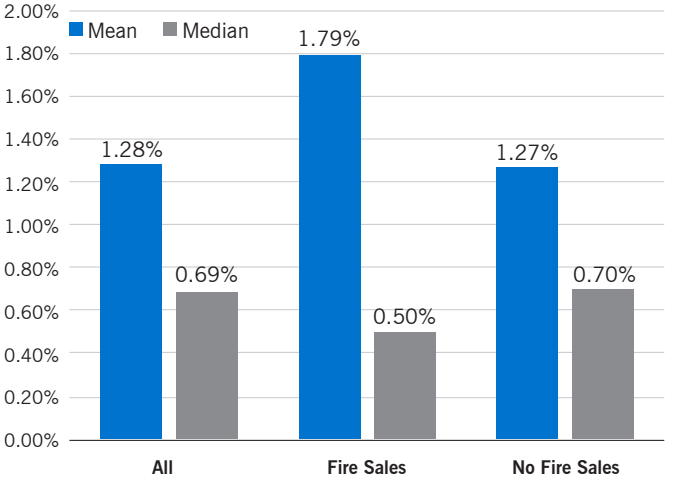


Figure 4

Combined Abnormal Returns in Fire Sales and Regular Acquisitions



of buyers and sellers. Two caveats associated with this analysis need to be highlighted, however. First, many sellers are not listed on the stock market, and some that were listed at one point in time may have been delisted by the time they filed for bankruptcy. For this reason, the fire sales in this (considerably smaller) sample are weighted more heavily toward firms that were restructuring outside of bankruptcy. We have selling-firm return and accounting data on 102 acquisitions, 64 of which are restructurings. Second, it is possible that the creditors of distressed and bankrupt firms earn abnormal returns around acquisitions, but because few of the selling firms have public debt outstanding, we were unable to compute such returns.

As reported in Figure 3, the selling firm gained 11.23%, on average, across all 4,571 acquisitions for which data were available, with a median of 3.44%. But tellingly, the difference between the sellers' returns in fire sales and regular transactions was enormous: the average returns for selling firms are very close to zero in fire sales, as compared to over 11% in regular acquisitions. Median seller abnormal returns are also substantially lower in fire sales compared to regular acquisitions.

The above findings also held when controlling for the year and industry in which the deal takes place and the characteristics of both the buyers and the sellers. In a regression model of seller returns with all control variables included, we found that seller returns in fire sales were 5.5 percentage points lower than in other deals. They also persist when we looked at sales of entire companies and sales of assets separately.

Figure 4 reports combined returns, computed as the weighted average of buyer and seller returns, based on the market value of their equity two days before the announcement.[22] We found no significant difference in combined returns between fire sales and other transactions. Although the mean is somewhat larger for fire sales than regular transactions, the median was somewhat smaller. Because combined returns are the same for fire sales and regular acquisitions, our results suggest that there is a transfer of wealth from selling firms to buying firms, which implies that there is no loss in welfare to the transacting parties combined.[23]

Spillover Effects

In the final part of our analysis of the effect of fire sales on overall welfare, we looked for spillover effects of fire sales on the seller's peers, the seller's suppliers and customers, and its

22 We also adjusted combined returns for the buyer's prior ownership stake in the seller. More specifically, combined returns were computed as

$$\frac{CAR_B(MV_B)+CAR_S(MV_S\text{-}OWN_B^S MV_S)}{MV_B+MV_S\text{-}OWN_B^S MV_S},$$

where CAR is the abnormal return of either the buyer (B) or the seller (S), MV is the market value, and OWN_B^S is the fraction of the seller owned by the buyer before the announcement of the bid.

23 One concern with this conclusion is that from the seller's perspective, the fire sale may be partially anticipated, so that the actual difference in returns between fire sales and regular acquisitions may be larger than displayed in Figure 3. This would imply that the combined returns in fire sales could be lower than in regular deals. To assess this possibility, we computed how important this anticipation needs to be for the combined returns in fire sales to be significantly lower than in regular deals and find that more than half of the negative effect of fire sales on seller returns needs to be anticipated. Given that we do not find any difference between fire sales and regular acquisitions in post-merger performance, we do not believe that such a strong anticipation effect is plausible.

employees. First, we analyzed the seller's peers. Some have argued that a fire sale puts downward pressure on the value of similar assets held by firms that are not in distress.[24] We obtained a list of peer firms (using the text-based network industry classifications from the hobergphillips.tuck.dartmouth.edu website)[25] and examined the stock price response of the seller's peer firms around the announcement of the acquisition. We found no difference between peer firm stock returns around fire sales as compared to regular acquisitions, after controlling for differences in time, industry, and the peers' characteristics.

