

Hedge Fund Activism and Corporate M&A Decisions[#]

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Abstract

This paper analyzes the effect of hedge fund activism on corporate mergers and acquisitions (M&A) and shareholder wealth. Using Schedule 13D filings by hedge funds and M&A announcements made by US companies from 1993 to 2015, we show that hedge fund activism leads to lower M&A activities, more favorable market reactions to M&A announcements, and better operating performance. Overall, our study provides robust evidence that hedge fund activism increases shareholder wealth by forcing firms to make fewer but better acquisitions (e.g., reducing acquisitions outside the core business area). We conduct various tests to explore other possible explanations of our results.

JEL classification: G23, G32, G34

Keywords: Hedge fund activism, M&A performance, Schedule 13D filings, Event study, Abnormal stock returns

1. Introduction

In this study, we analyze the effect of hedge fund activism on corporate mergers and acquisitions (M&A) and shareholder wealth. Although prior research explores various channels through which hedge funds influence corporate decisions, there is relatively little evidence regarding the role of hedge fund activism in corporate M&A decisions and its ramification for shareholder value.¹ This study provides such evidence by comparing the difference in stock market reactions to M&A announcements before and after hedge fund interventions and examining whether post-M&A changes in analysts' earnings forecasts and operating profitability differ between the pre- and post-hedge fund activism periods. We provide strong evidence that hedge fund activism improves operating performance and shareholder wealth by forcing firms to make fewer but better M&A.

Prior research shows that hedge funds play an important role in many corporate decisions. A strand of studies shows that hedge fund activism affects operating performance, corporate governance, and firm value (e.g., Kahan and Rock, 2007; Becht, Franks, Mayer, and Rossi, 2008; Brav, Jiang, Partnoy, and Thomas, 2008; Clifford, 2008; Klein and Zur, 2009; Gantchev, Gredil, and Jotikasthira, 2015).² Greenwood and Schor (2009) show that positive abnormal returns associated with hedge funds' announcements of activist intention can largely be attributed to the

¹ Bethel, Liebeskind, and Opler (1998) show that activist block purchases are followed by a decrease in the frequency of M&A. However, the authors do not examine the effect of activist block purchases on the efficiency or quality of M&A.

² Kahan and Rock (2007) analyze the governance role of hedge funds compared to that of other institutional investors. Becht et al. (2008) find that the activist investment of the UK pension fund Hermes results in superior performance. Brav et al. (2008) document abnormal stock returns around hedge fund activism announcements. They also find that hedge fund target firms exhibit increases in payout, operating performance, and CEO turnover. Clifford (2008) compares the value creation and improvement in operating performance between activist and passive hedge fund target firms. Klein and Zur (2009) analyze confrontational hedge fund activism campaigns and find positive abnormal stock returns around the campaign. Gantchev et al. (2015) find evidence of spillover effects of activism that the peer firms with fundamentals that are similar to hedge fund activism targets reduce agency costs and improve operating performance.

ability of activists to force firms into a takeover target. The authors also show that firms targeted by activists are more likely to be acquired than otherwise similar firms. Boyson, Gantchev, and Shivdasani (2016) show that hedge fund activism increases firms' probability of receiving a takeover bid, target announcement returns, acquisition premia, and completion rates. Brav, Jiang, and Kim (2015b) and Brav, Jiang, Ma, and Tian (2016) show that hedge fund activism improves firm productivity and innovation efficiency. Jiang, Li, and Mei (2016) analyze activist risk arbitrage in which activist shareholders block an announced M&A deal through public campaigns to obtain better terms. The authors show that activist risk arbitragers both promote investor interests and make good returns for themselves.

In contrast to prior research (e.g., Greenwood and Schor, 2009; Boyson, Gantchev, and Shivdasani, 2016) that focuses on hedge funds' ability to force firms into a takeover target, our study focuses on hedge funds' ability to improve firms' M&A decisions through activist interventions and how this could affect the welfare of acquiring firms' shareholders. Acquisition decisions are amongst the most important corporate decisions that require large investments. There could be a significant conflict of interest between managers and shareholders in these major corporate decisions. Our study sheds light on whether and how hedge funds could mitigate the conflict of interest through activist interventions in corporate M&A decisions.

Anecdotal evidence shows that certain M&A decisions trigger hedge fund activism. On July 16, 2012, in a proxy statement filed to campaign against Sigma Designs Inc., Potomac Capital Management, a New York based hedge fund, casted doubt on Sigma Designs' aggressive acquisition strategies spending more than \$251 million on acquisitions over past five years with limited improvement in operating revenue. Potomac Capital Management urged Sigma Designs to

refrain from further acquisitions.³ On August 12, 2012, they reached an agreement to elect directors recommended by Potomac Capital Management at the 2012 Annual Meeting. To the extent that the level of Sigma Designs' acquisition activities was indeed excessive due to its poor governance structure (e.g., poor board monitoring), the hedge fund's activism may change the firm's future acquisition activities. As the existing evidence speaks favorably on the impact of hedge fund activism on shareholder wealth, it may also benefit Sigma Designs' shareholders. We provide answers to these questions using a large sample of hedge fund activism and corporate M&A decisions.

This study uses Schedule 13D filings by hedge funds from 1998 to 2012 and M&A announcements made by US companies between 1993 and 2015 to examine how hedge fund activism affects the intensity and quality of corporate M&A. We use the difference-in-differences design and the propensity score matching method to isolate the effect of hedge fund activism from the effects of selection bias and other confounding factors. We show that hedge fund interventions result in a significant reduction in the number of M&A, the total transaction value of M&A, the average deal size, and the acquisition ratio after accounting for market-wide changes in these variables. These results are in line with the finding of prior research (Bebchuk, Brav, and Jiang, 2015; Brav et al., 2016) that firms targeted by activists typically reduce capital and R&D expenditures for immediate returns to shareholders such as dividends and stock buyback.⁴

To assess the effect of hedge fund activism on shareholder wealth and firm performance through its influence on firms' M&A decisions, we calculate cumulative abnormal returns around

³ See https://www.sec.gov/Archives/edgar/data/790715/000092189512000905/dfan14a08679003_04302012.htm.

⁴ In a letter sent to S&P 500 CEOs on March 31 2015, Laurence Fink, chairman and CEO of BlackRock Inc., emphasizes the importance of creating long-term value. He noted that companies tend to respond to activism by delivering an immediate return such as cash dividends or stock repurchases rather than investing in "innovation, skilled workforces or essential capital expenditures necessary to sustain long-term growth." See <http://www.businessinsider.com/larry-fink-letter-to-ceos-2015-4>.

M&A announcements as well as changes in analysts' earnings forecasts and industry-adjusted return on assets during the post M&A announcement period for both the treatment group (i.e., firms with hedge fund activism) and the control sample of propensity score matched firms (i.e., firms with no hedge fund activism). We find strong evidence that hedge fund activism results in significant improvements in the above M&A performance measures after controlling for market-wide changes in M&A performance.

To explore possible ways through which hedge fund activism improves M&A performance, we look at whether shareholder activism provided by hedge funds reduces the likelihood of a poor acquisition/merger deal. We consider a deal poor if its cumulative announcement abnormal return belongs to the bottom quintile of the distribution. We find that the reduction in the likelihood of making a poor M&A deal between the pre- and post-hedge fund activism periods is significantly greater for the treatment group than the corresponding value for the control group, indicating that hedge fund activism improves M&A performance after controlling for market-wide changes in M&A performance.

Prior research shows that diversification M&A in general destroy firm value (Morck, Shleifer, and Vishny, 1990; Matsusaka, 1993; Shleifer and Vishny, 1989; Schoar, 2002). Fan and Goyal (2006) find that vertical mergers are associated with positive wealth effects that are significantly larger than those for diversification mergers. Recently, a survey study by McCahery, Sautner, and Starks (2016) shows that disagreement with corporate strategies such as diversification M&A is one of the most important factors that trigger activist intervention. Brav et al. (2008) also show that hedge fund activists push firms to focus on the core business and oppose acquisitions outside the scope of a firm's core competency. Built upon these results, we examine whether hedge fund activism reduces diversification M&A. Following prior research, we assume

that a takeover is a diversification acquisition if the acquiring and acquired firms have different three-digit SIC codes. We find strong evidence that hedge fund activism results in a significant reduction in the frequency and aggregate dollar value of diversification M&A after accounting for market-wide changes in these measures.

Prior studies (e.g., Berger and Ofek, 1995) show that a firm with diversified business segments is worth less than the sum of the stand-alone value of each business segment (i.e., the diversification discount). Graham, Lemmon, and Wolf (2002) argue that the diversification discount could be mostly attributed to the fact that diversifying firms tend to acquire inefficient assets or companies. Based on these findings, we test whether the effect of hedge fund activism on M&A activities is stronger for firms with multiple business segments than for firms with a single business segment. Consistent with our expectation, we find that hedge fund activism plays a significant role in reducing diversification M&A by firms with multiple business segments only.

Although our empirical findings are consistent with the idea that hedge fund activism improves corporate M&A decisions, we cannot rule out the possibility that the results are driven by some other reasons. For instance, hedge funds may select firms that already have plans to improve their business strategies or governance structures voluntarily *without* the influence or pressure from hedge fund activism. To explore this possibility, we conduct our analysis using a sample of hedge fund interventions where hedge funds and their target firms have confrontational engagements. We consider this analysis to be a cleaner test of the effect of hedge fund activism because improvements in M&A performance in these cases are less likely due to firms' voluntary decisions. The majority of firms in our sample with confrontational hedge fund interventions ultimately accommodate or adopt certain changes in governance structure or business strategies.

Similar to the results from the full sample, we find a decrease in diversification M&A and an increase in abnormal stock returns for firms with confrontational hedge fund interventions.

Hedge funds are considered to be sophisticated investors with superior ability to pick stocks (Griffin and Xu, 2009). One may argue that the improved M&A efficiency could be due to hedge funds' abilities to select firms that will improve M&A performance. In such a case, it is difficult to determine whether the improved M&A performance is due to hedge funds' stock picking skills or their activism. To separate the activism effect from the stock picking skill, we focus our analysis on those hedge funds that switch from passive to active investors. A hedge fund-firm pairing is included in the switch group if the hedge fund filed at least one Schedule 13G or 13G/A on the firm within one year preceding the initial Schedule 13D filing. We show that the switch group exhibits lower M&A activities than the control sample. We also find that abnormal stock returns and changes in earnings forecasts are greater for the switch group relative to the control group although not statistically significant.

