Essays on Hedge Fund Activism

Evidence From the Recent Financial Crisis

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To my family . . .

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INTRODUCTION

Hedge fund activism is relatively a new phenomenon which has gained considerable attention in academics as well in financial press. Being exempted from several regulatory constraints, using sophisticated investment strategies, and attractive managerial compensation have allowed activist funds to replace the monitoring role once occupied by other corporate raiders in 80's. As a result of activist effective monitoring, all associated stakeholders have been seen as benefitting from the realized positive outcomes in the short-run as well as in the long-run. In order to extract these gains, active funds adopt a multifaceted strategy which may include to acquire largely concentrated stake in firm, lead campaign using tools of shareholder proposal, proxy contest, takeover, and media attention among others. Activist funds lead solely, however at times also function collaboratively with other institutional investors.

Despite the significant gains, fund-related activism has been criticized for the gains in the short-run, which are supposedly extracted on the cost of long-run value destruction. In addition, these gains are considered to be realized when markets were functioning in good conditions. The recent financial crisis, which has appeared significantly detrimental to hedge fund industry and challenged the traditional approach to activism, provides a competitive environment to test the performance in firms targeted by activist funds.

Using a uniquely hand collected dataset consisting of 551 US listed firms targeted by 112 active hedge funds over the period of January 2000 to December 2013, we study the impact of activism in two distinctive perspectives; in general for the entire sample period and in particular for the crisis period. Related with activism, we largely emphasize on to examine fund behaviour whilst targeting the firms and working mechanism with which the management in target firms is engaged. In doing so, we initially investigate the target firms' characteristics whether they are valued or growth stock. How activists do attempt to impact the internal governance of targets by influencing their managerial decisions? In addition, are there any observable changes to targeting patterns following the recent financial crisis?

Introduction

Does crisis affect the return to activism? And equally important question whether target firms perform better than nontargets in the short-run as well in the long-term before and after the crisis. These questions have been raised and possibly discussed in first chapter of the dissertation.

We define fund activism as an event when a hedge fund acquires 5% or more ownership stake in a publicly listed firm with intent to influence the firm's internal governance, and it reports a mandatory file namely Schedule 13D within 10 days of acquiring stake to the Securities and Exchange Commission of the US. In Schedule 13D fund states explicitly its objective of targeting firm and proposes its agenda. If a fund is not interested to serve an active role, then upon crossing a threshold of 5% or more, alternatively it reports Schedule13G within 45 days at the end of calendar year. We collect our event firms from Schedule 13D and nonevent firms from Schedule 13G. The firms drawn from 13D Forms and 13G Forms are targeted by a similar set of 112 US hedge funds over the period of 2000 to 2013. Thus, using samples comprised of firms drawn from similar funds allow us to control for the quantitative and qualitative characteristics of the activists in comparative analysis.

The summary statistics of target firms characteristics in lagged year of fund activism exhibit that firms are medium in size, undervalued, and financially profitable using time-series and cross-sectional analyses. The differential effects between target and nontarget firms largely explain the cross-sectional variation in fund decision of targeting the firms based on observable characteristics thus causing selection bias issue in analysis. To mitigate this potential issue, we identify propensity score matching methodology to assess the probability of firm to be targeted for fund activism based on certain observables. The estimates obtained from propensity score matching reveal that target firms are significantly distinguishable from nontarget firms.

Prior documented studies on hedge fund activism report that stock market positively responds to the fund announcement in target firm. We test this phenomenon by assessing the market reaction to fund's notification in target firm around the announcement date by utilizing event study framework. Using several event-windows of multiple lengths, we find that on average more than 5% cumulative abnormal returns is realized in the short-run. At next stage, we examine the cross-sectional distribution of these abnormal returns for well-defined types of activism. Regressing multi-period abnormal returns against types of activism, we find that fund's stating its objective to intervene in firm's capital structure is significantly rewarded followed by intervention in business strategy. However, these results pronounce more for

business strategy, when we account for crisis effect. Interestingly, the funds targeting firms without a pre-specified plan generate significant returns regardless the crisis effect.

In addition, we address the concerns expressed by critics about fund's myopic behaviour which describes activist as destructor to long-term value by analyzing long-term performance following the activism. We examine one year post-activism accounting performance in targets using propensity score matching methodology assuming firms are targeted nonrandomly. Then we relax this assumption and report the results using standard difference-in-difference approach. While using two different approaches, we present results in time-series and cross-sectional analysis. Our findings for one year succeeding activism suggest that targets experience substantial improvement in valuation, profit margin, and investment.

To examine crisis impact on target firms' performance, we test two distinctive hypotheses. In first hypothesis, we test whether recent crisis has impacted the performance of target firms. To test this hypothesis empirically, we divide full sample broadly into two periods; pre-crisis period from 2000 to 2006, post-crisis period from 2007 to 2013. The accounting measures of performance initially suggest that target firms perform better than nontargets in terms of value, profitability, and investment.

In second hypothesis, using a subsample of firms targeted during 2006 and 2007, we examine their performance in two years 2008 and 2009 during crisis period. We test whether these firms perform better in excess of matching sample firms before and after the crisis period. The post-activism two years performance in firms suggest that target significantly perform better than nontargets when assessed by valuation, profit margin, and investment measures.

We extend our analysis by raising question whether activist funds extract short-run gains over the cost of long-term value destruction. Another equally important question to be investigated is whether induced performance by activist funds in target firms have reversal effect over long-horizon. We are also interested to examine whether monthly abnormal returns pronounce when we control for several biases, and test-specifications over the long-period. These are few central questions which we raise in chapter two of this dissertation.

For a sample of 589 actively targeted firms over the period of January 2000 to December 2013, we explore two distinctive perspectives; first, we examine the power of test-statistics by constructing a wide array of well-defined benchmarks, second, after identifying an appro-

priate matching criterion, we test the abnormality in monthly stock returns using multiple approaches including cumulative abnormal returns, buy-and-hold abnormal returns, and calendar-time portfolio approach.

Using various benchmarks based on reference portfolios, matching sample firms, and multiple market indices, we find that cumulative abnormal returns approach using equally-weighted market index yields well-specified test-statistics which likely helps in mitigating new listing and skewness bias. Using well-defined benchmark, we test abnormality in monthly returns using Fama-French three-factor model in holding period approach and find insignificantly negative abnormal returns for (-12, +36) month event-window. Our findings invariably remain the same when we control for crisis effect.

In contrast with results obtained from using cumulative abnormal returns approach, buy-and-hold approach appears more effective in mitigating biases. When we test for monthly abnormal returns using Fama-French three-factor model as a reference portfolio, the estimates appear negatively significant for (–12, +36) month event-window for full sample period. However, after controlling for crisis effect, the post-crisis period results underperform the pre-crisis.

Unlike cumulative abnormal returns and buy-and-hold abnormal returns approach, test-specifications significantly pronounce for the calendar-time portfolio approach when we use carefully constructed size deciles as benchmark. In addition, the results are consistent and in line with other approaches when reference portfolio is used to address the new listing and rebalancing bias. Moreover, when we test for abnormality in monthly returns, the estimates appear lowest in magnitude, however significant for (-12, +36) month event-window. This finding is in contrast with other approaches for which we do not observe any significance.

In summarizing these results, we may conclude that actively targeted firms relatively perform better than passively targeted firms by similar hedge funds, however underperform the private equity firms over the (-12, +36) month event-window. Our results for both full sample period as well as for crisis are significantly negative. The methodologies to control for the biases and misspecifications in test-statistics partly address the issues. Due to the presence of overlapping in calendar-time and cross-sectional dependence in monthly abnormal returns, the yielded significant estimates are critically questionable.

Have hedge fund target firms become more leveraged following the recent financial crisis? It is the central question, we are attempting to answer in our third chapter. Given the enormous capital outflows from hedge fund industry following the recent crisis, activist funds are curtailed in raising funds to invest their positions in portfolios. On the contrary, Fed's new policy of quantitative easing has led to low interest rates which consequently enticed to high borrowings from financial intermediaries. Hedge funds which are arguably characterized as leveraging their targets have optimally availed this opportunity and channelized the additional borrowings for activism. We initially address this puzzle of additional borrowing in target firms and then examine whether increased level of leverage in target firms affect the fund decision of selling its holdings. We also investigate the impact of crisis on target firm's leverage and on explaining the cross-sectional variation in fund decision making.

Using 543 US listed firms targeted by 112 activist funds, we examine target firms leverage in the year prior to fund activism. We find that target firms leverage level is lower than nontarget firms matched on benchmark of size/book-to-market value/ 2–digit *SIC* industry codes.

We test the hypothesis whether firm's leverage explains any cross-sectional variation in fund decision making about selling its stock. By employing a wide array of multivariate logit regression model, we find mixed results. For full sample period we find that target firm's leverage significantly explains the fund decision making in first and second year of activism. However, when we control for the crisis effect, we find firm' leverage is significant in the first year of activism and insignificant in second year of activism. We interpret these results by implying that in first year with higher level of leverage, activist delays to sell target since it is less likely to find potential buyer. For second year, leverage being insignificant is economically justified as activist restructures debts and thus reduces the leverage.

We also investigate those potential venues to which these additional borrowings are allocated. To examine firms characteristics one year post-activism, we find that target firms experience significant improvement in distribution policy as measured by dividend yield, and payout and investment as indicated by capital structure.

This study has important implications for researchers, regulators, and for investors in the wake of recent financial crisis. For researchers, it provides additional empirical evidence and fresh insights on fund selection behaviour, targeting patterns, working mechanisms, evolved outcomes in a comparative analysis before and after the crisis. To regulators, we posit new

facts which may help them to revisit their preconceived notions about fund activism and expected regulations to align their working with broadly financial system.

PAPER 1

ACTIVIST HEDGE FUNDS: EVIDENCE FROM THE RECENT FINANCIAL CRISIS

Zazy Khan

ABSTRACT. This study extends the empirical evidence of hedge fund activism impact on target firm performance. We investigate whether activism strategies as well as their effects have changed following the recent financial crisis of 2007–2008. The analysis is based on the U.S. data covering 112 hedge funds, 551 target firms, from 2000 to 2013. We find that returns to activism accrue to approximately 5% during the (–20, +5) event window. Activism–related categories that generate significant and positive abnormal returns include capital structure, business strategy, and general undervaluation. Since the financial crisis, business-related activism generates the highest returns, followed by activism in financially depressed firms. We also find significant cross-sectional abnormal returns, both before and during the crisis, for hedge funds who do not pre-specify an objective. One year post–activism performance suggests that target firms experience substantial improvement in value, profit margin, and investment.

Keywords: Hedge funds, event studies, crisis, corporate governance

JEL classification: G12; G14

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1.1 Introduction

While the hedge fund industry has made tremendous growth in the post–crisis period, merely a few attempts have been made empirically to gauge the impacts of crisis on hedge fund–target firms. Since the recent financial crisis has likely challenged the traditional approach to activism and introduced new paradigm shifts, it would be interesting to examine whether and how activists have changed their targeting patterns of influncing firms. This study is among the first ones which attempts to assess the recent financial crisis (2007–08) impacts on active hedge funds' strategic behaviour towards targets and investigates the targets' performance in the short–term and in the long-term.[1]

In their seminal study, Berle and Means (1932) point out that dispersed shareholders holding negligible ownership stake in largely diffused U.S. corporations less likely make any significant difference in the internal governance of firms by their monitoring. To have an adequate due diligence on firms' management, a number of systematically well-defined mechanisms have been introduced in corporate finance literature. In these mechanisms, much emphasis is given to align the manager's interest with those of shareholders in order to alleviate the associated agency issues; however, empirical evidence suggests that so far these measures have appeared less successful in mitigating the agency problems (Baker et al., 1988). Of these monitoring measures, the inclusion of large stockholder is proposed on behalf of dispersed shareholders (Jensen, 1986); however, the evolved outcomes have been economically insignificant (Black, 1998; Carleton et al., 1998; Karpoff et al., 1996; Romano, 2001; Wahal, 1996). The limited role of such monitoring has been subjected to free riding (Black, 1998; Kahan and Rock, 2007; Partnoy and Thomas, 2007; Shleifer and Vishny, 1986), high cost (Black, 1998; Kahan and Rock, 2007), limited investment (Black, 1998; Karpoff, 2001; Parrino et al., 2003), weak financial incentives (Rock, 1990), regulatory constraints (Romano, 2001), conflict of interest (Davis and Kim, 2005), among others.[2]

Contrary to aforementioned limitations, however, the documented literature in hedge fund suggests that characteristics of hedge fund portray it as an ideal candidate to perform monitoring role as an activist (Armour et al., 2009; Bratton, 2006; Briggs, 2007; Kahan and Rock, 2007; Partnoy and Thomas, 2007). Hedge fund, so far, has been relatively preferred over non-hedge fund due to fewer regulations (Ackermann et al., 1999), relaxed taxations

[1]According to Hedge Fund Research (HFR) report, a leading research firm in hedge fund, the assets under management in industry has reached to $2.85 trillion in fourth quarter of 2014 for about 8,000 funds, of this activist funds are 71 (less than 1%) and manage about $120 billion which account for a large part in total assets. [1]https://www.hedgefundresearch.com/

[2]These shortcomings or constraints have been widely discussed in non-hedge fund literature.

(Jaeger, 2003), sophisticated investment strategies including leverage, short selling, derivatives, and concentrated portfolios (Partnoy and Thomas, 2007), (Jaeger, 2003, p. 133), and performance–based incentives (Ackermann et al., 1999). Despite the crisis period, hedge fund activisim has been persistently generating positively significant abnormal returns for its investors (Becht et al., 2014). These returns are arguably attributed to the organizational characteristics of the fund. To revisit this phenomenon, we investigate whether regulatory framework is underlying source of generating distinguishable returns from non–activist hedge fund particularly during the crisis period.

The impact of hedge fund activism on target firms' performance has been rigorously discussed and studied in recent decades (Bebchuk et al., 2014; Boyson and Mooradian, 2011; Brav et al., 2008; Greenwood and Schor, 2009; Klein and Zur, 2006). The empirical findings of largely documented studies provide evidence that hedge fund activism generates positively significant abnormal returns around the announcement of Schedule 13D Disclosures in the short–run and mixed results in the improvement of targets' performance in the long-term.

Numerous studies in hedge fund literature find general consensus that stock market favourably reacts to the announcement of funds' involvement in targets and as a result generates positively significant abnormal returns (Boyson and Mooradian, 2011; Brav et al., 2008; Klein and Zur, 2006). In pre-crisis sample studies, Klein and Zur (2006) report 10.3% abnormal returns over relatively longer (–30, +30) event window including the date of notification. In another study, Greenwood and Schor (2009) utilizing long-horizon data (1993–2006), document 3.5% abnormal returns in 15 days event–window. To add more evidence, Brav et al. (2008) show 7 percentage points abnormal returns in excess of matching firms based on size/book-to-market/industry in (–20, +20) event window and find no reversal in prices in the succeeding year of activism. The announcement related positively significant returns have signaled the market participants to reconsider traditionally prevailing thinking on activist investing. Recently, Becht et al. (2010) analyzing stock performance across regions including Asia, Europe, and North America and report that the US market responds most to fund disclosures which is 6.9% for (–20, +20) event window or 41 days.

Related with long–term targets' performance, the empirical evidence is however, mixed and largely depends on the sample frame and composition. In a seminal study, Brav et al. (2008) analyze the two years post-activism changes in targets and find that in terms of profitability and payout, targets have outperformed the nontargets when matched at industry/size/book to market value. In addition, they also find that at governance level, targets

experience higher CEO turnover following activism. Boyson and Mooradian (2011) using relatively a longer panel over 1994–2007, document that target firms' value improved when measured in terms of Tobin's Q over the course of activism. Another equally important finding is that targets significantly reduced the excess cash holdings thus showing the consistency in the widespread idea that activits reduce the agency costs of managerial discretion. Contrary to these findings, a number of studies report either adverse effects or no improvement in targets following activism. Klein and Zur (2006) do not find evidence of improvement in firms' accounting measures of performance. Instead targets experience decline in earnings per share (EPS), return on assets (ROA), and return on equity (ROE) in the succeeding fiscal year. However, ex-post activism targets' excess cash reduced substantially and distributed among shareholders as dividends. These mixed findings together with significant abnormal returns in the short-run around Schedule 13D filing suggest that the shareholders perceive benefits to reducing agency costs of excess cash and short-term investments.