Second, we analyzed the customers and suppliers of the sellers. If the company is sold piecemeal or if critical assets are sold, this can lead to disruption of the supply chain with adverse consequences for customers and suppliers.[26] Using a data set[27] that relies on corporate disclosures of their major customers and suppliers in their 10K filings, we examined the stock price response of the seller's suppliers and customers around the acquisition announcement, again controlling for time, industry, and firm characteristics. We found that the customers and suppliers of sellers in fire sales fared essentially the same as in regular transactions, for which prior research indicates that the average stock price response is not significantly different from zero.[28]

Finally, we studied the change in employment in the selling and buying firms combined from the year before until the year after the asset sale. Taking into account the buying firm's employment is important because the asset sale will likely result in the movement of employees from the seller to the buyer. To make sure that our measure of employment change is independent of the size of the buyer, we divided employment change by the number of employees in the selling firm. This measure is independent of the scale of the buyer. For example, suppose the acquisition of a company with 100 employees leads to 40 job losses. Our measure of employment loss would be 40%, regardless of the number of employees in the acquiring firm. As before, we measured the change in employment after controlling for differences in time period, industry, and the firm characteristics. We found a substantial decline in employment of 32 percentage points when comparing fire sales to regular acquisitions.

The results thus far indicate that the spillover effects are limited to employment losses. Of course, this conclusion is based on a comparison of fire sales and regular acquisitions. While this is the relevant comparison for our main analysis, which focuses on the returns earned by the buyers, when we study spillover effects, there is an alternative set of comparison firms: namely, companies that restructure or file for bankruptcy without accompanying asset sales. Earlier studies have shown that bankruptcy filings have negative stock return consequences for the firm's peers (which average -1%)[29] and its suppliers (which average -2%).[30] Our findings suggest that asset sales do not have spillover effects other than the filing effects reported in prior research. As far as employment is concerned, prior research reports that firms that underwent a bankruptcy reorganization saw an approximately 30% drop in employment in the two years after bankruptcy[31]—which is roughly equivalent to the result we found for fire sales relative to regular acquisitions.

Conclusion

In our recently published study, we provide compelling evidence of a unique buying opportunity: the acquisition of assets or entire companies that are in distress. As our research has shown, such acquisitions have been accompanied by abnormal returns that are two percentage points higher than for regular acquisitions. Despite many decades of work on the factors driving buyer returns in acquisitions, few characteristics stand out as delivering consistent shareholder value for buying firms, and average buyer returns around acquisition announcements are close to zero. The fire sale acquisitions we study fit into the category of deals delivering superior returns for shareholders.

In highlighting the benefits of fire sales, our general findings provide a sharp contrast to earlier work that focuses mainly on the costs of fire sales for sellers. Our more specific tests suggest that the main source of the buyers' gain is the reduction in the selling firm's bargaining position when distressed. Several results support our bargaining power argument: the excess returns earned by buyers are especially large when there is less "implicit" competition for the

24 See Benmelech, E., and N. K. Bergman, 2011, Bankruptcy and the collateral channel, *Journal of Finance* 66:337-78; Campbell, J. Y., S. Giglio, and P. Pathak, 2011, Forced sales and house prices, *American Economic Review* 101:2108-31.

25 See Hoberg, G. and G. Phillips, 2016, Text-based network industries and endogenous product differentiation, *Journal of Political Economy* 124:1423-1465.

26 See Goolsbee, A. D., and A. B. Krueger, 2015, A retrospective look at rescuing and restructuring General Motors and Chrysler, *Journal of Economic Perspectives* 29:3-24.

27 http://people.stern.nyu.edu/afrazzin/data_library.htm, based on Cohen, L., and A. Frazzini, 2008, Economic links and predictable returns, *Journal of Finance* 63:1977-2011.

28 See Fee, C.E., and S. Thomas, 2004, Sources of gains in horizontal mergers: evidence from customer, supplier, and rival firms, *Journal of Financial Economics* 74:423-460.

29 See Lang, L. H. P., and R. M. Stulz, 1992, Contagion and competitive intra-industry effects of bankruptcy announcements, *Journal of Financial Economics* 32:45-60.

30 See Hertzel, M. G., Z. Li, M. S. Officer, and K. J. Rodgers, 2008, Inter-firm linkages and the wealth effects of financial distress along the supply chain, *Journal of Financial Economics* 87:374-87.

31 See Bernstein, S., E. Colonnelli, and B. Iverson, 2019, Asset allocation in bankruptcy, *Journal of Finance* 74:5-53.

seller—that is, when the seller's industry is stressed, reducing the number of potential buyers for these assets. On the other hand, in cases where the selling firm's assets have more alternative uses, buyer returns decline. This bargaining power argument also applies to sellers that have already filed for bankruptcy.

We find no differences in the post-acquisition operating performance between fire sales and regular acquisitions, which supports our conjecture that buyer gains are higher because of their superior bargaining power, and not because of greater synergies with the seller. What's more, we find no evidence of larger negative spillover effects on the customers and suppliers of sellers in fire sales than in regular acquisitions. Nevertheless, employment does decline substantially relative to regular transactions; but when fire sales are compared not to normal acquisitions but rather to bankruptcy reorganizations (with no asset sales), the employment effects are about the same. Thus, from an overall welfare perspective, fire sales have considerably lower social costs than implied by earlier studies.

Our work thus has implications for government policy. Since our findings suggest that the returns earned by buyers in fire sales are best viewed as a redistribution from sellers (and thus as a means of preserving the going-concern value of their assets), the social function of bailouts in preventing such fire sales may be largely unnecessary and even counterproductive, particularly given the tendency of bailouts to perpetuate moral hazard, the distortions of commerce arising from political connections, and the political capture of bailed-out firms.

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