Our study contributes to the literature in two important dimensions. Opponents of hedge fund activism argue that hedge fund target firms may pass up profitable investment opportunities due to the reduction in internal funds that results from higher dividend payouts and/or larger stock repurchases. Scholars view this action of "sacrificing the future for a quick buck" as investment-limiting interventions (see Bebchuk et al. (2015) for a detailed discussion).⁵ Our study adds to this debate by providing empirical evidence that hedge fund target firms do not appear to sacrifice good M&A investment opportunities at the expense of long-term shareholders. Despite the tightening in acquisition spending, the quality of M&A improves after hedge fund interventions. This result is consistent with the finding of Brav et al. (2016) that innovation efficiency increases

⁵ See <http://www.businessinsider.com/larry-fink-letter-to-ceos-2015-4>.

after hedge fund interventions in spite of a reduction in R&D expenses. On the whole, our results suggest that making fewer but better M&A is a potential mechanism through which firm value increases following hedge fund interventions (Brav et al., 2008; Clifford, 2008).

Our study also adds to the stream of literature that investigates the role of institutional investors in M&A. Gaspar, Massa, and Matos (2005) show that institutional investors with a high portfolio turnover rate exert little influence on corporate acquisition decisions. Chen, Harford, and Li (2007) show that only independent institutions with concentrated long-term investments are associated with superior post-merger performance. Roosenboom, Schlingemann, and Vasconcelos (2014) show that stock liquidity reduces institutional incentives to monitor corporate takeover decisions, except when the disciplining effect of the threat of exit is high. Our study extends the literature by investigating the effect of shareholder activism provided by hedge funds on the extent and quality of corporate M&A.⁶

The paper proceeds as follows. Section 2 describes data sources and variable measurement methods and presents descriptive statistics. Section 3 presents and interprets our main empirical findings. Section 4 explores other possible explanations of our empirical results. Section 5 provides the results of robustness tests. Section 6 provides a summary and concluding remarks.

2. Data sources, variable measurement methods, and descriptive statistics

2.1. Data sources and sample construction

⁶ Following Bushee (1998, 2001), Chen et al. (2007) and Roosenboom et al. (2014) classify institutional investors based on portfolio turnover and diversification and show that transient investors (e.g., investors with a diversified holding and/or a high turnover rate) provide poorer monitoring than non-transient investors. Hedge funds may not easily fit into this classification. First, unlike other institutions that are required to maintain a diversified portfolio, hedge funds can hold a large and concentrated position in individual companies (Brav et al., 2008). Moreover, hedge funds have been regarded as short-term investors (Kahan and Rock, 2007).

We obtain the SEC Filings Index from the WRDS SEC Analytics Suite which includes the index information of the SEC filings.⁷ We then collect all initial Schedule 13D filings from the SEC's EDGAR database for the 15-year period from January 1998 to December 2012. Schedule 13Ds are filed by shareholders with SEC within 10 days of an entity acquiring 5% or greater shares in any class of securities of a publicly traded companies if they have intentions of influencing the firm or its management. The total number of Schedule 13D filings during our study period is around 26,000.

In addition to institutional money managers and hedge funds, corporations file Schedule 13Ds when two firms merge or form a business alliance. As noted by Mikkelson and Ruback (1985), corporate takeovers are usually preceded by accumulation of small ownership in the target firm. As our study aims to explore how hedge fund activists influence corporate M&A decisions, we focus on hedge funds' portfolio investment and discard the filings of cross-holdings for the purpose of a takeover. Following Greenwood and Schor (2009), we cross-reference Schedule 13D filings with a list of investment managers on the Thomas Reuter database of Schedule 13F filings and consider only those activists who have filed a Schedule 13F at any point in their history.⁸ This filtering step enables us to classify activists into "investment activists" and "takeover activists," but restricts the sample to those institutions managing more than \$100 million in U.S. stocks, reducing the sample size (i.e., the number of initial Schedule 13D filings) to around 6,900.

⁷ For example, the SEC Filing Index includes, but not limited to, the company name, GVKEY, company SEC CIK, type of form, filing date, the reporting registrant company name, the reporting registrant CIK, Reference Name of Complete Report Filing, etc. The Reference Name of Complete Report Filing, a URL, indicates the file name and the address on EDGAR for user to download the complete report.

⁸ Specifically, we match the name of reporting person (REGCONAME) on the Schedule 13D filing with the name of manager (MGRNAME) on the Thomas Reuter 13F filings. Of the original 1,257 distinct reporting persons on Schedule 13D filings, we are able to match 898 with the exactly same name appearing on 13F filings and 74 with a name that is slightly different from that on 13F filings (for example, Karpus Management Inc on Schedule 13D vs. Karpus Investment Management on Schedule 13F). We use information on corporate websites and web news to confirm these cases.

We then manually confirm the identity of activists as hedge funds using the information provided on corporate websites and news articles that discuss them.⁹ We filter out commercial banks, investment banks, brokerage firms, pension funds, mutual funds, insurance companies, REITs, and non-hedge-fund-individuals.¹⁰ In most cases, we are able to identify hedge fund activists and non-hedge fund activists based on web search. Some of the activists classified as non-hedge funds may have a hedge fund but the hedge fund is not its main product for investors. We classify them as non-hedge fund activists.¹¹ Following Brav et al. (2008) and Greenwood and Shor (2009), we also make an exception to Franklin Mutual Advisers, an investment company that offers mutual funds but behaves like a hedge fund activist. This step further reduces the 13D filings down to 2,568. A further restriction based on available accounting information on COMPUSTAT to conduct the propensity matching process described in Section 2.3 reduces the sample to 1,397 hedge fund-target pairs, 1,305 target firm-year observations, and distinct 1,103 target firms.

Because this study focuses on corporate M&A decisions around activist interventions, we identify firms with prior M&A activities. To do this, we retrieve all mergers and acquisitions between US firms from Thomson Reuter's Securities Data Company (SDC) database with (i) announcement dates between 1993 and 2015, (ii) disclosed transaction values greater than \$10 million, (iii) deals coded as merge (M), an acquisition of majority interest (AM), an acquisition of certain interest (AC), or an acquisition of assets (AA), and (iv) economically significant deals,

⁹ Due to self-reporting by hedge funds, hedge fund databases such as TASS and CISDM provide a limited sample of the hedge fund universe. Footnote 5 in Brav et al. (2008) indicates that they are able to match less than half of their sample to TASS/CISDM (in an early version, they indicate the matching rate around 20%-25%). In footnote 21, Clifford (2008) also reports a low matching rate (30%) to TASS/CISDM.

¹⁰ Hedge fund individuals include those who are active in hedge fund management and founders of a hedge fund. We search websites to obtain the background of individuals. Hedge fund individuals in our sample include Stephen Feinberg, George Soros, and Leon Cooperman.

¹¹ For example, Lazard Asset Management LLC, a New York based company with around \$148 billion asset under management, is an investment company that offers mutual funds to high net worth individuals and institutional investors in addition to investment advisory and research services. They also launched a hedge fund. See <http://www.lazardnet.com/us/alternative-investments/>.

which are defined as those deals with the relative deal size (i.e., the ratio of the transaction value to the acquiring firm's market value) larger than 1% (Moeller et al., 2005). We include in the study sample only those hedge fund target firms that undertook at least one qualified M&A during a five-year window prior to the intervention.

2.2. Example of hedge fund activism

On March 18, 2008, HealthCor Management filed a Schedule 13D with the SEC indicating that it owns 6.83% of Magellan Health Services. HealthCor Management has been a passive blockholder since its initial Schedule 13G filing on August 6, 2007. The Schedule 13D filing included a letter sent to Rene Lerer, the President and CEO, and the Board of Directors, that praised Magellan's growth and large cash flows but noted as problematic its previously-announced plan to make diversification acquisitions using its large cash balance. Magellan has previously highlighted acquisitions as a means for diversification and growth, and acquired National Imaging Associates and ICORE in 2006. HealthCor Management noted that:

"... the underperformance of ICORE since its acquisition makes cautious about future acquisitions that are consummated for the sake of diversification; we see no reason to waste more capital for the sake of grandeur 'empire building' acquisitions outside of a company's core competency are not being viewed favorable by investors..."

Prior to the public pressure from HealthCor Management, Magellan has undertaken two major acquisitions with more than \$400 million in value and with an average acquisition size approximately 18% of Magellan's total assets during 2006. Many believed that Magellan expanded beyond its core behavioral health care business because of these acquisitions. Although Magellan

had previously highlighted acquisitions as a means for growth, it has been involved in only one significant acquisition with \$110 million in value during the period under HealthCor Management's active monitor. HealthCor Management increased its stakes in Magellan in 2008 and took a smooth exit in 2012 after it switched to a passive blockholder in May 2009.

2.3. Sample characteristics

Table 1 provides a yearly breakdown of our study sample of 1,305 firms that had hedge fund activism during 1998-2012. For convenience, we use the acronym FHFA to denote "firm (or firms) with hedge fund activism." Of the 1,305 FHFA, 1,223 had one hedge fund activist, 72 had two hedge fund activists, and 10 had three hedge fund activists. As a result, the total number of hedge fund activists during the study period is 1,397 ($= 1,223 + 2 \times 72 + 3 \times 10$). Similar to the result reported in Boyson, Gantchev, and Shivdasani (2016), we find a higher level of hedge fund activism during the 2005-2008 period. Of the 1,305 firms that had at least one hedge fund activist during the sample period, 403 firms had at least one M&A deal during the five-year period prior to hedge fund activism and 783 firms did not have any M&A deal during the five-year period prior to hedge fund activism.¹²

Panel B shows the number of hedge fund activism events across the Fama-French 12 industries. The results show a high level of hedge fund activism in high tech, finance, wholesale and retail, and healthcare, medical equipment, and drug industries, and a low level of hedge fund activism in utilities, chemical and allied products, consumer durables and nondurables, and energy industries. Similar to prior research, our study sample includes such active hedge funds as Blum

¹² Of these 403 firms, 379 firms had one hedge fund activist, 22 firms had two hedge fund activists, and two firms had three hedge fund activists. Hence, the total number of hedge fund activists for these firms is 429.