Using a hand collected data for 112 hedge funds, 551 event firms over the period of 2000 to 2013, we study the impact of activism in two broadly distinctive perspectives, in general for the entire sample period and in particular for the crisis period. Related with activism, we are interested in to investigate whether the targeted firms are valued or growth stock. In addition, how activists do attempt to impact the internal governance of targets by influencing their managerial decisions? Are there any observable changes to targeting patterns following the crisis? Does crisis affect the returns to activism? In case of a visible significant change in targeting trends, we extend to investigate how does activists' target perform differently than non–hedge funds' target? Some of these concerns have been partly discussed in prior fund-related literature (Boyson and Mooradian, 2011; Brav et al., 2008; Klein and Zur, 2006). In this study, we emphasize on addressing these questions with crisis effect in particular.

Hedge funds hold largely concentrated ownership stake in their targets in order to assert their influence in firms' management. To do so, they normally target small and medium size firms. Targeting firms with small market capitalization allow hedge funds to acquire meaningful stake and to induce pressure on management to consider their suggested measures in serious manners. In this study, we find that the characteristics of the targets demonstrate that the firms are, on average, small and medium in size. In addition, they resemble value stock, however financially profitable and operationally stronger than peers in industry. Moreover, target firms are highly leveraged and hold liquid assets compared to matching firms. Previously documented studies including Boyson and Mooradian (2011); Brav et al. (2008) find that firms with less market capitalization and valued stock are highly prone to fund

activism.

Activists target firms with a pre–specified plan of actions. When a fund exceeds a threshold of 5% or more ownership stake in a firm, it reports a mandatory file known as Schedule 13D to the Securities and Exchange Commission of the US. In 13D notification, it explicitly proposes the anticipated changes to the firm. Targets have been experiencing positive and constructive support from activists during the course of activism. These interventions are positively perceived by the market and as a result, market appreciates the stock price in the short–run. The empirical findings of this study are consistent with the prior literature on documenting the short-run value creation around the announcement window. We find that in the short–run target firms' cumulative abnormal returns around the longest (–20, +5) event window exhibits 5.34% appreciation in stock returns which is in line with prior documented studies on fund activism.

We examine the market reaction to various types of activism and analyze the cross-section of short–run abnormal returns. We find that market appreciates most the intervention by an activist suggesting change to capital structure in target. The announcement-related returns (12.2%) accrue more to capital structure activism in which a fund initially intends to reduce the firm's excess cash holdings to mitigate the agency-related issues or repurchases of outstanding stocks and restructuring of the debts. This finding is consistent with crisis period and suggests implicit potential in targeting financially depressed firms. Following restructuring capital in targets, funds who seek to change the targets business course including operational efficiency or to gain favorable terms for mergers and acquisitions (in target) manage to earn 9.2% returns in excess of the matching peers. In addition to these proposals, fund filing 13D announcement without pre-specifying plan are rewarded by 2.8% returns which indicate that market considers the activist involvement as a positive signal for the target. We do not find meaningful reaction of the market to the type of activism which relates to sale of target. In the wake of the recent financial crisis, spinning off some business segment or whole firm is seen as the norm for fund activism, however, we do not find any statistical significant impact for such activity. The type of activism which improves the govrenance issues generates positive returns, however, we find once again lack of statistical significance. In sum, market responds more to funds' pre-specified plan as compared to non-confrontational approaches.

Since the financial crisis, the business–related activism promises the highest returns, approximately 15% which is statistically significant at 5% level. Funds who intervene in targets's business by suggesting measures to improve their operational efficiency which may

include restructuring of business or recommending feasible terms for anticipated merges and acquisitions during the crisis, generate most returns. Another notable finding is financially depressed firms in which fund activism is positively responded by market. In cases where activists target firms which have filed their cases in bankruptcy courts under Chapter 11 during crisis period, appeared potential venue to generate approximately 10% abnormal returns, however merely marginally significant. In a relatively short–period (–10, +10) event window, funds without any intent of serving active role earns more than 9% which is highly significant. Unlike previously gained results, we do not find any statistically significance for the abnormal returns for capital structure–related activism.

While analyzing the long–term one year performance of the target firms, we use two distinctive apporaches including propensity score matching and difference-in-difference approach on both dimensions; time-series and cross-sectional settings. The initial findings for entire sample period suggest that targets outperform their matching firms in terms of valuation, profitability, and in prospects of investment. One year after activism, targets experience substantial improvement in Tobin's Q and this increase in also evidenced by book–to–market value for which the difference in median observation is statistically distinguishable from zero. We also find that targets partly reduced their leverage. These finding are consistent with the documented literature and support the view that fund suggested measures in targets lead the stock price to reflect its fundamentals and thus help to enhance the firm value in long-term.

The targets long-term performance yield mixed results when we account for crisis effect in our analysis. Using difference–in–difference approach, we examine the crisis impact on firm's performance for entire sample and for a subsample of targeted firms during 2006 and 2007. For full sample analysis, we find that targets on average experience significant increase in measures for size, valuation, and investment. However, following crisis, targets suffer in terms of profit margin coupled with increase in debt capacity. For a subsample of firms targeted during 2006 and 2007, the two years long–term performance in 2008 and 2009 demonstrate that firms experience on average increase in profitability, and investment in first year following the fund activism. However, in second year of activism, we observe significant fall in dividend yield and investment.

The study contributes to the existing literature on several fronts. It primarily addresses the fundamental question of the impact of hedge fund's activism on the target firm's performance, and attempts to explore whether activism strategies as well as their effect changes following the financial crisis of 2007–2008. There has been growing literature on fund activism in

recent decades including Bebchuk et al. (2014); Becht et al. (2010); Boyson and Mooradian (2011); Brav et al. (2008); Clifford (2008); Klein and Zur (2006) examining the impact of activist's proactive role on targets' short–term and long–term performance. However, these studies only examine pre– crisis period (except (Bebchuk et al., 2014)) when markets were normal and fund activism was widely appreciated. Since the recent financial crisis might have changed the traditional course of activism, so it would be interesting to reexamine the patterns in targeting firm and to analyze the cross–sectional distribution of evolved outcomes to different types of activism.

Prior studies on fund activism generally characterize a firm selection as a random procedure (Brav et al., 2008). The samples studied in existing literature however suggest that targeted firms are typically financially and operationally strong and hold excess cash. Thus, critics raise a fundamental question on targets post–activism performance and argue that target's better performance is arguably subject to fund good choice rather than fund activism. Contradicting on this view, this study counterintuitively argues that a target selection is non-random and base on observable features indicating that data experience an implicit selection bias. Our analysis of firms' characteristics in the year before activism evidently supports this argument suggesting that activists' target firms are small in size, cash rich, profitable and highly paying out compared to their matching firms. Thus, to mitigate potential issue of endogeneity occuring because of possible sample selection bias, we use propensity score methodology. Using matching approach, we compare each target with controlling firm and estimate the probability of being selected for activism.

This study adds more evidence to the empirically documented literature on fund activism, in particular, considering the crisis effect. Regarding short-run performance, the studies have consistently been reporting abnormal returns around the announcement of 13D filing with no reversal in prices; however, results on targets long–term performance vary significantly.

In addition, activism–related studies have been analyzing a limited sample period. Differentiating on this aspect, this study considers relatively a longer panel covering from January 2000 to December 2013. The large sample frame permits to analyze two important elements: first, to examine how the hedge fund strategic patterns have evolved over the activism period, particularly following the crisis, and second it allows to obtain well diversified additional observations to our sample.

The rest of the paper proceeds in the following way: Section 1.2 discusses the formation of the sample. In section 1.3 presents the summary statistics on fund tactics and the targets' characteristics. Section 1.4 presents analysis about the short-run returns around 13D filing in the overall sample in general and compares it with crisis period. Section 1.5 analyzes the long term performance of targets for full sample period and relates it with prior documented studies. Section 1.6 examines the impact of recent financial crisis on accounting performance of target firms in the long term. Section 1.7 using different specifications analyzes the sensitivity of the results, and section 1.8 concludes the paper.

1.2 Data collection and variable construction

1.2.1 Hedge fund sample

Primarily, a sample of 200 hedge funds is obtained upon request from Barclayhedge.com (private) database with assets under management (AUM– hereafter) and monthly net returns. Of this, funds functioning only in the U.S. are chosen. At next stage, the funds investing in equities under various categories including global macro, global, event driven, market driven among others are shortlisted. To this sample, we add more funds found in hedge fund literature and on related websites. A list of at least 500 randomly chosen funds is assembled. To this extent, the details about fund holdings (AUM) and acquired stakes in firms are unknown. To make it further diversified and well-balanced sample, we perform a search test in the Securities and Exchangd Commission's EDGAR search file with the first name of fund in our list and retrieve additional funds. This process helps in to add more funds to the list which precisely marks about 800 activist hedge funds. From these 800 funds, we drop a large number of funds functioning as abitrageurs or taking positions for short period trading purposes. This leaves our initial activist sample to 127 funds involved in activism. To avoid any possible selection bias, we choose funds regardless of their characteristics e.g. fund size (AUM), previous filing record, performance, and characteristics about fund managers.

At next stage, each fund is searched in EDGAR system for its record from January 2000 to December 2013. Funds usually report several mandatory files during the period, they operate. When a hedge fund acquires 5% or more ownership stake in a publicly listed firm with intent to intervene in the business course of a firm, it is officially required to report the 13D Schedule within 10 days to the Securities and Exchange Commission (SEC henceforth) of the U.S. under the 'Securities Exchange Act of 1934' in order to regulate the transaction

for certain purposes in the secondary market.[3] The Schedule 13D indicates the filer as an activist and provides the details about filer name, the issuer name and identity as an asset class (bank, money manager), the number of total shares outstanding and their form (ordinary or preferred stock), payment methods and related costs, the purpose of transaction, filer holdings in total outstanding shares, and other necessary documentation in the course of transaction's proceedings.[4]

The Schedule 13D discloses essential information about filer's identity. Item 2 entitled as "Identity and Background" describes the reporting person's business address and type, record about filer's, if any, criminal and civil proceedings in last five years. However, it does not mention explicitly the filer's type whether it is hedge fund or non-hedge fund. Thus, to clarify any doubts about fund's identification and position, we examine thoroughly each fund's personal webpage and verify it with Factiva and other related websites. During this systematic search process, some funds are found offering services simultaneously for hedge funds as well as for private equity funds. We trace the parent investment companies which manage these funds and check for their identification. If the filer is found non-hedge fund, we simply exclude it. To give an example from the list of activist funds, Deephaven Capital Management LLC, which manages hedge funds and invests in fixed income securities and in private equity funds. To make sure whether it is classified as hedge fund, we check its website and record on past transactions in SEC to confirm its identification.

Using EDGAR's system to retrieve 13D filings could possibly bias the sample toward big funds and small firms. To acquire a meaningful stake in a firm for activism, a fund is required to invest a substantial part of holding capital. However, some activist funds have involved in target firms with ownership stake less than 5%, thus do not appear in EDGAR's system. For example, in recent period, Sandell Asset Management after acquiring merely 2% stake in JDS Uniphase Corp. (operating in networks and optical products), urged the target to consider a proposal of divesting some subsidiary assets. Following this suggestion, JDS announced its plan saying "This is a strategy our board has been actively considering for some time, ..." The effectiveness of proposal in short period is manifested by fund's

[3]The Schedule 13G is a mandatory disclosure statement for the persons subject to Section 13(g). The qualified institutional investor is requiresd to meet two core elements. First, the institution must have acquired the ownership stake in an ordinary course of business and not with the purpose of influencing the control of issuing authority. Second, the issuer must belong to a specific regulatory institution e.g. bank, insurance firms, saving association under Federal Act, registered investment bank among others. The filer (qualified institutional investor) of 13G Filing is required to report within 45 days of the end of calendar year in which the beneficial owner holds more than 5% or within 10 days of the end of the calendar year in which filer holds more than 10% onwership stake.

[4]Schedule 13D and other filings can easily be downloaded through EDGAR filings search on [1]www.sec.gov.

reputation and its active role in another firm namely Bob Evan Farms Inc., where it acquired four board seats and urged the firm to spin–off particular assets.[5] These events account for a significant portion of the fund-activism. We gather information about such events using various sources including financial press and related websites.[6]

Activist funds file initial Schedule 13D and then frequently report changes to it known as amended file (13D/A). In some cases, these amended files are not reported after first announcement to EDGAR's system. The amended files are used to follow the developments on fund activism during a specific period. In addition, to know how long the fund stayed in firm (in later part of analysis, these amended files are well explained). A notable example is Del Mar Asset Management, LP when it acquired 4.38% stake in Kennedy-Wilson Holdings, Inc. and announced 13D Filing on November 16, 2009. However, EDGAR's system does not report amendments following the initial filing, thus, all such cases are not considered.

A structurally well-defined procedure of multiple cross-checking and scrutinization leaves the sample with 112 U.S. hedge funds demonstrating the average characteristics of industry. In comparison with seminal study by Brav et al. (2008) who analyze 236 activist hedge funds over the period of 2001 to 2006, this study investigates 13D Disclosuers filed by 112 activist funds for a wide period starting from January 2000 to December 2013. Our sample composition in terms of activists' distribution resembles to Boyson and Mooradian (2011) study who investigate 111 activist hedge funds owned by 89 hedge fund management firms over the period of 1994 to 2005.[7] Table 1.2 presents the distribution of the activist funds over the period of 2000–2013. An overview of the sample depicts the monotonic trend. The number of activist funds on average do not vary from 2002 to 2005, however, just before crisis and in following years, an increasing trend is observed. Table 1.3 provides details about activist funds and their targets. Out of 760 fund and firm pairs (repeated in some cases), we have 688 firms uniquely targeted by 112 funds. On average, each activist fund targets 6 firms over the sample period. However, some funds exceptionally (e.g. Harbinger Capital Partners

[5] [1]http://blogs.wsj.com/moneybeat/2014/09/10/activist-sandell-urged-jds-to-explore options/?KEYWORDS=hedge+fund+2+equity+stake.

[6] An important criticism is drawn on activist's successful campaign by seeking insights to know how activists systematically gain board seats or influnce firm to implement their suggested plan by holding even less than 5% ownership stake. To gain insights into this puzzle, activists normally propose their agenda to inclined but reluctant large shareholders including pension funds, mutual funds, private equity funds, and more possibly with other hedge funds with whom they can find common grounds. Activists lead the campaign on behalf of other institutional sharedholders by dividing the monitoring cost proportionately. [1]http://business.financialpost.com/2014/11/15/how-activist-hedge-funds-on-steroids-have-become-a-boardroom-enemy/

[7] How well our sample is diversified and representative of the industry? According to global research firm Preqin [1]https://www.preqin.com/, currently more than 400 activist hedge funds functioning worldwide. Of these 400 active funds, 60% are US based thus comprising 240 funds from which we assemble our sample with 112 activist funds (47%).

Master Fund, Carl Ichan C, Jana Partners LLC, and VP Partners LLC, among others) engage in, on average, more than 20 firms in sample period which demonstrates their wide activist role.

1.2.2 Target firms sample

For a comprehensive list of 760 Schedule 13D events with the announcement dates, we retrieve 688 firms which are uniquely targeted by 112 activst hedge funds over the period of January 2000 to December 2013. For about 9% cases (760–688), some firms are targeted repeatedly in similar months, so therefore in order to avoid repeatition in analyses, we drop the firm occuring twice, however we strictly consider the purpose of transaction for which firm is targeted. At next stage, these firms are searched into the Thomson Reuters Datastream for their DS Mnemonic Codes (identification codes). During search process, about 20% firms do not appear in Datastream, thus we drop them from our sample. Our well–defined search process shortlists 551 U.S. firms, ultimately. These firms are publicly traded at $NYSE/AMEX/NASDAQ$ exchanges.

For a sample of 551 target firms, we extract data on their stock prices and for accounting figures from their balance sheets, income and cash flow statements, respectively. Stock prices are daily based and start prior to the January 2000 to December 2013. Table 1.1 provides in details the definition on variables used in analysis.

Of these 551 firms, a large number of target firms (about 36%) are reported as either dead or completely buyout, merged, or delisted from Datastream during the course of activism. Given that, the database does not explain any reason for disappearing firms. The missing annual accounting figures account for approximately 20% of entire sample. However, these caveats have been noticed by priorovious studies. Among others, Greenwood and Schor (2009) reduce their sample size approximately half to the firms available in Compustat but find it upward biased to small firms.

During the course of activism, a hedge fund keeps on following with the target firm and files several amendments known as 13D/As. These amended files reveal the fund's consideration about the target contemporary performance and its strategic plans regarding future policies. In the majority of these cases, a fund demands merely a formal communication for investment purpose, however, sometimes, it recommends an entire change in the course of actions including displacement of CEO, board management, making or blocking new

mergers and acquisitions (*M&As*), corporate and governance matters. In order not to miss any important information, I go through these amended files in particular and gather all theoretical information on relevant items. In case of a significant change to the previously submitted purpose of the transaction (e.g., if a fund initially purchases the stock for portfolio investment by having no intention of playing an active role at managerial level and later on alters it to participate in corporate activities as an aggressive/hostile investor) then this amended file would be considered as a separate case. However, earlier studies report that these follow up events do not affect the significance of the overall results (see, e.g., (Greenwood and Schor, 2009)). In this sample, 3500 amended files out of total 4260 (6 amendments per initial announcement) constitute about 80% of the total sample.

1.2.3 Matching firms sample

As discussed in the section 1.2.1 that when an investor or activist acquires 5% or more ownership stake and explicitly reveals interest not to influence the control of firm, then it is mandatory for the acquirer to report Schedule 13G within 45 days at the end of calendar year in which the investor holds ownership. In case of holding 10% or more stake, the duration to file 13G Announcement restricts to 10 days at the end of calendar year. We experience that an activist also acquires firm for longer period with nonactive purpose by filing 13G to the SEC. This intuitively motivates to a comparative analysis and raise question to investigate whether firms actively targeted perform better than non–actively targeted firms. In other words, to evaluate the performance of firms reported in 13D Schedules, we use the firms reported in 13G Announcements. We gather all reported 13G disclosures for the similar set of hedge funds for which we collect 13D files over the period of January 2000 to December 2013. From these 13G Files, we gather all relevant information including firm name, percentage of holding to total ownership, and type of shares (common versus preferred stock). Unlike 13D Schedule, 13G Announcement is distinctively exempted from several clauses to report.[8]

Initially we collect 955 firms from 112 hedge funds who report 13G Announcements over the period of January 2000 to December 2013. At next stage, we search these firms in Thomson Reuters Datastream database to retrieve their DS Mnemonic Codes (Identification codes) in order to collect data. For a small number of firms, which constitute approximately 6% of entire sample, however we do not find codes, thuse these firms are dropped from our sample. For the rest of 898 firms, we extract data on daily and monthly stock prices and

[8]In some cases, funds initially report 13D Schedule to the SEC, however later on they are observed to change the status to 13G depending on investment strategy.

annual accounting figures from using Datastream. All matching firms are US based and listed at $NYSE/AMEX/NASDAQ$ exchanges.

1.2.4 Crisis definition

For the analyses of daily and monthly stock returns, we divide the data into two sub-groups, for the period before crisis, it starts from January 2000 to July 2007, and for the period during and after crisis, it begins from July 2007 and lasts until December 2013. For the annual accounting analyses, the observations for the crisis begin from 2007 and onward.[9]

For stock returns, the crisis is measured by means of a dummy variable which takes value one, if Schedule 13D is filed from July 2007 and ends at 2013. In similar fashion, for accounting analyses, crisis is equal to one, if Schedule 13D is reported in year 2007 and onward. Prior studies considering recent crisis impact have been using a similar definition (For detail, e.g., see, Becht et al. (2010); Ben-David et al. (2012); Maier et al. (2011)). In the sample, one third observations fall in the period following the financial crisis.

1.2.5 Event definition

We define an event in our analysis as when an activist hedge fund acquires 5% or more ownership stake in a publicly listed firm with an intention to influence firm's internal governance by a well stated plan of objectives. On crossing the threshold of 5% the fund is required to report a mandatory file known as 13D Schedule to the SEC of the US within 10 days. We gather dates on these reported announcements by two ways; first, the day when a fund acquires ownership and does not disclose to the SEC (its initial holdings), in case of unavailability of first reported date, we consider the date available with the SEC.[10]

[9]The crisis in sub-prime sector which started in early 2007 subsequently trickled down to the financial institutions including banks, holding companies, investment banks, and brokerage houses in the mid of 2007. A general concensus among academicians define the recent financial crisis period from July 2007 till December 2009. Maier et al. (2011) explain the definition of crisis by stating "at the end of June 2007, hedge funds of the investment bank Bear Stearns, which had invested overwhelmingly in the sub-prime mortgage market, were among the first to struggle". (see, for details, 'Bear Stearns says battered hedge funds are worth little', New York Times, July 18, 2007., [1]http://www.nytimes.com/2007/07/18/business/18bond.html?_r=0.

[10]In section 1.2.2, we describe in detail the procedure of gathering information on announcement dates. Since our analysis is sensitive (particularly in short-run) to the fund announcement, thus we are preferably focused on exact dates when a fund acquires stake. To do so, we match dates reported on the SEC website with the ones available in financial press about fund's transaction. In case, a date is found in press reported earlier and mistmatch with SEC, we replace it with officially reported date.

1.3 Summary statistics of activism–based events

1.3.1 Hedge fund intention towards target

Table 1.2 exhibits the distribution of hedge funds over the period of 2000–2013. Interestingly, the number of funds does not vary significantly though relatively a small degree of spike is observed in the closing years of financial crisis.

Table 1.4 delineates the chronological distribution of the events over the sample period. Each event represents a Schedule 13D filing whether it is several times filed by an individual fund or separately filed by different funds. An overview of the figures reveals that there is a steady growth in activism events prior to the onsetting of the financial crisis. The overwhelming majority of the events take place during early 2000 and before financial crisis which is consistent with pre–crisis events' distribution documented by Greenwood and Schor (2009) and Boyson and Mooradian (2011). A potential factor for the significant increase in activist events is well motivated by Greenwood and Schor (2009) by arguing that hedge funds might have replaced the role of pension and mutual funds once occupied in 90s and early 2000s. Another reason could be the expansion in the hedge fund industry in post 2000s when investment was comparatively better rewarded by fund–related activism. A notable downfall in the events following the crisis is attributed to the outflow of capital from hedge fund industry and prudent behaviour of the investor (for detail, see, (Bolliger et al., 2011).

In Schedule 13D form, a filer provides detailed information about the transaction. Item 5 titled as "Interest in the Securities of Issuer" normally discloses information on beneficiary entity individually as well in a group, date of transaction, number of stocks held by each beneficiary, if applies then share class (type A or B). Item 3 known as "Source and Amount of Funds or other Consideration" of 13D filing describes the information on the amount paid on purchasing the stock and sources of payment.

Table 1.5 summarizes the percentage of the shares held by an activist and the related cost incurred on its purchasing. Out of 760 fund–firm pairs, for 733 events (more than 96%) we have details on stocks held by an activist. Mean ownership holding at initial filing is 13% which is in line with Boyson and Mooradian (2011) reported figure. However, quantitatively (in dollar terms) it is many times larger than theirs which indicate that targets in our analysis are much larger in size. Regarding the fund's costs of purchasing stocks, the available information is limited to about 50% firms approximately. The mean cost of the transaction,

by marking the threshold of 5% or above, is about 77 million dollars.

The Schedule 13D file essentially provides the details about filer and target firm. Among others, the Item 4 entitled as "Purpose of Transaction," in which a filer explicity discloses the objective of acquiring stake. These stated objectives declare the intent of filer about target firm whether firm has undervalued stock or requires to be enacted in business or management. Table 1.6 reports the theoretical information gathered from Item 4. To sort out the information, we follow partly the patterns built by Brav et al. (2008) into seven different categories as general undervaluation or maximization of the shareholder value, capital structure, business strategy, sale of the firm, and governance matters, financial distress or bankruptcy and arbitrage.

Consistent with previous studies (Boyson and Mooradian, 2011), an overwhelming majority of cases in our sample demonstrate that an activist fund initially acquires the target firm for value maximizing purpose considering either target is undervalued compared to its peers or contains potential to raise price to demonstrate the true intrinsic value. Aside from active role, a fund whether it files Schedule 13D or 13G, always starts participating in target firm by engaging with management with a central goal of value maximization.

A considerable majority of the cases indicates that funds view their target current business strategy flawed and operationally inefficient, illustrated by an approximately 16 percent of the transaction purposes. A business strategy might involve restructuring, spinning off some assets, blocking mergers and acquisitions or negotiating for better terms of deal and alike. A well proportion of events (11%) demonstrate that funds are concerned over poor corporate governance in target companies. Acquiring a meaningful stake (5% or more) in target firm presumably empowers the activist to get representation on board and to influence the aforementioned managerial decisions. Prior studies ((Boyson and Mooradian, 2011; Brav et al., 2008; Greenwood and Schor, 2009) favourably support this assumption and provide a fair amount of anecdotal evidence from industry. The aggregate of all events classified in table 1.6 exceeds the total reported events is because of non–mutually exclusive stated goals of the funds. Activists generally suggest multiple changes in targets simultaneously, for instance, an activist can involve in ousting CEO along with involving in firm to spin off some noncore asset. Thus, in such cases, each statement is placed into different type of activism.

1.3.2 Hedge fund techniques to influence the target

In this section, we collect and compile the information on fund techniques by which it intends to influence the targets at initial level of activism. These tactics are ordered according to the course of actions. The tactics are *1):* The hedge fund conducts preliminary meetings on a regular basis with the target management to get involved with the ongoing business activities. About half of the cases reveal that funds start active role by negotiation with the management (53.6%). *2):* A considerable majority of funds seeks to get board representation (12.25%). *3):* A small number of hedge funds plan to withdraw their board nominees (2.24%). 4): The funds intend to prevent the target to make any unfavourable decision regarding shares selling at discount (2.24%). *4):* Hedge fund asks the target to change the course of business on proposal of shareholders (8.56%). *5):* Funds performing individually, if unsuccessful then seek the collaboration with other institutions or block holders (5.40%). *6):* The hedge fund threats, confronts, or compel to restructure the target's prevailing course of business (9.09%). *7):* The hedge fund individually or as a group, plans to have a proxy contest against target's merger or acquisition for better negotiation (4.08%). *8):* The hedge fund legally sues the company in bankruptcy court (2.24%). *9):* Hedge fund completely buys out the firm or merge it with other target firm (1.58%).

1.3.3 Characteristics of target firms

Prior literature on fund–related activism argue that fewer regulatory bindings, acquiring large concentrated stake, and using complicated nexus of investment strategies allow fund to assert its influence to alleviate the agency issues associated with managerial discretion (Bratton, 2006; Kahan and Rock, 2007). To do so, what types of firms are included into fund's portfolio? The activist funds preferably target companies with potential prospects in terms of returns and financial performance. The selection of a target is subject to a fund's intended period of holding stake in a target, capital–lockup period, fund and firm operational and financial characteristics. In this section, we investigate the fundamental question of interest, what kind of firms do hedge funds target for activism?

Following prior activism–related literature (Boyson and Mooradian, 2011; Brav et al., 2008), we adopt two distinctive approaches to compare the characteristics of target firms with a sample of matching firms in the year before activism. In first approach, we compare the target firms with their peers based on firm size, book-to-market value, and industry classification. Initially, we sort out all target and non-target firms on 2–digit SIC industry codes. The nontarget firms, which do not match with target firms on 2–digit industry codes are

dropped from sample. For each target firm, at least one matching firm is found. At next stage, we choose the non-target firms whose market value of equity fall between 70% to 130% of market value of the target firm a month before being included into the sample. All target and non-target firms with missing observations are dropped. Finally, we compare the non–target firms with book-to-market closest to the book-to-market value of event-firms. Doing this continuous procedure of matching and scrutinizing reduces the sample considerably (by 52%).

Table 1.8 exhibits the summary statistics of the characteristics of the target companies in the year before activism. We report mean, median, and standard deviation of both target and matching sample firms. To mitigate any non–normality which may arise because of outlier in variables, we follow the prior fund–related literature (Boyson and Mooradian, 2011) and winsorize all variables at the threshold of 1%. The last two columns report the Wilcoxon signed rank test for the difference in the medians between targets and matching sample firms. All figures are annual and retrieved from using Datastream. We compute the essential list of ratios including proxies for firm size, operating and financial performance, debt capacities, profitability, investment, and valuation.[11]

To demonstrate the significane in average differences in the characteristics of target and matching sample firms, we report the difference in medians. Brav et al. (2008) motivate the use of medians difference by arguing that Wilcoxon signrank test characterized as exhibiting asymptotically normal distribution and provides better statistic in situations when variables largely display fat tails in their distributions. Column 8 reports the p-values for the difference in medians.

Starting with the firm size which is proxied by market capitalization, the median difference between the target and matching sample is approximately negatively 13 million dollar, which is insignificant and in line with previous studies stating that hedge funds target small size firm. To look into the details, we gather qualitative information from 13D Filings (section 5 & 6), on firm transaction size and total outstanding shares. On average (median), a fund holds 46.1 (9) million shares in a firm, which constitutes a mean (median) percentage of 13.3 (7.75%). The incurred cost on these transactions are on average (median) 77.7 (16.1) million dollar. Thus, this information provides enough evidence to the typical notion of a fund acquiring substantial stake in the target by spending a large amount of its portfolio capital. However, it is also consistent with the idea that hedge funds normally do not target

[11] For definitions and computation of ratios, table 1.1 is provided.

large firms, for which they need to spend a large part of their capital. Brav et al. (2008) argue that acquiring a significant size in large firm may induce the idiosyncratic portfolio risk for the fund.

Regarding firm valuation measured by Tobin's Q (long-term debt + the market value of equity/ long term debt + the book value of equity) is significantly higher than the matching sample firm by 0.78 points at 1%. In an unreported result, book–to–market ratio (book value of equity/ market value of equity) is positive and exceeds the matching firm by 0.02 points and is significant at 5%. These values clearly demonstrate that undervalued stock is more prone to fund–activism. Evidently, about 60% of funds stated explicitly in Schedule 13D 'Purpose of Transaction' that the targets are undervalued.

Related with firms operational performance which is scaled on sales growth, returns on assets, and profitability are strongly consistent with the previously documented figures. Discussing return on assets, which is much higher for target (0.029) as compared to matching firm (-0.010) and differ from zero significantly. To obtain more evidence from other measures, we examine the (sales) growth prospects of targets. Surprisingly, the target firms outperform the matching firm by 0.03 points which is significant too at 5%. These results are in contrast with Boyson and Mooradian (2011); Brav et al. (2008), who document negatively significant difference in medians. Return on assets and growth coupled with profitability might explain the entire pre-activism targets performance. To assess the ex-ante target's profitability (measured as net income / net sales or revenues), we find that difference in medians is approximately 0.03 points which is marginally different than zero. In a nutshell, targets operational performance portray them attractive for fund activism.