Capital Partners, Icahn Carl, Steel Partners, Jana Partners, Third Point, Steel Partners, Ramius Capital, and Elliott Associates.

2.4. Measures of M&A intensity

We measure M&A intensity by the total number of M&A deals, the total transaction value of M&A deals, the average deal size, and the average relative deal size using the data from COMPUSTAT and SDC with the same data filter described in the previous section. We also calculate the acquisition ratio (acquisition expenses scaled by total assets) to capture the actual expenses on acquisition spent over the year. These five variables collectively capture the intensity of M&A activities.

2.5. Descriptive statistics

We conduct our analysis using the treatment sample and the control sample of propensity score matched firms. The initial set of potential control firms includes all firms in COMPUSTAT with at least one M&A deal during the five-year period prior to the event date. In the logistic model, we include variables that are shown in prior studies to determine activists' decision to establish new positions. These variables include the market value of equity (MVE), Tobin's Q ratio, financial leverage, sales growth rate, dividend yield, return on assets (ROA) measured at $t-1$, and change in ROA between years $t-3$ and $t-1$ to capture the pre-event trend in operating performance (Bethel, Liebeskind, and Opler, 1998; Brav et al., 2008; Brav et al., 2016). We provide the definitions of these variables in the Appendix (Table A2). In addition to these variables, we also include the acquisition ratio in the logistic model to control for prior acquisition expenses. All accounting variables are winsorized at the 1st and 99th percentiles.

In each year, we match each of the 403 FHFA that had at least one qualified M&A during the five-year period preceding the activism intervention (the treatment group) with a firm that has the closest propensity score in the same two-digit Standard Industrial Classification (SIC) industry. We provide the results of the logistic regression in the Appendix (Table A1). The results show that hedge fund activism is stronger for smaller firms, value firms, firms with low growth, higher leverage, and low dividend payout. These results are consistent with the findings of prior studies (see, e.g., Bethel et al., 1998; Brav et al., 2008).

Table 2 reports the summary statistics in the event year for the 403 matching pairs of the treatment and control firms. The last three columns show the difference, the t-statistic, and the probability of the equality of the mean value between the treatment and control samples. The results show that the treatment sample and the control sample are similar across most firm characteristics, except for Tobin's Q. In spite of the fact that M&A intensity is not one of the matching variables, the treatment and control samples are similar in M&A intensity in the year of and prior to hedge fund activism. For example, the treatment (control) firms spent an equivalent of 3.6% (3.9%) of their total assets in M&A during the event year. On average, the treatment (control) firms had 0.29 (0.28) M&A with the total deal value of \$791 (\$760) million in the intervention year, and had 0.59 (0.56) M&A with the total deal value of \$1,086 (\$1,148) million during the three-year period prior to hedge fund activism.¹³

3. Empirical analyses

3.1. M&A intensity subsequent to hedge fund interventions

¹³ Brav, Jiang, and Kim (2015a) find that 25.5% of the firms targeted by hedge fund activism drop out of COMPUSTAT within two years, which is higher than the mean attrition rate of firms in COMPUSTAT. We find a similar attrition rate for the treatment sample (60%) and the control sample (66%) surviving through three years post event year.

We begin our empirical analyses by examining the relation between hedge fund activism and the intensity of M&A. As in Table 2, we conduct our analyses using the treatment sample of 403 FHFA and the control sample of 403 propensity score matched firms. The panel data include the observations from three years prior to an activism event to three years after an activism event. To account for the effects of extraneous factors and selection bias, we adopt a difference-in-differences regression framework throughout the study. Specifically, we use the following regression model in this section:

$$M\&A_{i,t} = \beta_1 (DHFA_i \times POST_{i,t}) + \beta_2 POST_{i,t} + \delta Control_{i,t} + \alpha_t + \alpha_i + \epsilon_{i,t}; \quad (1)$$

where the dependent variable $M\&A_{i,t}$ is one of the five M&A intensity measures described in Section 2.4, $DHFA_i$ is a dummy variable that is equal to one for FHFA and zero for their matched control firms, $POST_{i,t}$ is a dummy variable that is equal to one if firm-year (i,t) observation is within $[t+1, t+3]$ years of the activism event and zero otherwise, and $Control_{i,t}$ is the set of control variables. We also include year and firm fixed effects (α_t and α_i) in the model. Following prior research, we use market capitalization and firm age as controls (see Brav et al., 2016; Bebchuk et al., 2015). Note that β_1 , the coefficient on the interaction term $DHFA_i \times POST_{i,t}$, indicates whether there is a difference in the level of M&A intensity between FHFA and the control sample during the post activism period.

The results (see Table 3) show that β_1 estimates are negative and significant, regardless of which measures of M&A intensity are used in the regression, indicating that hedge fund activism results in a significant reduction in the total number of M&A deals, the total transaction value of M&A deals, the average deal size, and the average relative deal size, and the acquisition ratio (acquisition expenses scaled by total assets) after accounting for market-wide changes in these

variables. On the whole, the results indicate that hedge fund activism tends to make firms to spend less on acquisitions and undertake fewer and smaller M&A.

3.2. M&A performance subsequent to hedge fund activism

We adopt two measures of M&A performance widely employed in the literature (Chen et al., 2007; Masulis, Wang, and Xie, 2007). The first measure is the cumulative abnormal returns (CAR) around the M&A announcement date. We estimate the market model for each deal over a 200-day period ending 11 days before the announcement date using the CRSP equally weighted market return. We then use the estimated parameters to calculate the cumulative abnormal returns (i.e., CAR5) over the five-day (-2, +2) event windows centered on the announcement date.

The second measure is the change in analysts' earnings forecasts between the pre- and post-M&A periods. This measure captures the change in the analysts' expectation of the acquiring firm's earnings per share (EPS) that results from M&A. We measure the change in EPS (i.e., $\Delta EPS3$) by the difference between the first median analyst forecast in the three-month period after the M&A completion date and the last median analyst forecast in the three-month period prior to the M&A announcement date. We obtain analyst forecasts from the Institutional Brokers' Estimate System (I/B/E/S) database. We calculate both performance measures for each M&A deal. The sample includes M&A transactions made by firms in the treatment and control groups within three years before and after the hedge fund intervention year during the 1995-2015 period.

We employ the following regression model to more accurately measure the effect of hedge fund activism on M&A performance after controlling for the heterogeneity of deal characteristics:

$$Performance_{i,t} = \beta_1 (DHFA_i \times POST_{i,t}) + \beta_2 POST_{i,t} + \beta_3 DHFA_i + \delta Control_{i,t} + \alpha_t + \alpha_{IND} + \epsilon_{i,t}; \quad (2)$$

where the dependent variable $Performance_{i,t}$ includes the two measures of M&A performance that we described above (CAR5 and $\Delta EPS3$) and two additional operating performance measures constructed at the firm level: $IROA$ and $\Delta IROA$. $IROA$ is the industry-adjusted return on assets and $\Delta IROA$ is the change in $IROA$ during the period $[t, t+3]$, where t refers to the deal announcement year. $DHFA_i$ and $POST_{i,t}$ are the same as defined in regression model (1). $Control_{i,t}$ represents a vector of control variables that are previously found to determine the performance of M&A (e.g., relative deal size, method of payment, and status of the target firm). We also include year and industry fixed effects (α_t and α_{IND}) in the regression model. The coefficient β_1 indicates whether the change in the M&A performance between the pre- and post-activism periods is different between FHFA and the control sample.

The regression results (see Table 4) show that β_1 estimates are positive and significant for all four measures of M&A performance, suggesting that hedge fund activism improves M&A performance after controlling for any market-wide change in M&A performance. Taken together with the results in Table 3, our results show that hedge fund activism leads to lower M&A activities and favorable market and analyst reactions to M&A activities. These results suggest a possible channel through which hedge fund activism affects shareholder wealth: hedge fund activism increases shareholder wealth by forcing firms to make *fewer but better* M&A decisions. We explore this issue in the next section.

3.3. Hedge fund activism and the quality of M&A decisions

3.3.1. Testing whether hedge fund activism reduces poor acquisitions

Prior research shows that active institutional monitoring improves M&A performance (Chen et al., 2007; Roosenboom et al., 2014).¹⁴ In a similar vein, we conjecture that shareholder activism provided by hedge funds reduces the likelihood of a poor acquisition. To test this conjecture, we modify regression model (2) by replacing the dependent variable with a binary variable indicating poor M&A deals. We identify poor deals using the following steps: (i) we calculate three-day CAR (CAR3) for each qualified M&A deal described in Section 2.1; (ii) we consider a M&A deal to be poor if it belongs to the bottom quintile of CAR3 in a given year; (iii) we create the binary variable *Poor* which is equal to one if the firm has at least one poor M&A in a particular year and zero otherwise.¹⁵

Table 5 presents the regression results with the dependent variable *Poor*. We report the results of the OLS regression in column (1) and the results of the logistic regression in columns (2) and (3) with different fixed effects.¹⁶ We first note that, in columns (2) and (3), the positive coefficients on $DHFA_i$ indicate that FHFA are more likely to have poor M&A than the control sample during the pre-activism period. The negative coefficients on the interaction term $DHFA_i \times POST_{i,t}$ indicate that the change (i.e., reduction) in the likelihood of making a poor M&A deal between the pre-and post-activism periods is significantly greater for FHFA than the corresponding value for the control group. Hence, hedge fund activism improves M&A performance after controlling for any market-wide change in M&A performance.

¹⁴ Roosenboom et al. (2014) suggest that increased intervention by institutions is likely to increase pressure on managers to withdraw deals with negative announcement returns. However, withdrawal of deals with poor announcement returns has been viewed as evidence that managers learn from and react to the market, even without activism intervention (Luo, 2005).

¹⁵ We obtained similar results when the *Poor* deal is identified as the bottom "value destruction" calculated as the product of CAR3 and the market capitalization measured at the prior fiscal-year end.

¹⁶ The smaller number of observations in columns (2) and (3) is due to the perfect failure prediction in certain year or industry. Dummy variable $DHFA_i$ is included whenever the fixed firm effect is not included in the model.