In terms of debt capacities, the book leverage of target (matching) (defined as debt / (debt + book value of equity)), leverage (total debts / total equity), and market leverage (expressed as debt / debt plus + market value of equity) are 0.29 (0.77), 0.27 (0.16), and 0.19 (0.06) respectively and are distinguishable from zero at 1%, 10% and 1% respectively. Except for book leverage, rest of the measures exhibit higher ratios than matching firms which are consistent with the increasing trend in firms leverage in post–crisis period. [12] To look into the details, one can isolate the firms targeted in post-crisis period to examine whether higher leverage is driven primarily by firms in ex-post crisis. These figures differ from Boyson and Mooradian (2011) reported numbers who find target firms with lower leverage ratios as compared to their peers using data before crisis. We may attribute

[12] See e.g. R. Vincent. Leverage ratio surge at large companies. CFO.com, April 10, 2013.

the difference to crisis effect. Some variation in leverage difference can be explained by Fed's new policy of quantitative easing which led to upsurge in firms increased borrowings. Summarizing the firms debt burden, the targets are relatively financially depressed firms.

To examine whether the target firms are capital intensive and technology centered, we assess their investment aspects. Capital expenditure (measured as a percentage of total assets) and research and development (*R&D*, measured as percentage of total assets) are 0.01(0.01) and 0.02(0.01) respectively. Unlike Brav et al. (2008), the firms in our sample spend relatively more than their matching firms in industry. To explore further the sources of deriving higher capital spendings, we look into the industry classfication and find that 40% of the sample comprises of firms belonging to manufacturing industry.

Activist funds pay particular attention to firms provision for liquidity and distribution policy. Target payout policy and excessive cash holding likely increase the probability of being targeted by fund. One of main reason among stated objective of fund is to distribute the excess cash in firm. By doing so, fund achieves two goals; first, to mitigate any agency issue associated with excess cash hoarding, second, to increase payout for its sharedholders. In our sample, the median value (0.08) for cash (percentage of assets) in target firms is lower and significantly different than the median value (0.21) of matching firm sample indicating that targets hold less cash. These findings are in contrast with previously documented studies (Boyson and Mooradian, 2011), who find that matching firms, on average, hoard more cash than targets. Related with cash distribution in terms of payout policy, our median observations for both samples are zero. However, alternatively we compute the test in difference in averages. The dividend yield for target firms significantly differ from matching firms at 1%.

To examine the impact of crisis on the activist's choice of targeting firms, we analyze the characteristics of firms targeted in the year 2007 and onward. Table 1.10 presents summary statistics including mean, median, and standard deviation for targets and matching firms for five years from 2007 to 2013. In comparison with table 1.8 which provides summary results for the entire period, some results are interesting.

An important trend which evidently emerges from crisis period is that activists less likely target highly leveraged firms. Our three separately well–defined measures for debt capacities namely Book Leverage (defined as debt/(debt + book value of equity)), Leverage (total debts / total equity), and Market Leverage (expressed as debt / debt plus + market value of equity) are no more significant (except ML which is marginally significant at 10%) in contrast with

results exhibited in table 1.8 for full sample period.

Summarizing the characteristics of the target companies by a set of conventionally defined ratios, we demonstrate that the activists in this sample target relatively small size, undervalued and financially profitable firms. Our findings also hold with the prior documented studies which find that targets are usually highly leveraged, investment oriented with good distribution policy.

1.3.4 Likelihood of fund–activism

1.3.4.1 Sample selection bias

In section 1.3.3, the characteristics of target firms are compared with those of matching sample firms to examine the targets' performance in the year prior to fund activism. By analyzing the target's features, we attempt to show whether differential effects between a target and a nontarget might explain some potential reasons for a firm to be targeted for activism. However, critics arise fundamental question on fund choice and argue that an activist likely targets a firm which is financially strong, well performing and has potential to reflect its intrinsic value if firm's fundamentals are aligned.[13] Thus, target's outperformance in post–activism period remains controversial and not credited to the fund activism rather subjects to the activist good choice.[14] This raises an underlying issue of sample selection bias primarily occurring because of nonrandomness of targeting patterns and selection on observable covariates. Prior literatrue in fund activism has paid relatively less attention to this potential issue.[15] Apparently, it appears due to the choice–based sampling, in which an activist fund chooses a potential target and not because the analyst (see, e.g., Heckman

[13] In section 1.3.3, the plausibility of nonparametric analysis favourably supports this argument.

[14] To counter this argument, in later analysis, we thoroughly examine the fund suggested measures and following actions in targets to see the real impacts of fund activism on firm's performance.

[15] Recently in a critical study on fund activism, Coffee and Palia (2014) hightlighted this issue by raising serious concerns over formation of matching sample in evaluating activist performance.

(1979)).[16]

Given the nonrandom selectivity, the probability of being selected for fund activism could possibly be discussed using propensity score approach which has gained considerable attention in recent decades (Coffee and Palia (2014); Heckman and Navarro-Lozano (2004); Heckman and Vytlacil (2007); Rosenbaum and Rubin (1983)). Heckman and Todd (2009) propose for propensity score methodology in a setting (experimental studies) where members of the treatment group are over or under represented relative to their frequency in the population. As discussed in section 1.2.1 that our analysis include likely those cases in which an activist files Schedule 13D (acquires $\geq 5\%$) and ignores all such potential cases, where activism takes place with less than 5%, thus considers the treatment group under–representing the total population and fits to the setting to use propensity score methodology.[17]

In this section, we use propensity score approach to a setting where we conjecture that firms are targeted on some observable characteristics for activism. Imbens and Wooldridge (2009); Rosenbaum and Rubin (1983) propose matching sample strategy to encounter confoundedness. [18] It primarily allows to obtain the uniform distributions of target firms with matching sample firms, and thus helps yield possible unbiased estimates. We begin to construct a vector of common characteristics on which we match the targets with controlling firms to assess the probability of a firm to be a potential target. Prior literature on propensity score matching suggest to use all concerned variables which may affect both treatment selection and the outcome (Austin et al., 2007). Thus, we include all possible characteristics which can explain the probability of a firm selection. At next stage, using a logit regression model upon multivariates in lagged period, we examine the probability of

[16]Heckman and Navarro-Lozano (2004) model this issue as an economic choice by considering two potential outcomes (Y_0, Y_1). δ =1 if Y_1 is selected and $\delta = 0$ if Y_0 is selected. Activists pick their respective outcome based on utility maximization (which would be treatment effect in case of choosing good target firms). Let V be utility which is formulated as:

$$V = \mu_V(Z, U_V) \qquad D = 1(V > 0)$$

Where Z are factors (observed by the analyst) determining choices, U_V are the unobserved (by the analyst) factors determining choice and 1 is an indicator function. We emphasize on two different information sets — information set which an activist has and basis on certain observables— information set which an analyst has and is restrained with information about activist's choices.
Another reason for not likely considering issue of selection bias in previous fund-related studies could be that researchers manually construct sample and thus presumably avoid any non–random sampling errors (see, e.g., seminal study of Brav et al. (2008)).

[17]In later analysis, we introduce model to examine the causal effects of fund activism on target firms.

[18]In popular term, this strategy is known as nearest neighbour (NN) matching, based on treatment probabilities. The attractive feature for which Caliendo and Kopeinig (2008); Imbens and Wooldridge (2009) argue that it initially helps to reduce bias rather than variance in estimates.

each covariate in explaining the variation in firm selection.[19] In addition, we show whether our results show persistency with those obtained from nonparametric analysis in section 1.3.3.

Table 1.9 exhibits the effects of covariates on the likelihood of fund activism. We compare sample of target 551 firms with nontarget 898 firms based on propensity score matching. [20] Using logit regression setting, the dependent variable being dummy set to 1, if a firm is targeted in the year before activism. The independent variables include vector of firm salient features.[21] The results are presented. To control for fixed effects, we include industry and year dummies. All variables are winsorized at 1%.

Table 1.9 reports the coefficients of the multivariate regression model results. We discuss some noteworthy results. The market capitalization (in natural logarithm) is distinguishable from zero and provides some explanation for the variation in fund decision whether to target the firm for activism. In table 1.8, a fund choice of targeting firm for activism has also been discussed using non-parametric test. Fund essentially takes into account the size of firm and uses the mode of activism which might affect the firm governance in immediate future.

Firm valuation parameter (indicated by Tobin's Q) is consistent with the result presented in section 1.3.3 and is in-line with prior documented findings (e.g., (Boyson and Mooradian, 2011; Brav et al., 2008)). The coefficient on Tobin's Q is negatively significant at the level of 5%. We interpret it as one standard deviation decrease in Q is associated with 0.55 percentage points increase in the probability of a firm being targeted by an activist. It implies that fund includes undervalued stock into its portfolio.

Regarding firms' debt capacities, the coefficient on book leverage explains the cross–sectional variations in fund objective when targeting a firm. For instance, one standard deviation increase in book leverage increases the probability of firm being targeted with 0.58 points, if other things remain the same. This leaves enough potential for activists to target

[19] In principle, any discrete model can be used to estimate the propensity score. The preference for logit or probit models is highly derived from the unlikeliness of the functional form when the response variable is highly skewed and predictions are outside the [0, 1] bounds of probabilities (e.g., see, Smith (1997). For binary treatment cases, where we estimate the probability of target vs. nontarget — logit or probit models yield almost similar results, however Caliendo and Kopeinig (2008) argue for logit model since it demonstrates more density mass in the bounds.

[20] Alternatively, we can match each target firm with nontarget based on marke value, book-to-market ratio, and 2–digit *SIC* codes.

[21] Each target firm is checked in the SEC Ledger Filing system, where firm is reported with acquirer upon holding 5% or more stake. We consider only those cases, in which a firm has filed 13D in year following activism.

highly leveraged firms to generate value through restructuring their debts.

The patterns emerging from logit regression are consistent with the non-parametric analysis in section 1.3.3 and suggest that activists in general target small size, undervalued and highly leveraged firms to create value for its shareholders.[22]

1.3.5 Changes in targeting patterns during and after the crisis

Following the recent financial crisis, we analyze the activist's behaviour to investigate whether there is any significant change in targeting patterns of fund activism. To examine the changes theoretically, particularly in post–crisis period, we go through the Schedule 13D filings mainly Item 4 to obtain information on activist purpose of transaction. In addition, to gain updates on fund activism in target firms, we further search for related development in financial press. While analyzing theoretically, we emphasize on two aspects; first, following the crisis, what are those potential venues which an activist identifies for value generation? Second, given the restrained circumstances for liquidity, how an activist manages its financing for activism?[23]

To analyze changes in targeting patterns empirically, we examine the event data by generating a dummy variable for the crisis which takes value 1 if a certain type of activism occurs during the period starting from July 2007 to December 2013. In table 1.6, the event summary is decomposed for the periods before and after the crisis into two separate panels. A comparative overview of panel B and panel C depicts an even distribution of the events. To test whether a specific type of activism is exercised relatively more following the crisis, we carry out nonparametric analysis by using Wilcoxon signrank test for the statistical significance for difference in medians in pre– and post-crisis period.

To begin with target's capital structure, we test whether crisis has affected the activists' approach in targeting firm to intervene in capital structure, we find that the median difference between events in crisis period marginally differs than the events before the crisis. For post–crisis Schedule 13D reported events which account for 38% of entire sample period, of

[22] In an auxiliary tabulated result, we find that average probability of a firm being selected for fund activism is approximately 30%.

[23] Since the financial crisis, a paradigm shift has been experienced in fund activism. There are certain components which are more exposed to activists, for example, lack of leverage, *M&As*, governance issues. On the other hand, funds are also facing shortage of liquidity to acquire large stake in firms for longer period. Thus, to investigate these aspects in the wake of crisis would be an interesting subject.

them 40% cases of capital structure come from post–crisis period. This figure is economically justifiable. Since financial crisis, the target firms experienced high leverage and constraints in financing their business, thus appeared as a potential target for activism. In addition, we also find significant change in patterns for the activists targeting firms' internal governance during crisis. Ousting CEOs, formation of boards, and aligning performance–based compensation were norms of financial crisis. For the activists who do not intend to intervene in targets at managerial level proactively, are found distinguishably different than pre–crisis period at 1% level. The activists intervening in targets to reform their businesses including operational efficiency, to make better deals in *M&As* show no significant difference even during crisis.

Next we discuss the firms characteristics targeted during and after the financial crisis in the year before activism. Table 1.10 provides the results obtained from nonparametric analysis for the firms targeted during the period from 2007 to 2013. We report mean, median, and standard deviation of both target and matching firms sample. The last two columns report the Wilcoxon signed rank test for the difference in the medians between targets and matching sample firms. All figures are annual and retrieved from using Datastream. We compute proxies for firm size, operating and financial performance, debt capacities, profitability, investment, and valuation.[24]

The characteristics of target firms in the year before activism during crisis period demonstrate that firms are small in size when measured in terms of market capitalization. The median difference between target and nontarget is negatively 3.71 million dollar, which is distinguishably different from zero at 5% level of statistical significance. In terms of valuation, the difference in medians for Tobin's Q is positive which 0.85 points and significant at 1% level indicating that following the financial crisis, activists targeted valued stock. Looking at operational performance measured by net sales and sales growth, we find that nontarget firms are outperformed by target firms during and post crisis period. The median difference in net sales is approximately 163 million dollar, which is statistically significant at 5%. During this period, targets sales growth positively increased by 4%, however, the difference is not statistically significant. In addition, target firms reduced excess cash by 7% as compared to nontarget firms in the year before activism. We also find that during this period, target firms highly paid their investors in terms of dividend yield, thus the reduction in cash could be used in paying dividends. Target firms are relatively more leveraged in the year before activism as shown by market leverage ratio which is marginally significant at 10%.

[24]Variables are well-defined in table 1.1

To measure the conditional probability of each covariate in firm selection, we compute the propensity score for each firm characteristic using logit p-score model within year. To do so, we primarily start our both samples for targets and nontargets from year 2007 to 2013. Then we extract observations for firm accounting measures in lagged year before fund activism. To facilitate our matching procedure, we also include 2–digit SIC codes, and year. In order to mitigate any possibility of outliers, we winsorize variables at 1% level. Of 551 target firms from 2000 to 2013, approximately half of the firms (263) fall during crisis period from 2007 to 2013. On the contrary, in nontarget firms sample, roughly about 61% firms (545) constitute crisis period. Thus, we find at a minimum one matching firm for each target firm.

Table 1.11 presents estimates on targeted firms characteristics in comparison with nontarget firms using propensity score matching during crisis period. An overview of the results depict that using propensity score, we possibly obtain closed matches between two samples as shown by the differences between treated and control. However, using score matching to reduce selection bias and differences may not hold for some characteristics, for instance, difference between treated and control for ROA and R&D is exceptionally large enough to influence the treatment probability. To test the hypothesis whether target firms during crisis do not differ in terms of characteristics from matching sample firms, we use t-statisics using pstest procedure in an untabulated results and find that target firms during crisis differ from matching sample firms. Moreover we also find that the average probability or propensity score for a firm to be a target for fund activism based on characteristics is 32%. We also observe that by excluding cash variable for which we have less observations in sample, this increases to 38%. In addition, the number of exact match also varies depending upon covariates to measure the propensity score.

1.4 Fund activism and stock returns performance

To address the principal question of value creation through activism is our primary concern. In this section, we investigate how activists strategically target the firm in order to extract the returns and whether activism actually produces value for the shareholders. Second, how does the market perceive and reacts to the suggested measures of the activists? In answering these questions, we analyze the target firms performance in short–run and as well in the long–term. In the short-run, the impacts of activism–related measures are assessed by the market reaction and proxied by stock returns around the announcement date. In the long–term, the activists

impacts are examined by improvement in accounting and finacial performance in targets.