3.3.2. Testing whether hedge fund activism reduces diversification M&A

McCahery et al. (2016) show that disagreement with corporate strategies such as diversification M&A is among the most important factors that trigger activist intervention. Brav et al. (2008) also show that hedge fund activists push firms to focus on the core business and oppose acquisitions outside the scope of their core competency. In a similar vein, we conjecture that hedge fund activism reduces diversification M&A. To test this conjecture, we estimate regression model (1) with two new dependent variables separately: the intensity of diversification M&A and the intensity of non-diversification M&A. Following prior research, we assume that a takeover is a diversification acquisition if the acquiring and acquired firms have different three-digit SIC codes.¹⁷ For each firm, we calculate the number and total transaction value of diversification M&A and non-diversification M&A in each year and use them as measures of the intensity of each type of M&A.

The first two columns in Table 6 show the results for diversification M&A and the next two columns show the results for non-diversification M&A. Columns (1) and (3) show the results when the dependent variable is the natural logarithm of one plus the total number of M&A in each year. Columns (2) and (4) show the results when the dependent variable is the natural logarithm of one plus the total transaction value of M&A in each year. The results show that the coefficients on the interaction term $DHFA_i \times POST_{i,t}$ are negative and significant for diversification M&A, regardless of whether we use the number or aggregate dollar value of M&A. In contrast, the corresponding coefficients for non-diversification M&A are not significantly different from zero. These results indicate that hedge fund activism results in a significant reduction only in the frequency and aggregate dollar value of diversification M&A.

¹⁷ The results are robust to the use of a looser (two-digit SIC) or stricter (four-digit SIC) classification. The results are available upon request.

3.3.3. Testing whether the effect of hedge fund activism on M&A activities is stronger for firms with multiple business segments

Prior research (e.g., Berger and Ofek, 1995) shows that a firm with diversified business segments is worth less than the sum of the stand-alone value of each business segment (i.e., the diversification discount). Graham et al. (2002) argue that the diversification discount is largely attributable to the fact that diversifying firms tend to acquire inefficient assets or firms. Based on these findings, we conjecture that the effect of hedge fund activism on M&A activities is stronger for firms with multiple business segments than for firms with a single business segment. To test this conjecture, we employ the following regression model:

$$\begin{aligned} M\&A_{i,t} = & MULTIPLE_i \times [\beta_1 (DHFA_i \times POST_{i,t}) + \beta_2 POST_{i,t}] \\ & + SINGLE_i \times [\beta_3 (DHFA_i \times POST_{i,t}) + \beta_4 POST_{i,t}] \\ & + \delta Control_{i,t} + \alpha_t + \alpha_i + \epsilon_{i,t}; \end{aligned} \quad (3)$$

where $MULTIPLE_i$ ($SINGLE_i$) is equal to one for firms with multiple segments (single segment) and zero otherwise, and all other variables are the same as defined in regression model (1). We obtain the business segment information from the COMPUSTAT Industrial Segment (CIS) database. Following Berger and Ofek (1995), we exclude financial service firms and firms with financial service segments (SIC code between 6000 and 6999).¹⁸ A firm is considered to have multiple segments if it reports more than one business or operating segments with different SIC codes measured one year prior to the activism event year.¹⁹

¹⁸ Our results are robust to the inclusion of financial service firms and firms with financial service segments.

¹⁹ Tong (2011) also uses the number of segments to identify firm diversification.

Panel A of Table 7 shows the number of firms with a single business segment and the number of firms with multiple business segments for FHFA and the control sample, respectively. The results show that 42% of both FHFA and the control sample have multiple business segments.²⁰ Among the 158 firms with multiple business segments, 77 (91) of FHFA (the control sample) have two business segments and 48 (38) of FHFA (the control sample) have three business segments. The mean number of business segments for FHFA and the control sample is 2.89 and 2.74, respectively.

Panel B shows the regression results using four different measures of M&A activities (i.e., the total number of M&A deals, the total transaction value of M&A deals, the average deal size, and the acquisition ratio). For ease of comparison, the estimates of β_1 and β_2 for firms with multiple business segments are reported in odd-numbered columns and the corresponding estimates (β_3 and β_4) for firms with a single business segment are reported in even-numbered columns. The F -test statistics for the equality of the coefficients on the interaction term ($\beta_1 = \beta_3$) are reported in the bottom of table. The results show that the coefficients (β_1) on the interaction term ($DHFA_i \times POST_{i,t}$) are negative and significant only for firms with multiple segments. The F -test results indicate that the difference between β_1 and β_3 is statistically significant. These results are consistent with our expectation that hedge fund activism plays an important role in reducing poor M&A only for firms with multiple business segments.

We showed earlier (in Section 3.3.2) that hedge fund activism reduces only diversification M&A. To test the effect of hedge fund activism on diversification M&A and the effect of the number of business segments simultaneously, we estimate regression model (3) using the intensity of diversification M&A and the intensity of non-diversification M&A separately as the dependent

²⁰ Bethel et al. (1998) show that activists favor focused firms. We show that the treatment and control samples are similar in firm diversification at the outset.

variable. Panel C reports the results when we measure the intensity of M&A by the total number of M&A deals and the total transaction value of M&A deals. The first four columns show the results when we use the intensity of diversification M&A as the dependent variable and the next four columns show the results when we use the intensity of non-diversification M&A as the dependent variable. The results show that the coefficients on the interaction term are negative and significant only for firms with multiple business segments and diversification M&A, indicating that hedge fund activism plays a significant role in reducing diversification M&A by firms with multiple business segments.

Collectively, the above results suggest that as hedge fund activists see their target firms lack of business focus or exhibit excessive diversification, they tend to make target firms to refocus on the core business and less diversified through spin-off or divestiture of inefficient assets (Bethel et al., 1998; Brav et al., 2015b). Consequently, firms that lack business focus at the outset avoid further expansion into non-core businesses by reducing their M&A activities, particularly diversification M&A.

4. Alternative explanations

We have thus far shown that hedge fund activism is associated with improved efficiency in M&A. However, we note that hedge fund activism targets are not randomly selected into our sample, especially those firms with prior M&A. In this section, we conduct several tests to explore other possible explanations of our results.

4.1. Test of selection bias using confrontational hedge fund interventions

An alternative explanation of our results is that hedge funds selected those firms that would have improved their M&A performance even in the absence of their intervention. This explanation, however, is less applicable to cases where hedge funds and their target firms have confrontational engagements. It would be difficult to argue in these cases that the improved M&A efficiency is due to target firms' voluntary decisions rather than hedge funds' interventions. Based on these considerations, we conduct our analysis using a subsample of confrontational hedge fund activisms to assess the robustness of the results.²¹

We consider a hedge fund's activism to be confrontational when the hedge fund is involved in the following activities specified on Item 4 (Purpose of Transaction) of Schedule 13D or 13D/A (Brav et al., 2008; Brav et al., 2016): (i) it intends to take over the target or makes an offering bid; (ii) it sues the target firm or files a complaint with the court; (iii) it threatens to or launches a proxy contest; and (iv) it makes shareholder proposals or denounces the management team or demands management changes.²² We consider a hedge fund intervention to be confrontational if it entails any of the actions listed above.²³ We find that 74 hedge fund interventions in our sample are confrontational, which accounts for 18.4 % of the sample.²⁴ The majority of firms in our sample with the confrontational hedge fund activism ultimately accommodate or adopt certain changes in governance structure, business strategies, or capital structures. We replicate Table 3, Table 4, and Table 6 using the subsample of the confrontational hedge fund interventions, together with the propensity-score-matched control sample.

²¹ Brav et al. (2015b) and Brav et al. (2016) use a sample of confrontational hedge fund activism to test whether the improved efficiency in innovation and plant productivity can be attributed to hedge fund activism instead of voluntary changes.

²² Our classification of confrontational events may be incomplete because it is based only on the information contained in 13D and 13D/A filings.

²³ In the case of multiple interventions in the same year, we define this firm-year as confrontational event whenever there is at least one hedge fund intervention defined as confrontational.

²⁴ Our fraction of confrontational events is comparable to those reported in Brav et al. (2015b) and Brav et al. (2016).

Table 8 presents the results. In Panel A, the dependent variables are the M&A intensity measures. Similar to the results from a boarder sample shown in Table 3, we find a decrease in M&A activities for firms with confrontational hedge fund interventions: a 10.7% reduction in the number of M&A and a 5.8% reduction in deal size relative to the control sample. In Panel B, we report the results for diversification M&A and non-diversification M&A separately. Similar to the results in Table 6, the effect of hedge fund activism (i.e., a decrease in M&A activities) is observed only in the case of diversification M&A.

Panel C shows the effect of hedge fund activism on M&A performance for only those firms with confrontational hedge fund interventions using the control sample. The dependent variables are the three-day cumulative abnormal returns and the difference between the first median analyst forecast on EPS in the three-month period after the merger completion date and the last median analyst forecast in the three-month period prior to the merger announcement date (ΔEPS3). The results are qualitatively similar to those reported in Table 4 from the full sample: β_1 estimates are positive and significant for both measures of M&A performance, which confirms that hedge fund activism improves M&A performance after controlling for any market-wide change in M&A performance. These results refute the possibility that the positive relation between hedge fund activism and M&A performance documented in our study results from hedge funds selecting those firms that would have improved their M&A performance even in the absence of their activism.

More than half of the 74 confrontational hedge fund interventions were followed by some changes in governance structures (e.g., an increase in the number of independent board members or a replacement of board members), in the composition of the board (e.g., appointment of hedge-fund-designated individuals on boards and/or committees), or adoption of business plans advocated by hedge funds (e.g., split into multiple stand-alone entities or announce stock

repurchase).²⁵ These changes prompted by confrontational hedge fund interventions might have resulted in an increase in managerial monitoring and a decrease in agency problems, which ultimately improve the efficiency of M&A activities.

4.2. Test of selection bias using hedge funds that switch from Schedule 13G to 13D filings

Hedge funds are considered to be sophisticated investors with superior ability to pick stocks (Griffin and Xu, 2009). One may argue that the improved M&A efficiency could be due to hedge funds' abilities to select firms that will improve M&A performance. In such a case, it is difficult to determine whether the improved M&A performance is due to hedge funds' stock picking skills or their activism. To address this issue, we look at the SEC blockholder ownership reporting rules. Under Exchange Act Section 13(G) and Regulation 13D-G, investors who own beneficial ownership between 5% and 20% with no intent of shareholder activism are eligible to file a shorter form 13G. If a hedge fund were to change from a passive to an active investor, it would need to file a Schedule 13D. To separate the activism effect from the stock picking skill, we conduct our analysis using only those hedge funds that switch from passive to active investors.

First, we search for the Schedule 13G and 13G/A filings submitted by those hedge funds that filed Schedule 13D on those 403 firms that had at least one M&A during the five-year period preceding the activism intervention. A hedge fund-firm pairing is defined as *switch* if the hedge fund filed at least one 13G or 13G/A on the firm within one year preceding the initial 13D filing (i.e., this hedge fund switched from 13G to 13D on the firm). Second, we define *passive firms* as those firms with (1) a 13G or 13G/A filing reported by any of the activist hedge funds that is defined as *switch* above, (2) no 13D filing reported by the activist hedge funds that is defined as

²⁵ The actual number of confrontational hedge fund interventions could be larger than this figure because it is based only on the information contained in 13D and 13D/A filings.

switch above, and (3) at least one M&A during the five-year period preceding the activism event year. There are two advantages of this sample construction: First, both *switch* and *passive* firms are invested by the same set of hedge funds that once switched from passive to active investors. Second, both *switch* and *passive* firms have prior experience in M&A. The final sample includes observations from three years prior to and three years subsequent to the 13D filing for *switch firms* (82 interventions) and initial 13G filing for *passive firms* (747 firms).²⁶

We adopt the following model specification to test whether the improved M&A performance is due to stock picking skills or activism:

$$M\&A_{i,t} = \beta_1 (SWITCH_i \times POST_{i,t}) + \beta_2 POST_{i,t} + \delta Control_{i,t} + \alpha_t + \alpha_i + \alpha_{hf} + \epsilon_{i,t}; \quad (4)$$

where $SWITCH_i$ is equal to one if the hedge fund-firm pairing is a switch from 13G to 13D and zero otherwise and $POST_{i,t}$ is equal to one if the firm-year observation is within [t+1, t+3] years after the year of the switch to a Schedule 13D for the subsample of the *switch*, and after the year of the Schedule 13G filing for the *passive* subsample, and zero otherwise. α_t , α_i , and α_{hf} represent the year, firm, and hedge fund fixed effects. As in Table 3, we measure M&A intensity by the number of M&A, the aggregate dollar value of M&A, deal size, and the relative deal size.

The results (see Table 9) show that the coefficients on $SWITCH_i \times POST_{i,t}$ are all negative and significant in three of the four regressions, indicating that the switch group exhibits lower M&A activities than the passive group during the post event period. The negative and significant coefficients on the POST dummy variable indicate a decrease in M&A activities for the passive group between the pre and post event period. In unreported results, we also find that CARs and changes in EPS forecasts are greater for the *switch* group relative to the *passive* group although

²⁶ The fraction of switch sample (20%) is marginally larger than that (14%) reported by Brav et al. (2016).

not statistically significant. Overall, these results suggest that the reduced M&A activities could be attributed at least partially to the hedge fund intervention.

4.3. Market trend

The positive CAR associated with M&A announcements made by FHFA could merely reflect a market trend rather than the consequence of hedge fund activism. The coefficient on $POST_{i,t}$ in regression model (2) captures the abnormal stock return associated with M&A announcements for the control sample during the post-activism period. Table 4 shows that the coefficient on $POST_{i,t}$ is not significantly different from zero, indicating that the positive CAR for FHFA may not be attributed to a general market trend.

5. Results for firms with and without M&A activities during the pre-activism period

Our analyses so far are based on firms with M&A activities during the pre-activism period. In this section, we expand our study sample to include firms with no M&A activities during the pre-activism period. That is, we do not impose the condition that firms had at least one qualified M&A during a five-year window prior to the hedge fund intervention on both the treatment and control groups. We replicate the matching process described in Section 2.3 using the 1,305 firm-year observations. We provide the results of the logistic regression in Table A1 in the Appendix. We then reevaluate the performance of M&A using the methodology and model specification that we describe in Section 3.1 and 3.2 and report the results in Table 10.

In Panel A, we show the pre-activism summary statistics for the treatment and control groups as we do in Table 2. The results show that the two groups are quite similar across not only the matching variables but also other firm and M&A attributes. In Panel B, we report the results of

M&A performance. Consistent with the results in Table 4, we find that the coefficients on the interaction term $DHFA_i \times POST_{i,t}$ are positive and significant, indicating that firms make better M&A decisions subsequent to hedge fund activism interventions.

6. Summary and concluding remarks

This paper analyzes how and to what extent hedge fund activism influences corporate M&A decisions. We show that firms with prior M&A activities generally reduce the frequency and size of M&A after Schedule 13D filings by hedge funds. The stock market responds more favorably to M&A announcements made by firms with hedge fund activism than those made by firms without hedge fund activism. Our results suggest that the stock market responds favorably to M&A announcements made by firms with hedge fund interventions because these firms tend to make fewer but better M&A. For example, hedge fund activism plays a significant role in reducing diversification M&A by firms with multiple business segments, suggesting that hedge funds pressure firms to focus on their core business.

To minimize the effect of selection bias on our results, we also analyze a sample of confrontational hedge fund interventions and show that our results are unlikely driven by selection bias. We also show that the effect of hedge fund activism on firms' M&A decisions is stronger when there is clearer indication of activism revealed by hedge funds' deliberate move to the Schedule 13D investor status from the Schedule 13G investor status, suggesting that the relation between hedge fund activism and firms' M&A decisions documented in this study is unlikely to be spurious.

Opponents of hedge funds' activism argue that it may force firms to sacrifice profitable investment opportunities to satisfy the short-term interest of shareholders. Our empirical results

suggest that although hedge fund activism generally reduces firms' M&A activities, it tends to reduce only poor M&A, but not good M&A, by pressuring firms to make fewer but better M&A. On the whole, our results suggest that hedge funds play an important role in the market for corporate control by increasing the efficiency of firms' M&A decisions through their activist interventions.

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Table 1

Hedge fund activism and M&A by year and industry

Panel A provides a yearly breakdown of our study sample of 1,305 firms that had hedge fund activism during 1998-2012. Of the 1,305 firms that had at least one hedge fund activist during the sample period, 403 firms had at least one M&A deal during the five-year period prior to hedge fund activism and 783 firms did not have any M&A deal during the five-year period prior to hedge fund activism. Panel B shows the number of hedge fund activism events across the Fama-French 12 industries.

Panel A: Hedge fund activism by year

	Hedge fund events	Firm year events	Had at least one M&A during the five-year period prior to hedge fund activism	Had no M&A during the five-year period prior to hedge fund activism
Year	(1)	(2)	(3)	(4)
1998	80	80	17	63
1999	68	66	19	46
2000	40	39	10	27
2001	73	67	19	45
2002	63	54	13	39
2003	63	58	14	38
2004	77	72	20	48
2005	136	124	43	64
2006	134	124	38	71
2007	163	154	55	80
2008	141	127	37	77
2009	80	75	27	43
2010	91	82	22	54
2011	98	96	26	58
2012	90	87	43	30
Total	1,397	1,305	403	783

Panel B: Hedge fund activism by industry

Industry	Firm year events	Had at least one M&A during the five-year period prior to hedge fund activism	Had no M&A during the five-year period prior to hedge fund activism
(1)	(2)	(3)	
Consumer Nondurables	63	20	38
Consumer Durables	33	6	20
Manufacturing	114	41	58
Energy	49	21	26
Chemicals and Allied Products	24	7	15
High Tech	273	117	133
Telecommunication	48	14	31
Utilities	16	8	8
Wholesale and Retail	155	49	86
Healthcare, Medical Equipment, and Drug	138	31	96
Finance	186	31	147
Others	206	58	125
Total	1,305	403	783

Table 2

Descriptive statistics

This table shows the summary statistics in the event year for the 403 matching pairs of the treatment and control firms. In each year, we match each of the 403 firms that had at least one qualified M&A during the five-year period preceding the activism intervention (the treatment group) with a firm that has the closest propensity score in the same two-digit Standard Industrial Classification (SIC) industry. The last three columns show the difference, the t-statistic, and the probability of the equality of the mean value between the treatment and control samples. See the Appendix for the definition of each variable.

	Treatment group (N = 403)			Control group (N = 403)			Difference Treatment – Control		
	Mean	S.D.	Median	Mean	S.D.	Median	Difference	t-stat	Prob
Ln(MVE)	6.072	1.668	5.908	6.098	1.917	6.045	-0.026	-0.21	0.84
Ln(Assets)	6.546	1.592	6.475	6.414	1.726	6.223	0.132	1.13	0.26
Book-to-Market	0.666	0.833	0.615	0.680	0.802	0.553	-0.014	-0.25	0.80
Tobin's Q	1.112	0.719	0.970	1.334	1.954	1.040	-0.222	-2.14	0.03
Leverage	0.265	0.239	0.232	0.239	0.206	0.217	0.026	1.67	0.09
Growth	0.113	0.603	0.034	0.105	0.280	0.070	0.007	0.22	0.82
Dividend yield	0.021	0.323	0.000	0.019	0.065	0.000	0.002	0.11	0.91
ROA(t-1)	0.091	0.114	0.102	0.102	0.115	0.106	-0.011	-1.43	0.15
Δ ROA	-0.002	0.111	-0.004	0.000	0.109	-0.004	-0.002	-0.26	0.80
Acquisition ratio	0.036	0.079	0.000	0.039	0.074	0.000	-0.003	-0.61	0.54
Number of M&A deals	0.293	0.567	0.000	0.288	0.579	0.000	0.005	0.12	0.90
Total value of M&A	792	1,682	0.000	761	1,683	0.000	31	0.26	0.79
Average deal size	761	1,609	0.000	780	1,694	0.000	-20	-0.17	0.87
Average relative deal size	0.114	0.470	0.000	0.083	0.448	0.000	0.031	0.95	0.34
Number of M&A (past 3 years)	0.591	1.292	0.000	0.561	1.217	0.000	0.030	0.34	0.74
Total value of M&A (past 3 years)	1,086	2,250	0.000	1,149	2,450	0.000	-62	-0.38	0.71
Firm age	20.553	14.092	16.000	20.591	13.394	16.000	-0.33	-0.30	0.77

Table 3

M&A intensity subsequent to hedge fund activism

This table shows the results of the following regression model:

$$M\&A_{i,t} = \beta_1 (DHFA_i \times POST_{i,t}) + \beta_2 POST_{i,t} + \delta Control_{i,t} + \alpha_t + \alpha_i + \epsilon_{i,t};$$

where the dependent variable $M\&A_{i,t}$ is one of the five M&A intensity measures (i.e., the total number of M&A deals, the total transaction value of M&A deals, the average deal size, and the average relative deal size, and the acquisition ratio), $DHFA_i$ is a dummy variable that is equal to one for FHFA and zero for their matched control firms, $POST_{i,t}$ is a dummy variable that is equal to one if firm-year (i,t) observation is within [t+1, t+3] years of the activism event and zero otherwise, and $Control_{i,t}$ is the set of control variables. We also include year and firm fixed effects (α_t and α_i) in the model. We use market capitalization and firm age as controls. Note that β_1 , the coefficient on the interaction term $DHFA_i \times POST_{i,t}$, indicates whether there is a difference in the level of M&A intensity between FHFA and the control sample during the post activism period. The t -statistics based on standard errors clustered at the firm level are displayed in parentheses. ***, **, and * indicates significance at the 1%, 5%, and 10% level, respectively.