1.4.1 Short–run announcement returns for targets

To measure the immediate reaction of market to the activist's announcement, we utilize an event study approach. Numerous studies have used this methodology to empirically examine the effect of corporate events on a firm's stock price around the announcement days. A well-developed literature begins with Dolley (1933) study of examining the effect of stock split in nominal price. In the late decade of 1960s the seminal studies by Ball and Brown (1968), and Fama et al. (1969) introduced improvements which provide foundation for today's methodology.

Brown and Warner (1980, 1985) investigate the issues which are related with violation of statistical properties in event studies methodologies. A key issue with daily stock returns is non–normality as identified by Fama (1976) and as a consequence the distribution of daily stock returns tends to fat–tailed compared to normal distribution. Brown and Warner (1985) find similar evidence in excess returns by examining the properties of small sample. To this specific problem, Billingsley (1979) proposes Central Limit Theorem and argues that if the cross–sectional excess returns in securities are drawn from independent and identically distributed samples from finite variance distributions, then the distribution of mean excess returns converges to normality as the size of sample increases. To the fact that non–normality does exist in event studies, our sample size is large enough to rule out such problem.

Prior fund activism-related studies have used rigorously event study methodology to examine the effect of fund announcement on the target firm stock price around the notification dates (for details, see, (Boyson and Mooradian, 2011; Brav et al., 2008; Klein and Zur, 2006)).[25]

To compute the abnormal returns in target firms around the annoucement days, Fama and French (1993) three factor model is preferred over the returns from passively targeted matching firms. Two important reasons are argued; first, by matching on these three attributes, we control for systematic risk associated with stock returns and financial characteristics related with firm-type (see, e.g., Klein and Zur (2006)). Second, this approach provides a

[25] In recent periods, the application of event study approach could be seen in various fields of Economics and Finance; In Financial Economics (Brav and Gompers (1997)), Accounting performance (Bhagat et al. (2001)), and Finance and Law (Bhagat and Romano (2002)).

comparative analysis for our results with prior fund activism-related studies who have used equally or value-weighted market index or portfolios to compute abnormal returns.

The adaptation of event study approach in fund activism analyses is critically viewed as it contrasts with the essence of methodology which necessarily requires that the event should be unpredictable by the market. In other words, the critics argue that fund announcement in target firm is a likely event which is perceived in well–advance before the disclosure of notification date, thus this approach is subject to misspecification. To counter this narrative, we argue that our suggested relatively longer estimation window should induce all such information and as a result, the market reaction to the event date should be neutral. However, we show that prior to the fund announcement, the market behaves normally and reacts to the fund notification overwhelmingly.[26] In addition, it is the activist who evaluates the target and declares the intent to intervene in firm's ordinary course of business which is completely indepedent from market assessment. Thus, market is most likely unawared by the fund announcement and unanticipated course of action.

In order to prevent the event from influencing the normal performance model parameter estimates, we construct an estimation window of 120 days as suggested by MacKinlay (1997). For each target firm, we extract daily stock price 150 days prior to the event date and restrict it to 30 days before the given filing or announcement date. An estimation window of four months or (–150, –30) 120 days will likely account for any non-linearity in time series patterns in normal return fluctuations.[27]

Building on the methodologies proposed by Greenwood and Schor (2009); MacKinlay (1997), we construct the initial settings as:

$$AR_{i\tau} = R_{i\tau}^{Target} - R_{\tau}^{Match} \tag{1.1}$$

Where $R_{i\tau}^{Target}$ is (logarithmic) normal return on the target firm security and R_{τ}^{Match} is the (logarithmic) return on the matching portfolio security. To compute abnormal return for each target firm, we use Fama and French (1993) well-constructed six valued–weighted portfolios formed on size, and book-to-market value. These Fama and French (1993)

[26] In later analysis, we show the patterns in market behaviour by constructing multiple event–windows to demonstrate that as soon as the information content is perceieved by the market, it begins to discount all factors associated with the event and reflects into the firm stock price around the annoucement days.

[27] In sample, a small number of target firms (approximately 6%) do not provide an array of stock prices for 150 days prior to the event date for certain reasons. To such insignificant cases, we generate surrogate observations by taking average of closest period values.

three factors include High minus Low (*HML*), Small minus Big (*SMB*), and market return factor.[28] We subtract each announcement observation in excess of aforementioned factors to compute abnormal returns. Then these abnormal returns are aggregated through multiple time dimensions:

$$CAR_i^{\tau_1,\tau_2} = \sum_{\tau=\tau_1}^{\tau_2} AR_{i\tau} \tag{1.2}$$

In the next stage, we test the hypothesis whether mean cumulative abnormal returns are different than zero or equivalently fund announcement has no effect on target firm stock price. To test whether these abnormal returns are statistically significant, we use standard Z test.

To examine the market reaction to fund involvement around the announcement days, we construct event-windows of different sizes. Figure 1.1 plots mean *CARs* for targets over the longest event-window of (–20, +5) or 26 days covering pre and post announcement dates. The evolving pattern in returns reveals insignificant movements in the early days but as market perceives the fund presence, a positive and significant response emerges from the market. The US stock market is characterized as well-informed and highly liquid, it immediately responses to fund's transaction and reflects it into price level. An equally important question arises that up to what extent market reacts to this transaction or in other words how much *CARs* in aggregate are fully realized. There is price run-up which keeps on rising sharply and as a result, there is realization of more than 5% CARs for event window of (-20, +5) days. Figure 1.2 and figure 1.3 decompose the total *CARs* in pre and post–crisis period to know which part of observations is mainly deriving positive returns. A depiction of figure 1.2 clearly demonstrates that pre–crisis fund announcements are well-rewarded by market long before the fund notification by generating about 7% *CARs*, however, on the contrary, in post–crisis period, only positive *CARs* are realized merely one day before the fund notification and hardly marks 3%. These results are in line with Becht et al. (2010) who find a sharp fall in *CARs* approximately by half (10.5% - 5.8%) over the period 2006 - 2010. To significant shortfall in abnormal returns during the crisis period, they argue for the potential collapse of the takeover markets and liquidity.

There is a general concensus over positive response of market to fund announcement. The short-run performance is consistent with prior research on fund activism. As Brav et al. (2008) document an aggregate of 7.2% buy-and-hold returns (*BHARs*) in excess of buy–and–hold returns on the value weighted $NYSE/AMEX/NASDAQ$ index over an event

[28] Portfolios formed on size and book to market can easily be downloaded from [1]Fama-French website.[http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html]

window of (–20, +20) 41 days. Using a longer panel of targets over the period of 1994 to 2005, Boyson and Mooradian (2011) find similar results and report 9% to 11% for filing and event date respectively. In an recent study, Becht et al. (2010) analyze market response to fund disclosure and report that for a relatively longer event window of 41 days, about 6.9% abornormal returns are generated. In contrast with positive response, an early study by Klein and Zur (2006) documents some mixed findings. Their reported figures suggest an array of different ranges of *CARs* from 5.0% to 10.3% over multiple period event windows when abnormal returns are computed using market index. However, when event firms are matched on industry/size/book-to-market, the size-adjusted mean returns are negatively significant.

To identify the early –10 (–20, –10) days effect, we break-up the event window to (–10, +5) days to capture the close impacts of 13D filing on stock prices. Interestingly, there is no significant change to *CARs*. This finding suggests that fund's intent of acquiring firm has been conveyed to the market and thus the information content has been discounted long before the fund formal notification about activism. Table 1.12 illustrates the various event windows and their subsequent *CARs*. Reviewing the aggregate returns for each window, it appears that a large portion of returns accrue just prior to the event or announcement date. The run–up spike follows early days which is depicted by (–10, +5) event window. A drastic change in trading volume is observed in (-10, +5) day event window generating 5.14% *CARs* in excess of the market returns demonstrating an immediate outcome of acquiring a substantial stake in the target in the short-run. However, post-announcement day scenario differs. We observe that the *CARs* reduce approximately by half in (0, +10) event window which indicates that market has exhausted all available information about volume of transaction and activist explicit purpose of targeting firm.

1.4.2 Types of activism and event–days abnormal returns

In previous analyses, enough light has been shed on how activist proposes the purpose of transaction in Schedule 13D filing. These stated objectives are classified broadly into two types; active versus non-active role. Activists identify potential venues for improvement in target firm's value and specify a plan of action. We gather the qualitative information from 13D Filings Section 4 known as "Purpose of Transaction" about fund's type of action and classify them into five widely well–defined categories partly following Brav et al. (2008). In this section, we examine the heterogeneity in market perceptions about fund's particular type

of activism and investigate that which type of activism generates more returns for the fund by constructing univariate settings:

$$CARs_i = \alpha_i + \beta_i Type_i + \varepsilon_i \tag{1.3}$$

Where $CARs_i$ presents abnormal returns for firm i in aggregate manners obtained from multiple event windows, and only explanatory variable $Type_i$ indicates the well–defined type of activism based on fund initial stated objective. Table 1.13 explains the cross–sectional distribution of expected *CARs* accruing to various types of activism.

In table 1.13, column I to IV illustrate the regression results after regressing *CARs* of multiple event–windows against well-defined types of activism. Following the prior literature (Boyson and Mooradian, 2011), the estimated coefficients would be interpreted as market reaction to each type of activism explicitly stated in fund purpose of transaction. In order to control for potential unobserved heterogeneity in returns over time, we control for the target firm size (measured as natural logarithm of market value), year and industry dummies. The long term debt is expressed as the ratio of long term debt to the aggregate of total debt and market value of equity. The model includes dummies for General Undervaluation, Capital Structure, Business Strategy, Sale of Target, Governance. We winsorize firm size and long term debt at 1% level.

Since the model mostly incorporates dummies, to facilitate the interpretation of the coefficients on dummy variables, we follow the practice of suppressing the intercept of the regressions as suggested in previous fund–related literature (see, e.g., Boyson and Mooradian (2011); Brav et al. (2008)). In addition, the nondummy variables, which include the size of the target and long term debt are demeaned and expressed in the form of deviation. As a result, the coefficients on dummies can be interpreted as the average effect of a specific group of type of activism on abnormal returns with the assumption that the targets demonstrate average characteristics.

Table 1.13 presents the effects of covariates on *CARs* of different event windows around the announcement of Schedule 13D. In column I, *CARs* from longest (–20, +5) event window are regressed against the activism dummies, firm size, and the long-term debt. The estimates of all dummies are positive which indicates the proportionate contribution of each type of activism in generating the mean abnormal returns. The fund proposing as to change capital structure of target is successful in generating highest mean *CARs* of 12.2 percentage which is positively significant at 5% level. The returns to capital structure are likely justified in

the wake of the recent crisis in which most of the targets got financailly depressed because of imbalances in capital structure specifically in leverage ratio. Following returns to capital structure, activists who intent to bring changes to target business strategy likewise restructuring or spinning off are generating a mean *CARs* of 9.2% which distinguishes from zero at 5% significance level. Activists with no pre-specifying purpose of transaction are rewarded the least with a mean *CARs* of 2.8% which is marginally significant in the longest (–20, +5) event window. We critically observe another pattern in returns arising from general undervaluation category which shows that as the news of fund notificaiton approaches to date of announcement, the returns eventually increase.

Given the non-mutually exclusive nature of types of activism, an activist can generate an aggregate abnormal returns by getting involved in different types of activism simultaneously. To explain it further, for instance, a fund may suggest its initial objective to change capital structure but later on it may propose additional measures to firm's business strategy, thus could cause to generate an aggregate abnormal return of 21.4% (12.2% + 9.2%). However, if these changes are proposed in the beginning of the first filing, it is less likely to identify the source to which suggestion market reacts most. In table 1.13 column II, *CARs* from relatively shorter (-10, +5) event window are regressed on the set of similar explanatory variables. As a result, the magnitudes of estimates reduce considerably, nonetheless, they remain persistently significant. We explain this differential effect in returns arising from systematic intervals in event windows as market mechanism of discounting the information long before a fund making formal announcement. Column III, and IV explain it further by extending days in post announcement period and show how the coefficients on types of activism become gradually marginally significant. Summarizing the cross–section distribution of abnormal returns, we observe that the market reacts remarkably to the anticipated changes to firms' capital structure and business related activism and reflects an immediate positive reaction into stock prices. On the other hand, market persistently generates abnormal returns to the announcement of funds who merely engage with firm's management on regular basis and do no specify a particular course of action.

These results are in-line with the previously reported studies on activism impact on returns. Brav et al. (2008) find that market reacts most and generates positively significant abnormal returns of 8.54% to the announcement of fund stating its goal to spin off a certain segment of firm and followed by fund who reveals its intent to engage with management without any intervention. Using relatively a longer panel Boyson and Mooradian (2011) document that the fund putting up its stated agenda as to intervene in target's governance

are highly rewarded by price appreciation with a significant *CARs* of 38.5%. The remaining activism-motives other than governance though generate positive abnormal returns but are not distinguishable from zero.[29]

In summarizing, we may conclude that in short–run market responses to the fund announcement and generates positive abnormal returns. We also find that market perceives each type of activism distinctively different by discounting the information it receives about fund announcement and reflects into stock price. The question of generating high abnormal returns subjects to level and degree of activism. In general, the findings in this study are consistent with previous studies on the aspect of positive abnormal returns in short–run, however the variations in cross–section of abnormal returns are attributed to differently composed datasets and approaches to detect them. In addition, prior studies examining the market reaction to fund activism have been using pre–crisis period which is distinguishable factor to be accounted for.

1.4.3 Crisis effect

1.4.3.1 Abnormal returns around the announcement days in post financial crisis

To examine the crisis impact on fund activism, we revisit the model used in section 1.4.2 and incorporate the crisis dummy in it. In addition, we include non-dummies specifications including size of the firm (natural logarithm of market capitalization) and long-term debt (ratio of natural logarithm of long term debt to the sum of natural logarithm of total debt and market value of equity). Both variables are demeaned and presented in a deviation form. The panel regressions regress dependent variable *CARs* on multiple event windows against dummies of activism, crisis dummy, and size of the firm. We control for industry and year fixed effects in all panels. To observe the mean effect of each type of activism, we suppress the intercept term.

Table 1.14 reports the regression results after incorporating the crisis dummy. The coefficient on the crisis dummy is positively significant. Unlike results reported in table 1.13, the coefficients on stated objectives appear with mixed results (both positive and negative), however, quite surprisingly none of the estimate is statistically significant across the event windows of multiple lengths. Our interest, however lies in central variable of interest crisis which is positive and in part explains variations in abnormal returns around the announcement dates. How market responded to activist's announcement regardless any specific objective,

[29] Klein and Zur (2006) report *BHARs* returns for activism types but in a slightly different way which are significantly positive.

figure 1.3 as an evidence, indicates the real effect by reflecting the downfall in returns during the crisis period around the announcement dates.

In the next stage, we examine the cross–section of abnormal returns during the crisis period to investigate how size of the firm in part explains the differential effect in returns. In addition, we also create interactive terms of crisis with types of activism to analyze the effectiveness of each type during crisis period. In general, each coefficient on the interactive term would be interpreted as the mean effect of crisis on each type of activism. In later analysis, we argue for the composition of these variables.

Table 1.15 revisits the previous model with interactive terms and reports the results for multiple event windows. The activist funds proposing structural improvement in target's business direction earn most of abnormal returns in longest (–20, +5) event window. This result is consistent with Becht et al. (2010) findings who report that during crisis takeovers likewise mergers and acquisitions appeared to be a potential source of generating value. The abnormal returns from business – related activism are competitively followed by those funds who put forward their agenda to intervene in financially depressed firms.[30] During recent crisis, default of firm or fund appeared as norm, and forced either voluntarily or involuntarily to be sued in courts. Given such circumstances, if fund appeared to assist and reorganize target's business and reduce debts, then such involvement is highly appreciated from the market. However, approximately 10% *CARs* are realized merely marginally at 10% level. In relatively shorter (-10, +5) event window, coefficient on General Undervalue becomes significant indicating that market is more responsive to the funds aquiring firms without any pre-specifying agenda. Funds without any specified stated goal earns more than 8% in excess of matching sample firms. This in turn contrasts with results presented in table 1.13 which reports that funds serving no active role are rewarded by 3.9% immediately in short period. Interestingly, net gain to nonactive role increases during crisis.

Comparing the results obtained in table 1.15 and table 1.13, two distinct emerging trends are observed. First, since the financial crisis, it is more popular to invest in a financially depressed firm. Firms which experienced inadequate liquidity and operating capital to run business are largely affected during crisis. Activists viewed such firms potential venue which could be exploited to generate returns by appearing as collaborative force. For example when Brookfield Retail Holdings LLC acquired General Growth Properties, Inc stating that firm

[30]Chapter 11 is a legal process which allows both coordiantors including firm and fund to reorganize the target business and pay the debts over time.

has bankrupted and it requires re-organization.

Firms which require more liquid assets and capital to run business are largely affected during crisis. To improve on their business direction, activists find potential to provide liquidity to restructure non-functional segments and assist firm to get on track. Contrary to this finding, it is more profitable to restructure firms debts in full sample period which is evidenced in table 1.13, where highest cross–sectional returns are attributed to fund whose stated goal is to reform capital structure.

Second, regardless crisis effect, a bulk of abnormal returns are driven by business–related activism. For full sample period, it generates more than 9% returns, which increases by 4.2 percentage points with crisis effect. It indicates that business related activities which involve restructuring business, bargaining for better terms in mergers and acquisitions, and emphasizing on growth opportunities are more profitable across any economic situation.

Table 1.16 presents results for model using full specifications of crisis and interactive terms. We regress *CARs* obtained from three different event-windows across types of activism and crisis interactive terms with and without industry fixed effects. From column (1) to (9), we find that estimates for types of activism become insignificantly negative in the period before crisis across multiple event-windows. For the firms targeted without any pre-specified stated objective, however the effect is significantly negative without incorporating year dummies. These results entirely contrast with post-crisis period. The coefficients on crisis interactive terms are insignificantly positive in models when crisis dummy is used. Crisis being highly correlated with interactive terms, we drop it from model and gain results which are significantly positive. Results from various models suggest that market highly appreciates the fund announcement with stated objective of influencing target's business strategy, which is persistently prounces without year effect. Following it, funds without pre-specifying objective of interfering in target firms are highly rewarded from market with approximately 10% *CARs*.

These findings initially suggest that positively significant abnormal returns are primarily driven by post-crisis period despite the economic downturn and heavy losses in stock markets.

1.5 Activism and long–term performance

1.5.1 Model, notations, and analysis

The long–term impact of fund activism on target firm's performance has been assessed using several methodologies.[31] In section 1.9 we initially established in our discussion that an activist targets a firm based on certain observables. Thus our analysis is bounded under assumption of unconfoundedness in which we observe some factors related with both dependent variable and with error term (Rosenbaum and Rubin, 1983). Given this particular setting, we identify propensity score which allows us to assess the conditional probability of a firm being selected for activism.

In this section and in what follows, we analyze the impact of fund activism on target firms in succeeding year using propensity score matching. Initially, the standard formation of unit-level causal effect is modeled partly following Roy–Rubin model (Roy, 1951; Rubin, 1974) as:[32]

$$\tau_i = Y_{it1} - Y_{it0} \tag{1.4}$$

Where Y_{it1} is a potential outcome for firm i after receiving treatment in post-activism year 1, and Y_{it0} is counterfactual outcome for firm i before receiving treatment in pre-activism year 0. The potential outcome is defined as $Y_i(D_i)$ for each firm i, where $i = 1, 2..., N$ and N represents the total population. However, we observe only one outcome for each firm i, i.e., counterfactual outcome which is unobserved during the analysis and leading to the problem of misevaluation. To resolve this issue, Caliendo and Kopeinig (2008) suggest to concentrate on average treatment effect rather than individual treatment effect τ_i.

To assess the average effects of activism for a well–constructed sample representing entire population, generally two eminent estimators are used namely average treatment effect (ATE), and average treatment effect on the treated (ATT or ATET). Since we are interested in those firms which are selected on certain observables and exposed to fund activism — in

[31] Ideally, a standard $Difference-in-Difference$ approach is considered a suitable mechanism to estimate the average effects in a setting where the firms are targeted randomly on unobservable characteristics (Blundell and Dias, 2009; Imbens and Wooldridge, 2009). In a simplest setting, the average gain over time in control group is substracted from the gain over time in the target group. Thus, in doing so, differencing helps mitigate biases in second period on both dimensions time wise as well as cross-sectional.

[32] Roy – Robin model with trivial notations has been adopted in evaluation literature (see, Heckman and Navarro-Lozano (2004)). In this study, the generic functional form of treatment effect is presented in similar fashion.

addition, the targeted firms are matched with another control group which is less likely prone to activism— thus ATT is more relevant expression to estimate the activism impact. [33] The average treatment on the treated is parameterized as:

$$\tau_{ATT} = E(\tau \mid D = 1) = E[Y_1 \mid D = 1] - E[Y_0 \mid D = 1] \tag{1.5}$$

However Caliendo and Kopeinig (2008) argue that counterfactual mean for the firms being targeted – $E[Y_0 \mid D = 1]$ is not observed, so we need a proper substitute for it in order to estimate ATT. The true parameter τ_{ATT} is only identified, if:

$$E[Y_0 \mid D = 1] - E[Y_0 \mid D = 0] \tag{1.6}$$

1.5.1.1 Long–term performance using propensity score matching approach

In this section, we examine the target firms performance using propensity score matching approach based on assumption that firms are targeted on observables.

In table 1.17, we regress the change in firm characteristic as a dependent variable against "Activism Dummy" with using vector of control specifications. The coefficient on activism dummy which indicates average treatment effect after being targeted and would be interpreted as activism impact on firm's accounting performance. To control for fixed effects, we include firm size (measured as natural logarithm of market capitalization) both in linear and quadratic form, industry, and year dummies. We include the observations for which we find close match in controlling sample firms based on propensity score.

Table 1.17 presents some interesting results. The coefficient on net change in cash is negatively significant at 1% level. This initially implies that target firms substantially reduced the excess cash as compared to the year prior to fund activism and thus reduced the chances of being exposed to agency issues related with holding excess cash. In addition, one year long-term accounting performance exhibits that firms experienced overwhelmingly increased investment and improved profitability as indicated by change in capital expenditure and profit margin variables.

In comparison with results presented in table 1.17 in time-series setting, we are keenly interested in long-term performance compared to matching firms. Table 1.18 presents the

[33] Drawing samples (target and nontarget) from similar sample of activists funds (representing sub-population) also arise serious concerns over selection — a problem of endogeniety, which will be discussed in following analysis.

results in excess of matching sample firms one year following the activism. In doing so, we revisit the previous setting and substract the matching firm characteristic from target firm. The net change in firm characteristic is regressed against *Activism Dummy*, and vector of control specifications. Since for each characteristic variable, the number of matches differ between target and nontarget firms, thus each regression experiences different number of observations.

While discussing the results, we find that the coefficient on activism dummy is significant for various dependent variables (change in firm characteristic). Target firms remarkably improve market value comapred to matching sample firms post-activism one year, however only marginally significant at 10% level. In terms of valuation, the book-to-market value is positively significant. Moreover, the targets profitability (measured by return on assets) also positively significant at 5% level. While comparing with matching firms debt capacity in post-activism period, target firms experience fairly reduction in market leverage by 0.39 percentage points which is however marginally significant.

Summarizing these results obtained from using propensity score approach, target firms experience improvement in various components which may include valuation, profitability and investment both in time-series and cross-sectional analyses. These significant improvements are initially attributed to activists suggested measures in target firms.

1.5.1.2 Long–term performance using difference-in-difference approach

In section 1.5.1.1, we primarily assume that firms are targeted based on observable characteristics thus there is potential issue of bias sample selection. To resolve it, we evaluate the target firms' performance for entire period of analysis using propensity score matching approach. In contrast with propensity score methodology, we use a standard difference-in-difference approach by relaxing the assumption that firms are selected nonrandomly. We assume that counterfactual levels for target and nontarget firms are different but time invariably remains the same, and thus formulate it as:

$$E[Y_{0t1} - Y_{0t0} \mid D = 1] - E[Y_{0t1} - Y_{0t0} \mid D = 0] \tag{1.7}$$

Following prior documented studies on hedge fund activism (Bebchuk et al., 2014; Boyson and Mooradian, 2011; Brav et al., 2008; Greenwood and Schor, 2009; Klein and Zur, 2006), we extend the empirical evidence and test the hypothesis whether hedge fund activism

actually improves the targets' performance in the long–term.

To evaluate the long-term performance in targets, we analyze the firms characteristics in one year following activism and compare them with matching sample firms. By doing so, our analysis will provide us comparison on two dimensions; first, we compare the results of post–activism year with the results obtained in pre-activism year (time–series analysis), second, to compare with the performance of the matching sample firms in the year following activism (cross-sectional analysis). As a result, the improved changes may be attributed to the suggested measures by activist funds, assuming other factors remain equal.

To analyze the ex-post performance in target firms in succeeding year following activism, we adopt two approaches. In first approach, we assemble a matching sample using a benchmark of size/book–to–market value/ 2–digit *SIC* industry code in the same year. Then compute the difference in means in pre and post-activism means, and medians for target and matching sample firms. Then, a test of differences between change in medians is used as proposed by Boyson and Mooradian (2011). In second approach using time-series setting, we compare the characteristics of targets in pre and post activism and test the difference in medians.

Table 1.20 presents the characteristics of targets in the year after activism and compares them with matching firms. For the events taking place in 2013 and onward, Datastream is unable to provide data for the next fiscal year. Thus, in such cases, sample drops firms. In addition to this, many firms in the sample in first year of post–activism are either delisted, acquired, merged or simply did not produce data.[34] All variables are winsorized at 1%. The entire set of variables are annual and the accounting data is extracted using Datastream.

In table 1.20 from column I to columm IV, the change in means and medians in target and nontargets are reported respectively. Column V and IV exhibit the difference in change in medians for the targets and report the Wilcoxon signed rank test values to demonstrate the level of significance in the difference in medians.

[34]When a fund announces 13D Filing with a pre-specified purpose, it suggests measures and asserts influence to implement its plan of actions over the course of activism. In some cases, these actions prolong and outcomes are realized in the later period. To receive all such outcomes, fund keeps on increasing its ownership and thus fully buyout the target. In this case, target goes private from public and get delisted. On the other hand, fund forces its portfolio firm A to acquire another portfolio firm B to get high premium. In these cases, database does not provide data for post-activism period.

To assess the long–term impacts of activism on target firms' performance, we analyze firm valuation, operational performance, and profitability measures as argued by Brav et al. (2008) that *ROA* and operating profit margin are reasonable measures which largely remain unaffected by nonoperational factors such as leverage and corporate taxes. Starting with difference in medians for target firms Tobin's Q has reduced merely by 7% as compare to 80% in matched firms, which suggests that targets have gained much appreciation in value compared to their peers during the course of activism. The net value of Tobin's Q in excess of matched sample is 0.73 points which is undistinguishably different than zero at the level of 5%. This finding is strongly supported by the change in book–to–market value. Activists targeted firms improve their book to market value by 0.03 in contrast with 4% reduction in nontargets value. The net value of 7% is positively significant at 1%. These results provide explanation to the activists pre-activism intentions which describe their targets undervalued in most cases and suggest that activists are much successful in improving the targets value. The reason why many targets become delisted following activism is largely explained by the improvement in their value. Activists capitalize on their value and sell them at premium to potential acquirer (for details, see, Greenwood and Schor (2009)).

In analyzing the targets operating profit margin (expressed as ratio of earnings before interest and taxes by net revenues) and growth (percentage change in sales), the findings are interesting. Activists are much successful in maintaing the level of profit margin to the year before activism. Viewing the difference in targets profitability in pre and post period might induce perception that the firms merely sustain the pre-activism profit margin, however they have indeed outperformed the nontargets matched at size/book to market/2 digit SIC industry. Decomposing this ratio ($EBIT$ / Net Sales) and tracking back to the change in sales, we can observe that difference in sales is not that large enough and not distinguishable from zero. This finding evidently supports the view that activists' targets perform much better than their peers. Further extending the analysis, we examine the comparative trends in growth in targets sales. The time-series patterns emerging from chages in growth reveal that there is a reduction of 2 percentage points following activism. Nonetheless, targets lead their peers by 3% which is positively significant at 5% level.

On the side of investment, the capital expenditures (% of total assets) improved substantially following activist involvement. On the contrary, the matched firms reduce largely their spendings on assets. In this study, a large portion of firms is drawn from manufacturing industry (36% and 33% for targets and nontargets respectively) and implies meaningful interpretation of such change in capital structure. A net real effect of 4 percentage points

which is positively significant at 5% level is attributed to the impacts of hedge fund activism.

Summarizing the post-activsm accounting and financial performance of the targets, we may conclude that there is significant evidence that activists facilitate the poorly–performing firms in improving their long-term value. An assessment of targets valuation, profitability, and investment exhibit that targets outperformed their peers. These findings are in contrast with one strand of literature which documents that activists extract short-run returns on the cost of long–term value destruction. Instead, we find evidence that shareholders not only benefit in the short–run but also realize value enhancement in target firms in long-term by the measures suggested by the activists.

1.6 Long–term performance in crisis period

1.6.1 Regression analysis

1.6.1.1 Model, notations, and analysis

In this section, we test two competing hypotheses. In first hypothesis, we test whether and how recent finacial crisis has affected the long–term performance of target firms. To examine crisis effect, we divide target firms sample into two distinctive subgroups; in pre- and post-crisis period. For pre-crisis period, we include all firms targeted between 2000 to 2006. For post-crisis period, we investigate those firms targeted during 2007 to 2013.

Table 1.21 demonstrate some interesting results for time-series nonparametric analysis. We compute summary statistics for both samples before and after the crisis period. An overview of the difference in medians depict that crisis has substantially affected the target firms in terms of size, profit margin, leverage, distribution, and investment. Firm size which is measured by various means including market capitalization, sales, and assets is positively statistically significant implying that firm size being an important factor explains partly variation in the long-term performance.

The recent financial crisis has undoubtedly affected the profitability of target firms. The difference in medians for profit margin, measured by return on assets exhibits 4 percentage points which is negatively significant at 1%. To add more evidence, profit ratio also reduce by 2% for the firms targeted during the crisis period. To examine the crisis impact on target's debt capacity, our book and market leverage values suggest that firms reduce their leverage

during crisis period, however, the difference in medians are statistically insignificant. On the contrary, the leverage ratio (measured by total debt to total assets) indicates that target firms have remarkably increased their leverage following the financial crisis. To investigate the underlying factors for deriving higher leverage in firms, we look into the investment measures by assuming that higher leverage might have used to initiate new investment projects. We find that target firms experience increase in research and development and capital structure by 2.4 percentage points and 2% respectively which are positively significant at 1%. To investigate how distribution policy is affected by crisis in target firms? We observe that the median observations for dividend yield are zero for both samples before and after the crisis. To evaluate it, alternatively, we test the difference in means which is negatively statistically significant at 5%, thus showing that target firms following crisis period reduce paying dividends to shareholders.

These results are partly consistent with those obtained in table 1.19, in which we analyze the firms' performance one year before and after the activism in time-series analysis without considering the crisis effect. We find that size, profitability, and leverage (market leverage) behave in similar way. The differential effect in both section of analyses suggest the part of sample deriving significant results.