Variables	Ln(1+No. M&A)	Ln(1+ Sum of M&A value)	Ln(1+ Average deal size)	Average relative size	Acquisition ratio
	(1)	(2)	(3)	(4)	(5)
DHFA×POST	-0.050*** (-2.639)	-0.491*** (-2.724)	-0.488*** (-2.742)	-0.043** (-2.284)	-0.009** (-1.965)
POST	-0.024 (-1.557)	-0.263 (-1.627)	-0.279* (-1.744)	-0.012 (-0.696)	-0.003 (-0.750)
Ln(MVE)	0.060*** (5.677)	0.482*** (4.870)	0.486*** (4.915)	0.028* (1.665)	0.008*** (4.154)
Ln(Age)	-0.012 (-0.193)	0.191 (0.324)	0.283 (0.487)	-0.103 (-1.223)	-0.023 (-1.463)
Constant	-0.013 (-0.077)	-0.185 (-0.117)	-0.344 (-0.219)	0.250 (1.148)	0.084* (1.821)
Year fixed effects	Yes	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes	Yes
Sample size	5,088	5,088	5,088	5,088	5,088
Adjusted R ²	0.076	0.043	0.045	0.029	0.123

Table 4
Regression results for M&A performance

This table shows the results of the following regression model:

$$Performance_{i,t} = \beta_1 (DHFA_i \times POST_{i,t}) + \beta_2 POST_{i,t} + \beta_3 DHFA_i + \delta Control_{i,t} + \alpha_t + \alpha_{IND} + \epsilon_{i,t};$$

where the dependent variable $Performance_{i,t}$ includes the two measures of M&A performance (CAR5 and $\Delta EPS3$) at deal level and two operating performance measures constructed at the firm level. The first measure is the cumulative abnormal returns (CAR) around the M&A announcement date. We estimate the market model for each deal over a 200-day period ending 11 days before the announcement date using the CRSP equally weighted market return. We then use the estimated parameters to calculate the cumulative abnormal returns (i.e., CAR5) over the five-day (-2, +2) event windows centered on the announcement date. The second measure is the change in analysts' earnings forecasts between the pre- and post-M&A periods. This measure captures the change in the market's expectation of the acquiring firm's earnings per share (EPS) that results from M&A. We measure the change in EPS (i.e., $\Delta EPS3$) by the difference between the first median analyst forecast in the three-month period after the M&A completion date and the last median analyst forecast in the three-month period prior to the M&A announcement date. The third and fourth measures are $IROA$ and $\Delta IROA$. $IROA$ is the industry-adjusted return on assets and $\Delta IROA$ is the change in $IROA$ during the period $[t, t+3]$, where t refers to the deal announcement year. $DHFA_i$ and $POST_{i,t}$ are the same as defined in regression model (1). $Control_{i,t}$ represents a vector of control variables that are previously found to determine the performance of M&A (e.g., relative deal size, method of payment, and status of the target firm). We also include year and industry fixed effects (α_t and α_{IND}) in the regression model. Figures in parenthesis are the t -statistics. ***, **, and * indicates significance at the 1%, 5%, and 10% level, respectively.

Variables	CAR5	$\Delta EPS3$	$IROA$	$\Delta IROA$
	(1)	(2)	(3)	(4)
DHFA×POST	0.019* (1.717)	0.128* (1.779)	0.024** (2.386)	0.030** (2.163)
POST	-0.004 (-0.528)	-0.058 (-1.129)	-0.007 (-0.991)	-0.020* (-1.856)
DHFA	-0.008 (-1.286)	-0.035 (-0.839)	-0.020*** (-3.785)	
Ln(MVE)	-0.004** (-1.999)	0.035** (2.421)	0.010*** (5.515)	0.004 (0.537)
Book-to-market	-0.040*** (-4.843)	-0.134*** (-2.613)	-0.049*** (-7.010)	-0.051*** (-3.337)
Cash ratio	-0.026 (-1.361)	-0.090 (-0.686)	-0.099*** (-5.933)	-0.045 (-1.087)
Relative deal size	0.014** (2.125)	-0.024 (-0.448)	-0.006 (-1.203)	-0.006 (-0.838)
Private target	0.000 (0.061)	0.003 (0.075)	0.008* (1.756)	0.005 (0.874)
Equity payment	0.016 (1.611)	-0.042 (-1.011)	-0.021** (-2.199)	-0.015 (-1.089)
Stock run-up	-0.008			

	(-1.429)			
Constant	0.087**	0.084	0.038	-0.008
	(2.556)	(0.342)	(1.375)	(-0.150)
Year fixed effects	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	No
Firm fixed effects	No	No	No	Yes
Sample size	1,135	993	1,135	897
Adjusted R ²	0.052	0.039	0.348	0.508

Table 5

Hedge fund activism and avoidance of poor M&A

This table show the results of the following regression model:

$$Poor_{i,t} = \beta_1(DHFA_i \times POST_{i,t}) + \beta_2POST_{i,t} + \delta Control_{i,t} + \alpha_t + \alpha_i + \epsilon_{i,t};$$

where $Poor_{i,t}$ is a binary variable indicating poor M&A deals and $DHFA_i$ and $POST_{i,t}$ are the same as defined in regression model (1). We identify poor deals using the following steps: (i) we calculate three-day CAR (CAR3) for each and every qualified M&A deal described in Section 2.1; (ii) we consider a M&A deal poor if it belongs to the bottom quintile of CAR3 in a given year; (iii) we create the binary variable $Poor$ which is equal to one if a firm undertakes at least one poor M&A in a particular year and zero otherwise. We report the results of the OLS regression in column (1) and the results of the logistic regression in column (2) and (3) with different fixed effects. The coefficients reported in columns (2) and (3) are marginal effects of each explanatory variable at the mean values. In column (1), the t -statistics based on standard errors clustered at the firm level are reported in parentheses. In column (2) and (3), the standard errors clustered at the firm level are reported in parentheses. ***, **, and * indicates significance at the 1%, 5%, and 10% level, respectively.

Variables	OLS (1)	Logistic (2)	Logistic (3)
DHFA×POST	-0.042*** (-3.360)	-1.071*** (0.297)	-1.087*** (0.300)
POST	0.004 (0.395)	0.108 (0.206)	0.129 (0.206)
DHFA		0.669*** (0.170)	0.657*** (0.167)
Ln(MVE)	0.014* (1.798)	0.108*** (0.042)	0.109** (0.045)
Ln(Age)	0.001 (0.035)	-0.335*** (0.129)	-0.274** (0.132)
Constant	-0.077 (-0.785)	-2.958*** (0.561)	-3.029*** (0.750)
Year fixed effects	Yes	Yes	Yes
Firm fixed effects	Yes	No	No
Industry fixed effects	No	No	Yes
Sample size	5,088	5,057	4,900
Adjusted R ²	0.039	-	-
Pseudo R ²	-	0.0409	0.0598

Table 6

Hedge fund activism and diversification M&A

We estimate regression model (1) with two new dependent variables separately: the intensity of diversification M&A and the intensity of non-diversification M&A. We assume that a takeover is a diversification acquisition if the acquiring firm and the acquired firm have different three-digit SIC codes. For each firm, we calculate the number and total transaction value of diversification M&A and non-diversification M&A in each year and use them as measures of the intensity of each type of M&A. The first two columns show the results for diversification M&A and the next two columns show the results for non-diversification M&A. Columns (1) and (3) show the results when the dependent variable is the natural logarithm of one plus the total number of M&A in each year. Columns (2) and (4) show the results when the dependent variable is the natural logarithm of one plus the total transaction value of M&A in each year. The *t*-statistics based on standard errors clustered at the firm level are displayed in parentheses. ***, **, and * indicates significance at the 1%, 5%, and 10% level, respectively.