In table 1.22, we evaluate the target firms' performance in excess of matching firms before and after the crisis period.[35] The differences in medians suggest some mixed findings. Firm size in excess of matching sample firms is larger by 1.4 percentage points which is significant at 5% level. We experience positive effect for size when measured by net revenues and assets, however statistically insignificant.

In terms of valuation, targets outperform the nontargets in post-crisis period which is significant at 1% level. In addition, target firms find remarkable increase in investment measured by capital expenditures in the post-crisis period. However, following crisis, targets experience higher leverage which is strongly evidenced by positively significant difference in medians for book leverage and leverage ratio. We also find that targets profit margin reduce

[35]The change in firm characterisitc is computed for both target and nontarget before and after the crisis period. To simplify it by an example, we assume the change in market capitalization, i.e., MV:

$$\Delta Characteristic = MV^{t}_{2007-13} - MV^{t}_{2000-06} - MV^{m}_{2007-13} - MV^{m}_{2000-06} \tag{1.8}$$

Where $MV^{t}_{2007-13}$ is the average market value for target firms sample during 2007 to 2013, $MV^{t}_{2000-06}$ is the average market value for target firms sample during 2000 to 2006, $MV^{m}_{2007-13}$ is the average market value for matching firms sample during 2007 to 2013, $MV^{m}_{2000-06}$ is the average market value for matching firms during 2000 to 2006.

in the post-crisis period which is marginally significant at 10%.

In comparison with results in table 1.20, the findings in this analysis partly share some commonalities. For instance, the target firms experience improvement in valuation, investment, and distribution.

To test our second hypothesis, we examine the performance in a similar set of firms which are targeted in pre-crisis period and remain target for fund activism in next two years following the crisis. We evaluate these firms' performance in two years before and after the crisis. By doing so, we expect that change in performance may allow us to attribute it to the fund activism in excess of matching firms during the crisis period. Initially we have a setting, where target and nontarget firms are exposed to an exogenous shock i.e., crisis and we address the fundamental question whether target firms perform better than matching firms during the crisis period. Instead of evaluating the outcome variable before and after the treatment, we evaluate the change in outcome variable before and after the activism in pre and post crisis period. To make our analysis simple, we relax the assumption that targets are selected on observables.[36]

Our difference-in-difference setting initially parameterizes the crisis effect in a simple regression model as:

$$\Delta Characteristics_{it} = \alpha_i + \beta_i Presence + \gamma_i Dummy_i + \theta_i Control_i + \varepsilon_i \tag{1.9}$$

Where $\Delta Characteristics$ is the change in a specific characteristic before and after the crisis period in excess of matching sample firm. The explanatory variable *Dummy* takes a value of 1 if a firm is targeted during that year (during the period when we analyze the change in characteristic) by any other activist. *Presence* is a dummy variable which is equal to 1 if activist fund is still present in firm in the year after crisis. The variable *Control* is the vector of specifications which control for size, indebtedness, age, year and industry fixed effects.

Following Bebchuk et al. (2014), we measure the change in firm characteristics for a subsample of firms targeted in 2006 and 2007 before and after the crisis. Activists generally do not stay in target for longer period and reduce their ownership on average after two years. To account for activist presence in target, we have incorporated dummy namely *Presence*.

[36] A similar question partly has been discussed in Bebchuk et al. (2014) work. They use pre–crisis data to examine the impact of crisis on target's profit margin and valuation measures, however, in their setting — the sample selection is considered randomly.

We examine change in performance on both dimensions; time variate (across the years) and as well as cross-sectional (difference with matching firm). However, there is possibility that the coefficient β on dummy variable can be biased, particularly when firm characteristic is likely correlated with dummy. To simplify it with an example, we assume that a firm is targeted whose debt is lower than the matching firm in 2007 and we are interested in to examine the target's leverage position in one year post–activism. Now suppose that in year 2008, another activist hedge fund acquires a meaningful stake ($\geq 5\%$) and suggests some measures which may lead the target's leverage either to increase or decrease, thus this may cause the coefficient β to produce some spurious effect – especially, it may tend to overvalued the performance of *Dummy* variable in increasing or decreasing the leverage during the crisis – thus without taking these considerations into account, we may report biased estimates.

Table 1.24 illustrates the estimates on different dummies when change in firm characteristic (after minus before) is regressed. For each regression, we control for firm size, age, year and industry fixed effects. As we have relaxed the assumption of biased sample selection, thus we compare the target firms with a matching sample firms using a benchmark of size/book-to-market value and 2-digit *SIC* industry codes. By matching targets on well-defined benchmark reduce our sample drastically. In addition to it, we are evaluating firms targeted during 2006 and 2007, therefore, lower number of observations (11%) is inevitable.

In comparison with Bebchuk et al. (2014) documented findings, the coefficient on variable "*Fund Presence*" is negative in first year implying that firm value reduced in first year of activism during crisis period which is statistically insignificant. In second year of fund activism, however, it becomes insignificantly positive. Following first year of activism, targets improved in terms of profitability as measured by return on assets and profit margin (at 5% and 10% respectively) and investment (indicated by research and development) which is positively significant at 10%. These results, however become significantly negative in second year of activism during crisis period. We do not find any evidence that presence of another activist fund (outside sample) impact on firm performance. These results partly provide evidence that target firms enhanced their earnings and investment even during the crisis period.

In table 1.24, we regress the change in firm characteristic (after minus before) in excess of matching firms against a vector of dummies, and control variables.[37] The results obtained in cross-sectional analysis, interestingly do not deviate much from those in table 1.23. The estimated coefficients on change in profitability and investment are positively marginally significant. Thus, we may conclude that during crisis firms targeted by activists performed relatively well in comparison with their industry peers and we do not find evidence that targets became more fragile and vulnerable to economic shocks compared to nontargets during crisis period.

1.7 Robustness check

To examine whether our results for crisis effect and other types of activism hold for different model settings, we consider several robustness checks. First, we investigate whether size of the firm is an underlying source of surviving from getting delisted after activism. To explain it further, a big portion of the targets got delisted following the activism in this study. Those firms either fully acquired or went private from public, thus did not report annual accounting and stock price data to Datastream. We check whether firm size plays any role during the crisis. Second, we consider the liquidity of target to assess whether it explains cross-sectional returns to firm capital structure. Third, given that the 13G and 13D Filings are drawn from similar funds, we expect market may react differently (high or low) to those 13D announcements which are made to firms previously targeted for 13G.

[37]The change in firm characterisitc is computed for both target and nontarget before and after the crisis period in following simplistic setting:

$$\Delta Characteristic = MV^{t}_{2008-09} - MV^{t}_{2006-07} - MV^{m}_{2008-09} - MV^{m}_{2006-07} \tag{1.10}$$

Where $MV^{t}_{2008-09}$ is the average market value for target firms sample during 2008 to 2009, $MV^{t}_{2006-07}$ is the average market value for target firms sample during 2006 and 2007, $MV^{m}_{2008-09}$ is the average market value for matching firms sample during 2008 and 2009, $MV^{m}_{2006-07}$ is the average market value for matching firms during 2006 and 2007.

1.7.1 Firm and fund size explaining the cross-section of abnormal returns in targets

Table 1.25 presents cross-section of CARs for multiple event-windows by introducing Schedule 13F and six-months pre-activism daily returns to our settings.[38] In our sample, large amount of activist funds hold concentrated ownership in target firms and have filed Schedule 13F along with 13D. Given that, we are interested in to analyze the impact of such large stakeholding on market perception and subsequent impact on initial stock price.

An overview of the estimates reveal that the coefficients on types of activism change across multiple event-windows. In the longest event-window of 26 days, the estimates on *General Undervaluation*, *Capital Structure*, and *Business Strategy* are positively significant at 10% and 5% respectively. In comparison with results presented in table 1.13, the magnitude on coefficients reduce, however remain statistically significant.[39]

1.7.2 Impact of firm size and liquidity on *CARs* during crisis period

Table 1.26 presents results regressing *CARs* obtained from various event-windows against types of activism and crisis-interactive terms. We examine the market responses to the activist certain stated objective given the firm size and liquidity during the crisis period. By introducing firm size and liquidity interactive-terms into our settings, we attempt to decompose *CARs* and measure the differential effect in types of activism perceived by the market. To do so, we construct size (firm) interactive terms with all types of activism during crisis period. In constructing leverage interactive terms, we argue that activists suggesting changes to target's capital structure may involve restructuring of the debts particularly duing crisis period, thus market perceives such changes positively. To the funds getting involved with firms being financially depressed also primarily requires to restructure the debts.

In table 1.26, using full model specificaitons and vector of control variables, we find that the estimates with interactive terms involving leverage are positively significant across various event-windows. These findings support the view that market positively responded to

[38] Institutional investment manager is required to report Schedule 13F to the SEC within 45 days of calendar year after having an aggregate market capitalization of at least $100 million.

[39] In an auxiliary regression, we substitute firm size which is measured in market capitalization with net sales and total assets to check whether different measures explain the cross-section of abnormal returns.

the activist fund's involvement in a firm capital structure during the crisis period.

1.8 Concluding summary

This study examines hedge fund activism impact on target firms performance with a largely hand–collected unique dataset consisting of 112 activist funds targeting 551 firms over the period of January 2000 to December 2013. An activist hedge fund is defined as when a fund accumulates 5% or more ownership stake in a firm with an intent to influence firm's internal governance and announces it with filing Schedule 13D Form to the U.S. Securities and Exchange Commission.

The study investigates the fundamental question whether the recent financial crisis has affected the hedge fund activism. Since the crisis, critics have been questioning the effectiveness of hedge fund monitoring in target firms. Thus, we are also interested in to examine whether crisis might have changed the traditional approach to activism and introduced new paradigm shifts, making it interesting to investigate whether and how firms have accordingly shaped their strategic patterns of impacting the target companies.

The study thoroughly examines the funds' objectives, targeting tactics, target firms' responses, and the evolving outcomes. In comparison with previous studies, it investigates the emerging trends in strategic ways of impacting target firms before and after the crisis. The study identifies pre-crisis period starting from January 2000 to June 2007 and post-crisis from July 2007 to December 2013.

The targeted firms in our analysis share features which are partly in line with previously documented studies. These firms are small and medium in size with undervalued stock, and operationally profitable compared to the matching firms in the year prior to activism. To generate returns in the short-run and to improve value in the long-run in target firms, activist hedge funds normally acquire large concentrated stake, suggest measures, and assert force on the firm's management to follow their proposed agenda. To pursue their stated objectives, the firm's management is tactically interacted. In some cases, they interact with management in friendly way, and on various occasions they confront them in an aggressive manner.

The findings of this study are partly consistent with the prior documented literature on fund activism. In short–run, market reacts positively to the hedge fund activism around the

announcement of 13D filings. The longest (–20, +5) event-window generates a mean *CARs* about 5.34% which is in line with previous studies. A large part of variation in cross-sectional *CARs* accrues to the activists targeting firms with objective of restructuring the debts followed by business-related activism. Since the crisis, funds targeting firms to change the business-strategy earn more than 15% returns which is followed by funds targeting financially depressed firms.

We also test the competitive hypothesis whether short-run abnormal returns are generated on the cost of long-run value destruction. The long–term accounting performance of the targets after one year of activism suggest mixed results. Target firms substantially find increase in profitability, investment, and improvement in value.

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Figure 1.1: CARs (–20, +5)

Cumulative abnormal returns are plotted over the longest event–window of (–20, +5) days for a sample of 551 firms targeted by 112 hedge funds over the period of January 2000 to December 2013. To compute *CARs* for each target, we use Fama and French (1993) well–constructed six value–weighted portfolios formed on size, and book to market value. 0 indicates the announcement date, when an activists formally files 13D Schedule to the Securities and Exchange Commision of the US within 10 days of acquiring ownership stake in firm. We consider 20 days prior to the event date and extend to 5 days in succeeding announcement date.

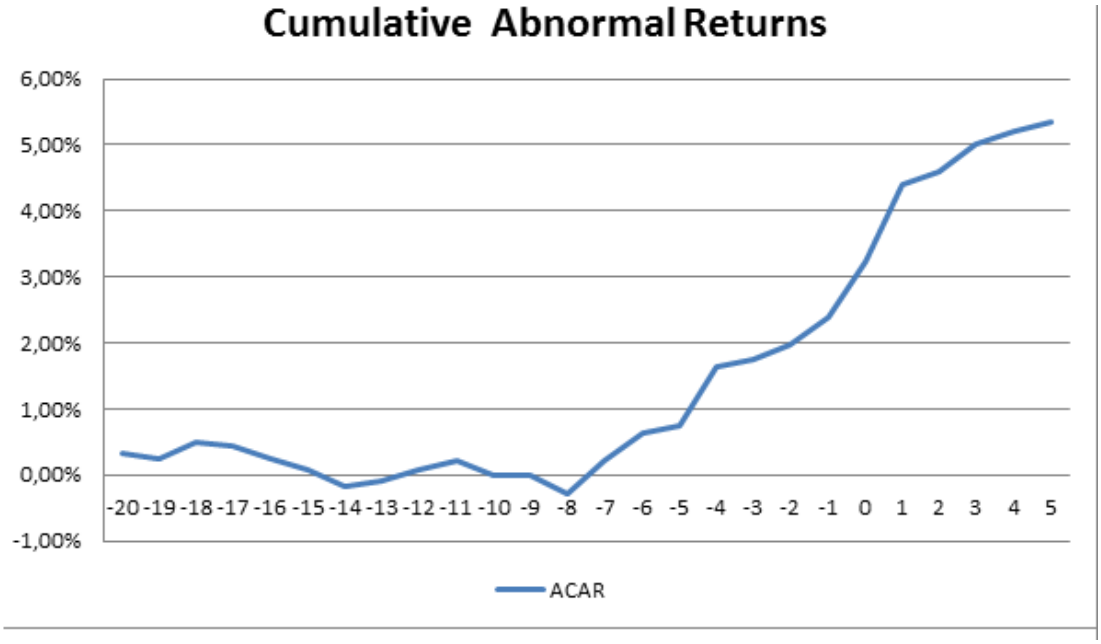

Figure 1.2: Pre–crisis CARs (–20, +5)

Figure 1.2 plots CARs for pre–crisis period. We measure pre-crisis period which begins by January 2000 and ends at June 2007.

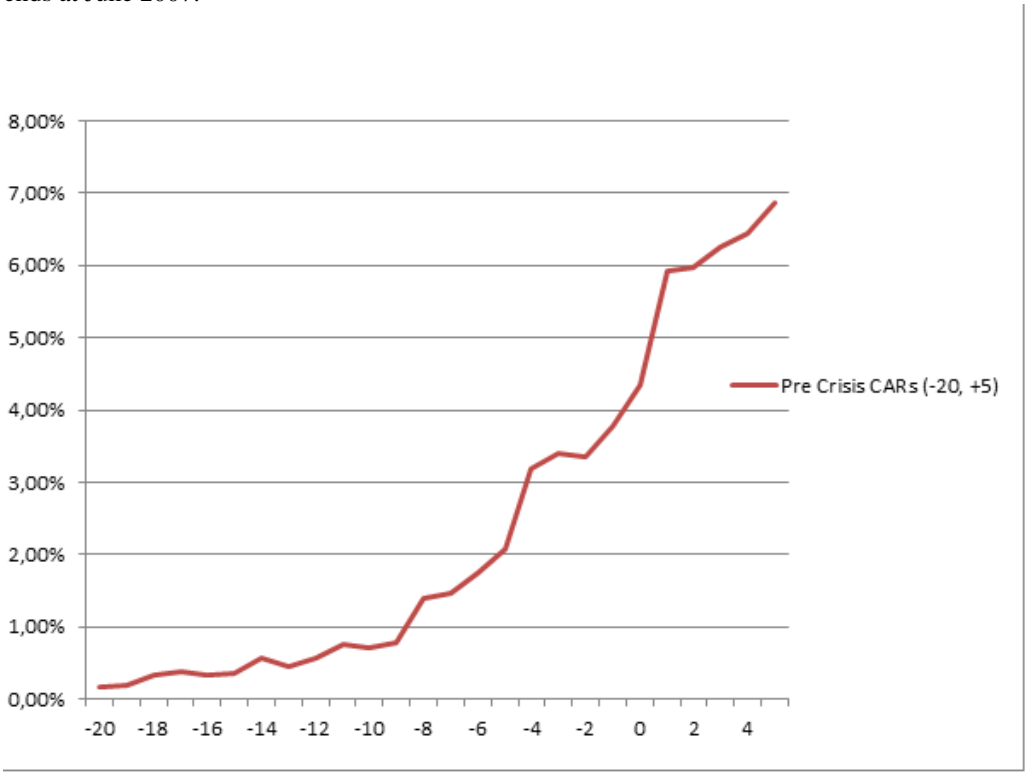

Figure 1.3: Post–crisis CARs (–20, +5)

Figure 1.3 exhibits the CARs performance in post–crisis period which starts by July 2007 and lasts until December 2013.