Variables	Diversification M&A		Non-Diversification M&A	
	Ln(1+ No. M&A) (1)	Ln(1 + Sum of M&A) (2)	Ln(1+ No. M&A) (3)	Ln(1+ Sum of M&A) (4)
DHFA×POST	-0.047*** (-3.216)	-0.299*** (-3.517)	-0.008 (-0.548)	-0.068 (-0.786)
POST	0.000 (0.034)	-0.019 (-0.233)	-0.026** (-2.336)	-0.160** (-2.226)
Ln(MVE)	0.031*** (4.772)	0.168*** (4.079)	0.029*** (4.478)	0.177*** (4.233)
Ln(Age)	-0.026 (-0.509)	0.087 (0.315)	0.035 (0.776)	0.352 (1.313)
Constant	-0.027 (-0.208)	-0.644 (-0.944)	-0.033 (-0.267)	-0.461 (-0.618)
Year fixed effects	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes
Sample size	5,088	5,088	5,088	5,088
Adjusted R ²	0.094	0.069	0.085	0.095

Table 7

Hedge fund activism, firm diversification, and M&A

A firm is considered to have multiple segments if it reports more than one business or operating segments with different SIC codes measured one year prior to the activism event year. Panel A shows the number of firms with a single business segment and the number of firms with multiple business segments for FHFA and the control sample, respectively. Panel B shows the results of the following regression model:

$$\begin{aligned}
 M\&A_{i,t} = & MULTIPLE_i \times [\beta_1 (DHFA_i \times POST_{i,t}) + \beta_2 POST_{i,t}] \\
 & + SINGLE_i \times [\beta_3 (DHFA_i \times POST_{i,t}) + \beta_4 POST_{i,t}] \\
 & + \delta Control_{i,t} + \alpha_t + \alpha_i + \epsilon_{i,t};
 \end{aligned}$$

where $MULTIPLE_i$ ($SINGLE_i$) is equal to one for firms with multiple segments (single segment) and zero otherwise, and all other variables are the same as defined in regression model (1). We use four different measures of M&A activities (i.e., the total number of M&A deals, the total transaction value of M&A deals, the average deal size, and the acquisition ratio). Control variables include the natural logarithms of firm market capitalization and the natural logarithms of firm age. For ease of comparison, the estimates of β_1 and β_2 for firms with multiple business segments are reported in odd-numbered columns and the corresponding estimates (β_3 and β_4) for firms with a single business segment are reported in even-numbered columns. The F -test statistics for the equality of the coefficients on the interaction term ($\beta_1 = \beta_3$) are reported in the bottom of table. Panel C reports the results when we measure the intensity of M&A by the total number of M&A deals and the total transaction value of M&A deals. The first four columns show the results when we use the intensity of diversification M&A as the dependent variable and the next four columns show the results when we use the intensity of non-diversification M&A as the dependent variable. All specifications include firm and year fixed effects. The t -statistics based on standard errors clustered at the firm level are displayed in parentheses. ***, **, and * indicates significance at the 1%, 5%, and 10% level, respectively.

Panel A: Distribution of firm diversification

Event year	Single	Multiple	Multiple (%)	Total	No. of segments	Treatment (N = 158)	Control sN = 158)	Total
Treatment	214	158	42%	372	2	77	91	168
Control	214	158	42%	372	3	48	38	86
					4	20	14	34
					5	5	10	15
					6	5	4	9
					7	1	1	2
					≥ 8	2	0	2
					Mean	2.89	2.74	2.81
					Median	3	2	2

Panel B: Hedge fund activism, firm diversification, and M&A intensity

Variables	Ln (1+ No. M&A)		Ln (1+Sum of M&A value)		Ln (1+ Average deal size)		Acquisition ratio	
	<i>Multiple</i> (1)	<i>Single</i> (2)	<i>Multiple</i> (3)	<i>Single</i> (4)	<i>Multiple</i> (5)	<i>Single</i> (6)	<i>Multiple</i> (7)	<i>Single</i> (8)
DHFA×POST	-0.084*** (-2.917)	-0.007 (-0.279)	-0.866*** (-3.094)	-0.105 (-0.414)	-0.854*** (-3.104)	-0.096 (-0.383)	-0.020*** (-2.903)	-0.002 (-0.301)
POST	0.009 (0.433)	-0.058*** (-2.649)	0.100 (0.464)	-0.538** (-2.372)	0.083 (0.390)	-0.566** (-2.531)	0.004 (0.743)	-0.009* (-1.739)
Ln(MVE)		0.052*** (5.733)		0.437*** (5.124)		0.436*** (5.106)		0.009*** (3.946)
Ln(Age)		0.023 (0.358)		0.364 (0.548)		0.442 (0.676)		-0.032* (-1.682)
Constant		-0.082 (-0.501)		-0.490 (-0.277)		-0.597 (-0.341)		0.104** (1.982)
Year fixed effects		Yes		Yes		Yes		Yes

Firm fixed effects	Yes	Yes	Yes	Yes
Sample size	4,628	4,628	4,628	4,628
Adjusted R ²	0.073	0.044	0.046	0.112
F-test: $\beta_1=\beta_3$	3.994	3.988	4.054	3.029
Prob > F	0.0461	0.0463	0.0445	0.0823

Panel C: Hedge fund activism, firm diversification, and diversification M&A

Variables	Diversification M&A				Non-Diversification M&A			
	Ln (1+ No. M&A)		Ln (1+Sum of M&A deals)		Ln (1+ No. M&A)		Ln (1+Sum of M&A deals)	
	<i>Multiple</i>	<i>Single</i>	<i>Multiple</i>	<i>Single</i>	<i>Multiple</i>	<i>Single</i>	<i>Multiple</i>	<i>Single</i>
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
DHFA×POST	-0.075*** (-3.576)	-0.005 (-0.295)	-0.458*** (-3.307)	-0.073 (-0.670)	-0.012 (-0.540)	-0.005 (-0.250)	-0.131 (-0.978)	-0.022 (-0.175)
POST	0.013 (0.731)	-0.012 (-0.753)	0.032 (0.270)	-0.071 (-0.754)	-0.005 (-0.327)	-0.045*** (-2.749)	-0.024 (-0.241)	-0.286*** (-2.802)
Ln(MVE)	0.028*** (4.242)		0.147*** (3.721)		0.027*** (4.085)		0.161*** (3.889)	
Ln(Age)	-0.002 (-0.047)		0.139 (0.472)		0.031 (0.622)		0.316 (1.076)	
Constant	-0.081 (-0.661)		-0.712 (-1.012)		-0.018 (-0.132)		-0.313 (-0.396)	
Year fixed effects	Yes		Yes		Yes		Yes	
Firm fixed effects	Yes		Yes		Yes		Yes	
Sample size	4,628		4,628		4,628		4,628	
Adjusted R ²	0.083		0.060		0.091		0.099	
F-test: $\beta_1=\beta_3$	6.067		4.664		0.0502		0.343	
Prob > F	0.0140		0.0312		0.823		0.558	

Table 8

Regression results with confrontational hedge fund

We consider a hedge fund's activism to be confrontational when the hedge fund is involved in the following activities specified on Item 4 (Purpose of Transaction) of Schedule 13D or 13D/A: (i) it intends to take over the target or makes an offering bid; (ii) it sues the target firm or files a complaint with the court; (iii) it threatens to or launches a proxy contest; and (iv) it makes shareholder proposals or denounces the management team or demands management changes. We consider a hedge fund intervention to be confrontational if it entails any of the actions listed above. We replicate Table 3, Table 4, and Table 6 using the subsample of the confrontational hedge fund interventions, together with the propensity-score-matched control sample. In Panel A, the dependent variables are the M&A intensity measures. In Panel B, we report the results for diversification M&A and non-diversification M&A separately. Panel C shows the effect of hedge fund activism on M&A performance for only those firms with confrontational hedge fund interventions using the control sample. The dependent variables are the three-day cumulative abnormal returns and the difference between the first median analyst forecast on EPS in the three-month period after the merger completion date and the last median analyst forecast in the three-month period prior to the merger announcement date (Δ EPS3). We show the *t*-statistics in parentheses. ***, **, and * indicates significance at the 1%, 5%, and 10% level, respectively.

Panel A: M&A intensity subsequent to confrontational activism

VARIABLES	Ln (1+ No. M&A)	Ln (1+Sum of M&A value)	Ln (1+ Average deal size)	Average relative size	Acquisition ratio
	(1)	(2)	(3)	(4)	(5)
DHFA×POST	-0.107** (-2.584)	-1.046** (-2.468)	-1.011** (-2.420)	-0.058** (-2.185)	-0.010 (-1.123)
POST	0.015 (0.324)	0.183 (0.388)	0.147 (0.312)	0.054 (1.630)	0.006 (0.615)
Ln(MVE)	0.018 (0.955)	0.188 (0.957)	0.206 (1.052)	-0.009 (-0.760)	0.010** (2.005)
Ln(Age)	0.191 (1.150)	1.774 (1.187)	1.816 (1.194)	0.023 (0.204)	-0.064* (-1.681)
Constant	-0.076 (-0.165)	0.045 (0.009)	-0.142 (-0.029)	0.219 (0.993)	0.131 (1.492)
Year fixed effects	Yes	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes	Yes
Sample size	931	931	931	931	931
Adjusted R ²	0.126	0.062	0.063	0.007	0.099

Panel B: Diversification M&A subsequent to confrontational activism

VARIABLES	Diversification M&A		Non-diversification M&A	
	Ln (1+ No. M&A)	Ln (1+Sum of M&A deals)	Ln (1+ No. M&A)	Ln (1+Sum of M&A deals)
	(1)	(2)	(3)	(4)
DHFA×POST	-0.068** (-2.436)	-0.468*** (-2.878)	-0.045 (-1.352)	-0.278 (-1.206)
POST	0.052* (1.736)	0.456** (2.281)	-0.035 (-0.983)	-0.279 (-1.135)
Ln(MVE)	0.018 (1.371)	0.100 (1.343)	-0.001 (-0.056)	-0.013 (-0.132)
Ln(Age)	0.269** (2.009)	1.924** (2.513)	-0.069 (-0.627)	-0.526 (-0.761)
Constant	-0.267 (-0.773)	-2.683 (-1.458)	0.184 (0.654)	1.258 (0.719)
Year fixed effects	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes
Sample size	931	931	931	931
Adjusted R ²	0.196	0.132	0.122	0.105

Panel C: M&A performance subsequent to confrontational activism

Variables	CAR3	CAR3	Δ EPS3	Δ EPS3
	(1)	(2)	(3)	(4)
DHFA \times POST	0.049*** (2.656)	0.065** (2.100)	0.502* (1.725)	0.897*** (2.915)
POST	-0.026* (-1.762)	-0.018 (-0.593)	0.170 (0.831)	0.177 (0.773)
DHFA	-0.036*** (-2.972)		-0.282* (-1.923)	
Relative deal size	0.021 (0.745)	0.004 (0.159)	0.197 (0.684)	0.474* (1.888)
Ln(MVE)	0.000 (0.002)	-0.004 (-0.185)	0.081 (1.641)	0.519** (2.550)
Equity payment	-0.021 (-0.741)	-0.008 (-0.154)	0.215 (0.647)	-0.302 (-0.872)
Private target	0.012 (1.106)	-0.000 (-0.014)	0.134 (1.018)	0.080 (0.668)
Stock runup	-0.010 (-0.671)	-0.019 (-0.791)		
Constant	-0.015 (-0.397)	0.022 (0.157)	-0.592 (-0.507)	-3.423** (-2.096)
Year fixed effects	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	No	Yes	No
Firm fixed effects	No	Yes	No	Yes
Sample size	203	203	178	178
Adjusted R ²	0.183	0.385	0.030	0.583

Table 9

Test of selection bias using hedge funds that switch from 13G to 13D filings

We adopt the following model specification to test whether the improved M&A performance is due to stock picking skills or activism:

$$M\&A_{i,t} = \beta_1 (SWITCH_i \times POST_{i,t}) + \beta_2 POST_{i,t} + \delta Control_{i,t} + \alpha_t + \alpha_i + \alpha_{hf} + \epsilon_{i,t} ;$$

where $SWITCH_i$ is equal to one if the hedge fund-firm pairing is a switch from 13G to 13D and zero otherwise and $POST_{i,t}$ is equal to one if the firm-year observation is within [t+1, t+3] years after the year of the switch to a Schedule 13D for the subsample of the *switch*, and after the year of the Schedule 13G filing for the *passive* subsample, and zero otherwise. α_t , α_i , and α_{hf} represent the year, firm, and hedge fund fixed effects. As in Table 3, we measure M&A intensity by the number of M&A, the aggregate dollar value of M&A, deal size, and the relative deal size.

We search for the Schedule 13G and 13G/A filings submitted by those hedge funds that filed Schedule 13D on those 403 firms that had at least one M&A during the five-year period preceding the activism intervention. A hedge fund-firm pairing is defined as *switch* if the hedge fund filed at least one 13G or 13G/A on the firm within one year preceding the initial 13D filing (i.e., this hedge fund switched from 13G to 13D on the firm). We define *passive firms* as those firms with (1) a 13G or 13G/A filing reported by any of the activist hedge funds that is defined as *switch* above, (2) no 13D filing reported by the activist hedge funds that is defined as *switch* above, and (3) at least one M&A during the five-year period preceding the activism event year. The final sample includes observations from three years prior to and three years subsequent to the 13D filing for *switch firms* (82 interventions) and initial 13G filing for *passive firms* (747 firms). α_t , α_i , and α_{hf} represent the year, firm, and hedge fund fixed effects, respectively. As in Table 3, we measure M&A intensity by the number of M&A, the aggregate dollar value of M&A, deal size, and the relative deal size. The *t*-statistics based on standard errors clustered at the firm level are displayed in parentheses. ***, **, and * indicates significance at the 1%, 5%, and 10% level, respectively.

Variables	Ln(1+No. M&A) (1)	Ln(1+Sum of M&A value) (2)	Ln(1+ Average deal size) (3)	Average relative size (4)
SWITCH×POST	-0.055* (-1.742)	-0.548* (-1.792)	-0.553* (-1.841)	-0.055 (-1.611)
POST	-0.044*** (-2.628)	-0.523*** (-3.255)	-0.534*** (-3.321)	-0.033 (-1.628)
Control	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes
Hedge fund fixed effects	Yes	Yes	Yes	Yes
Sample size	5,447	5,447	5,447	5,447
Adjusted R ²	0.144	0.109	0.107	0.058

Table 10
Results for firms with and without M&A activities during the pre-activism period

In Panel A, we show the pre-activism summary statistics for the treatment and control groups as we do in Table 2. This table replicates the results in Table 2 and Table 4 with the expanded sample. We expand our study sample to include firms with no M&A activities during the pre-activism period. We start with the 1,305 firm-year samples and re-do the matching process described in Section 2.3. At this time, however, we do not impose the condition that firms had at least one qualified M&A during a five-year window prior to the intervention on both the treatment and control groups. In Panel A, we show the pre-event summary statistics for the treatment and control groups as we do in Table 2. In Panel B, we report the results of M&A performance.

Panel A: Descriptive statistics

	Treatment group (N = 1,305)			Control group (N = 1,305)			Difference Treatment – Control		
	Mean	S.D	Median	Mean	S.D.	Median	Diff	t-stat	Prob
Ln(MVE)	5.411	1.791	5.321	5.406	2.411	5.551	0.005	0.06	0.95
Ln(Assets)	5.993	1.809	5.925	5.913	2.254	6.062	0.080	1.00	0.32
Book-to-Market	1.200	1.104	0.926	1.227	1.151	0.936	-0.027	-0.60	0.55
Tobin's Q	0.473	2.781	0.597	0.564	4.026	0.596	-0.091	-0.67	0.50
Leverage	0.263	0.271	0.205	0.244	0.250	0.193	0.019	1.84	0.07
Growth	0.121	0.725	0.025	0.105	0.498	0.058	0.016	0.65	0.52
Dividend yield	0.033	0.491	0.000	0.041	0.400	0.000	-0.008	-0.45	0.65
ROA(t-1)	0.038	0.215	0.076	0.047	0.220	0.089	-0.009	-1.02	0.31
Δ ROA	0.002	0.181	-0.001	-0.006	0.189	-0.002	0.008	1.08	0.28
Acquisition ratio	0.022	0.064	0.000	0.023	0.061	0.000	-0.001	-0.44	0.66
Number of M&A deals	0.090	0.343	0.000	0.105	0.386	0.000	-0.015	-1.02	0.31
Total Value of M&A	244	1003	0.000	275	1,065	0.000	-31	-0.75	0.45
Average deal size	235	960	0.000	265	1,039	0.000	-30	-0.76	0.45
Average relative deal size	0.035	0.266	0.000	0.028	0.278	0.000	0.007	0.69	0.49
Number of M&A (past 3 years)	0.182	0.768	0.000	0.231	0.878	0.000	-0.049	-1.52	0.13
Total value of M&A (past 3 years)	335	1,346	0.000	400	1492	0.000	-65	-1.16	0.25
Firm age	18.774	14.025	14.000	17.733	12.947	13.000	1.041	1.97	0.05

Panel B: M&A performance

Variables	CAR5 (1)	Δ EPS (2)	IAOP (3)	Δ IAOP (4)
DHFA×POST	0.017** (2.014)	0.124** (1.965)	0.020** (2.301)	0.033** (2.494)
POST	-0.005 (-0.833)	-0.023 (-0.494)	0.001 (0.125)	-0.001 (-0.102)
DHFA	-0.006 (-1.065)	-0.075* (-1.794)	-0.015*** (-2.702)	-0.004 (-0.229)
Constant	0.050 (1.507)	0.415 (1.484)	-0.005 (-0.139)	0.021 (0.274)
Control variables				
Firm characteristics	Yes	Yes	Yes	Yes
Deal characteristics	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	No
Firm fixed effects	No	No	No	Yes
Sample size	1,367	1,203	1,367	1,073
Adjusted R ²	0.078	0.165	0.463	0.430

Appendix

Table A1

Logistic regression results

We conduct our analysis using the treatment sample and the control sample of propensity score matched firms. Column 1 shows the results of the logistic regression using the treatment sample of 403 firms with at least one M&A deal during the five-year period prior to the event date and with available information to calculate propensity scores. Column 2 shows the results of the logistic regression using the treatment sample of 1,305 firms with or without M&A deal during the five-year period prior to the event date and with available information to calculate propensity scores. We include variables that are shown in prior studies to determine activists' decision to establish new positions. These variables include the market value of equity (MVE), Tobin's Q ratio, financial leverage, sales growth rate, dividend yield, return on assets (ROA) measured at $t-1$, and change in ROA between years $t-3$ and $t-1$ to capture the pre-event trend in operating performance. In addition to these variables, we also include the acquisition ratio in the logistic model to control for prior acquisition expenses. All accounting variables are winsorized at the 1st and 99th percentiles. We report the marginal effects of each explanatory variables at the mean values. All specifications include year fixed effects. The standard errors are given in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	<i>Treatment sample</i> (403)	<i>Treatment sample</i> (1,305)
	(1)	(2)
Ln (MVE)	-0.002*** (0.000)	0.000 (0.000)
Tobin's Q	-0.001* (0.001)	-0.001*** (0.000)
Leverage	0.005* (0.003)	0.000 (0.001)
Growth	-0.005** (0.002)	-0.001 (0.000)
Dividend yield	-0.040*** (0.014)	-0.000 (0.000)
Acquisition ratio	0.015* (0.008)	0.001** (0.001)
ROA	0.007 (0.006)	0.002* (0.001)
Δ ROA	-0.008 (0.007)	-0.002** (0.001)
Year fixed effects	Yes	Yes
Sample size	27,728	100,371
Pseudo R ²	0.0374	0.0222
Percent targeted	1.45%	1.30%

Table A2
Variables definition

Firm variables

MVE	Product of share outstanding and stock price at the end of fiscal year
Book-to-market ratio	Book value of equity / (Book value of equity + Market value of equity)
Tobin's Q	(Market value of the firm Liquidating value of the firm's preferred stock + Book value of long-term debt) / Total assets
Leverage	(Current debt + Book value of long-term debt) / Total assets
Growth	Growth rate of sales over the previous year
Dividend yield	(common dividend + preferred dividends) / (book common stocks + book value of preferred)
Acquisition ratio	Acquisition expenses / Total assets
ROA	Returns of assets, defined as earnings before interest / assets
IROA	Industry-adjusted ROA, defined as ROA adjusted to the median value in the same three-digit SIC industry in the same year.
Firm age	The total year since the first appearing on Compustat.

M&A variables

CAR3(CAR5)	Three-day (five-day) cumulative abnormal returns, calculated using the market model. The parameters of market model are estimated over days (-210, -11) prior to the announcement date using an ordinary least squares model and CRSP equally-weighted index as the market return
$\Delta \text{EPS}_3(\Delta \text{EPS}_6)$	Changes in analyst forecast EPS, defined as the difference between the first median analyst forecast on EPS in the three-month (six-month) period after merger completion and the last median analyst forecast in the three-month (six-month) period prior to merger announcement.
Stock-runup	Buy-and-hold-abnormal return over days (-210,-11) prior to announcement date using the CRSP equally -weighted index as the market return
Equity deal	Dummy variable that takes one if the acquirer pays with stock
Private target	Dummy variable that takes one if the target is a private firm
Relative deal size	The ratio of transaction value over firm size (MVE)