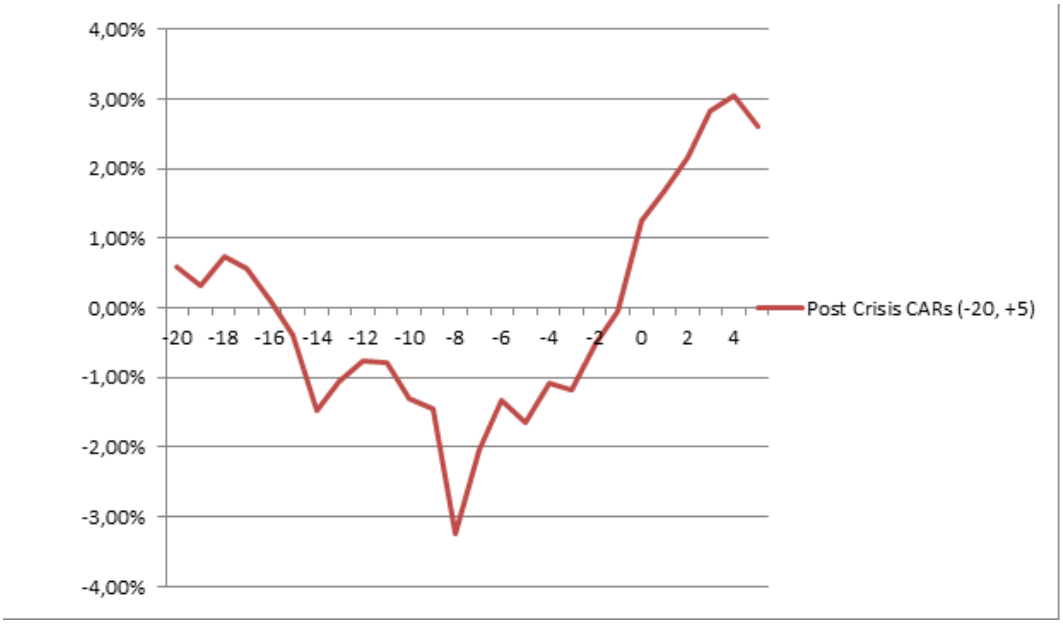

Table 1.1: Variable definitions

Variable	Description
Market value	Total number of outstanding shares times price per share.
Net sales	Firm's annual sales in dollars.
Tobin's Q	Aggregate of long term debt and the market value of equity divided by aggregate of long term debt and the book value of equity.
Book-to-market ratio	Firm book value of equity/market value of equity.
Growth in sales	Annual percentage growth in sales.
Cash flows	Cash as percentage of total assets.
Book leverage	Total debt divided by aggregate of total debt plus book value of total equity.
Market leverage	Total debt divided by aggregate of total debt and market value of equity.
Cash	Aggregate of cash and cash equivalents divided by total assets.
New equity	Amount of new equity issued during the year divided by the lagged assets.
Dividend yield	Aggregate of common dividend and preferred dividend divided by aggregate of market value of common stock and market value of preferred stock.
Payout	Total dividend divided by net income before extraordinary items.
Capital expenses	Capital expenses as percentage of total assets.
Research and development	Research and development as percentage of total assets.
Return on equity	Net income divided by total equity.

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Variable	Description
Profitability	Earnings before interest and taxes divided by net sales.
Liquidity	Cash and short term assets divided by current liabilities.
Growth ratio	Retention rate which is equal to 1 minus dividend declared divided by net income
Return on equity	Net income divided by total equity.
WACC	Weighted average cost of capital, computed as: $$\frac{E}{V}R_e + \frac{D}{V}R_d(1-T_c)$$ R_e Cost of equity R_d Cost of debt E Total common shareholders equity D Total debt V Total value is an aggregate of total equity and total debt.
Cost of equity	Dividend per share divided by current market value of stock multiplied by growth rate of dividends.
Cost of debt	Annual interest payment of total debt divided by market value.
Industry	2–digit SIC industry codes of each firm

Data sources: All accounting and financial figures are extracted from the annual reports of target firms using Datastream.

Table 1.2: Chronological distribution of funds

The table represents the chronological distribution of the activist hedge funds over the period of January 2000 to December 2013.

Years	Number of Funds	Percentage of sample
2000	10	8.93%
2001	4	3.57%
2002	7	6.25%
2003	6	5.36%
2004	7	6.25%
2005	7	6.25%
2006	13	11.61%
2007	10	8.93%
2008	9	8.04%
2009	9	8.04%
2010	17	15.18%
2011	6	5.36%
2012	2	1.79%
2013	5	4.46%
Total	**112**	**100.00%**

Table 1.3: Number of hedge funds and their target firms

This table summarizes in detail the total events, and number of firms targeted by activist hedge funds over the period of 2000 to 2013.

Fund / Firm pair	Number
Total fund/firm pairs	760
Individual fund/target firm pair	760
Number of individual targets	688
Number of individual funds	112
Number of hedge fund management companies	86
Number of firms targeted once	398
Number of firms targeted twice	114
Number of firms targeted thrice	27
Number of firms targeted four times	12
Number of activist hedge funds with 1 target	18
Number of activist hedge funds with 2 targets	13
Number of activist hedge funds with 3 targets	11
Number of activist hedge funds with 4 targets	15
Number of activist hedge funds with 5 targets	11
Number of activist hedge funds with 6 targets	13
Number of activist hedge funds with 7 targets	15
Number of activist hedge funds with more than 8 targets	16

Table 1.4: Chronological distribution of target and matching firms

The following table represents the chronological distribution of firms drawn from Schedule 13D Files, and Schedule 13G Files from EDGAR search system in Securities and Exchange Commission of the US. These files are reported by a similar set of activist US hedge funds over the period of January 2000 to December 2013. A 13D Disclosure indicates intent of an activist to influence the internal governance of target firm whereas a 13G Disclosure shows a fund has no intention to play an active role. All firms are publicly traded at $NYSE/AMEX/NASDAQ$ exchanges.

Year	No. of targets	% of sample	No. of matching	% of sample
2000	23	4.24%	12	1.34%
2001	30	5.52%	28	3.12%
2002	33	6.08%	35	3.90%
2003	28	5.16%	78	8.69%
2004	38	7.00%	106	11.80%
2005	68	12.52%	76	8.46%
2006	67	12.34%	148	16.48%
2007	77	14.18%	122	13.59%
2008	55	10.13%	83	9.24%
2009	23	4.24%	55	6.12%
2010	48	8.84%	87	9.69%
2011	32	5.89%	42	4.68%
2012	10	1.84%	9	1.00%
2013	11	2.03%	17	1.89%
Total	**543**	**100%**	**898**	**100%**

Table 1.5: Percentage of ownership held by fund and firm

The table represents the summary statistics of the information gathered from Schedule 13D Filing using several items, in particular, Item 5 known as "Interest in the Securities of the Issuer". This statistics provides averages about 760 events filed by 112 activist hedge funds over the period of January 2000 to December 2013.

Initial Filing	Mean	Median	Sd.	Min	Max	Obs.
Shares held by hedge fund ($mil.)	46.1	2,600,329	626	147	12200	733
Total outstanding shares by the target	410	28	7930	363	210000	717
Percentage of ownership held by fund	13.13%	7.75%	15.87%	5.71%	100.00%	717
Cost(incl./excl.commission)($mil.)	77.7	16.1	222	7794.2	2310	433

Table 1.6: Categories of activism

This table summarizes the stated objectives and categorizes them into well–defined types of activism for the 760 events reported over the period of January 2000 to December 2013. The types of activism are classified partly following the specifications of Brav et al. (2008). Each type of activism is a dummy which takes value 1 if a specific objective falls in a certain category. The categories are non-mutually exclusive. Panel A summarizes types for entire set of events. Panel B presents the summary of activism types for pre–crisis period which begins from January 2000 to until June 2007. For one–third observations which fall in post–crisis period between July 2007 to December 2013, panel C illustrates the information on types of activism.

Panel A: Types of activism for entire sample period

No.	**Category**	**Stated Objective**	**Number of Events**	**% of Total**
1	CAT1	General Undervaluation	601	79.3%
2	CAT2	Capital Structure	51	6.7%
3	CAT3	Business Strategy	119	15.7%
4	CAT4	Sale of Target Firm	41	5.4%
5	CAT5	Governance	85	11.2%
6	CAT6	Bankruptcy/ Chapter 11	10	1.3%
7	CAT7	Arbitrage	2	0.3%

Panel B: Types of activism before crisis Jan 2000 - June 2007

No.	**Category**	**Stated Objective**	**Number of Events**	**% of Total**
1	CAT1	General Undervaluation	381	68.16%
2	CAT2	Capital Structure	32	5.72%
3	CAT3	Business Strategy	68	12.16%
4	CAT4	Sale of Target Firm	23	4.11%
5	CAT5	Governance	52	9.30%
6	CAT6	Bankruptcy/ Chapter 11	3	0.54%
7	CAT67	Arbitrage	2	0.3%

Panel C: Types of activism during and after crisis July 2007 - December 2013

No.	**Category**	**Stated Objective**	**Number of Events**	**% of Total**
1	CAT1	General undervaluation	221	63.14%
2	CAT2	Capital Structure	20	5.71%
3	CAT3	Business Strategy	51	14.57%
4	CAT4	Sale of Target Company	18	5.14%
5	CAT5	Governance	33	9.43%
6	CAT6	Bankruptcy/ Chapter 11	7	2.00%

Table 1.7: Fund techniques to influence the target

The following table summarizes the qualitative information about an activist fund on how it plans to carry out agenda of influencing the target firm. Activist describes its reason of targeting firm in Item 4 known as "Purpose of Transaction," along with precise plan of action to implement the course of agenda in target firm. These suggested measures could be of multiple-tasking in nature simultaneously. We collect this information from 760 Schedule 13D reported to the SEC and filed by 112 activist hedge funds over the period of January 2000 to December 2013.

No	Tactics	Number of Events	Percentage of Events
1	Meeting with the management on preliminary basis in order to get involve with business activities / negotiation	408	53.62%
2	Seeking board seat for better representation of shareholders interest and to maximize the value through large stake	93	12.25%
3	No more board representation / withdrawal of board seat	17	2.24%
4	Negotiation over limiting poison pills	7	0.92%
5	Shareholder proposal for business structure changes	65	8.56%
6	Negotiation with the larger shareholders in order to change managerial or corporate policy changes	41	5.40%
7	compel to restructure/working with other shareholders	69	9.09%
8	Solicitation/ proxy contest for board replacement or other managerial changes / preventing from acquiring or merging	31	4.08%
9	Legal Suing /sues in the bankruptcy court to fulfill the legal requirements	17	2.24%
10	Acquiring of the total firm/ complete buyout / merging with other firm	12	1.58%
	Total	**760**	**100%**

Table 1.8: Target characteristics in year before activism

This table reports the characteristics of target firms for the year before activism and compares it with a matching sample based on size/book-to-market/2-digit SIC industry. The sample consists of 551 firms targeted by 112 hedge funds over the period of 2000 to 2013. Market Value is a firm stock price times number of shares outstanding and is measured in dollars. Sales represent a firm annual sales in dollars. Tobin's *Q* is defined as (long term debt + the market value of equity/ long term debt + the book value of equity). Book to Market ratio of a firm is expressed as book value of equity/market value of equity. Growth in sales is annual percentage growth in sales. Book Leverage is defined as debt/(debt + book value of equity), Leverage is measured total debts / total equity, Market Leverage is defined as debt/ (debt + market value of equity), Cash as a percentage of assets is defined (cash + cash equivalents)/assets, Dividend Yield is defined as (common dividend + preferred dividend)/(market value of common stock + market value of preferred stock), Payout is defined as total dividend / net income before extraordinary items, Capital Expenses are measured as a percentage of assets, Research and Development is measured as a percentage of assets, Profitability is operating profit margin and measured as EBIT / Net sales. The entire set of data is derived from Thomson Reuters Datastream. We report the mean, median, and standard deviation for both target and nontarget samples. Column VII exhibits the difference in medians between target and matched firm, and column VIII reports the p-value to demonstrate the level of significance in medians. All variables are winsorized at 1%.

Characteristics	**Target firms**			**Matching firms**			**Median comparison[1]**	
	Mean	**Median**	**Sd.**	**Mean**	**Median**	**Sd.**	**Difference**	**p-val**
Market Value ($mil.)	987.86	257.78	2,257.88	936.22	270.33	2,066.06	-12.55	0.2003
Sales ($mil.)	869.22	279.20	1,568.37	613.68	92.36	1,268.47	186.84	0.0001
Tobin's Q	2.56	1.55	4.01	2.13	0.77	5.62	0.78	0.0000
Growth	1.11	1.04	0.67	1.10	1.02	1.24	0.02	0.0454
ROA	-0.04	0.03	0.43	-0.18	-0.01	0.50	0.04	0.0000
Book Leverage	0.46	0.29	1.03	2.13	0.77	5.62	-0.48	0.0000
Leverage	0.83	0.27	4.86	0.41	0.16	2.52	0.11	0.0942
Market Leverage	0.26	0.19	0.27	0.18	0.06	0.24	0.13	0.0022
Cash	0.15	0.08	0.19	0.30	0.21	0.29	-0.13	0.0000
Dividend Yield	0.45	0.00	1.35	0.02	0.00	0.08	0.00	0.0041
Payout	0.00	0.00	0.59	0.17	0.00	2.01	0.00	0.4575
Capital Exp.	0.13	0.01	0.23	0.12	0.01	0.25	0.00	0.6390
R& D	0.10	0.02	0.23	0.12	0.01	0.25	0.01	0.0403
Profit	-2.62	0.04	17.04	-6.32	0.01	32.17	0.03	0.0792
Assets ($mil.)	1,426.21	356.61	4,021.32	919.04	120.43	2,670.10	236.18	0.0000

[1] Wilcoxon signed rank test for differences in medians between the target and the matched firms.

Table 1.9: Logit regression – likelihood of fund activism

The table reports the effects of covariates on the probability of being targeted by hedge fund in the year before activism. The dependent variable is a dummy which takes value 1 if firm had been a target in the previous year. All independent variables are lagged by one year. Column I reports the coefficients and column II reports marginal probabilities. All data is extracted from Datastream. We winsorize all variables at 1%. *, **, *** indicate the level of significance at 10%, 5%, and 1%.

Characterisitcs	Coefficients	Marginal Probabilities
Market Capitalization	-2.962**	-0.414*
	-1.439	0.232
Total Sales	-0.109	-0.015
	(0.151)	0.0206
Growth	-0.325	-0.045*
	(0.199)	0.027
Return on Assets	-0.679*	-0.095*
	(0.397)	0.057
Tobins Q	-0.540**	-0.075***
	(0.217)	0.023
Book to Market value	0.169	0.024
	(0.108)	0.016
Book Leverage	0.575***	0.080***
	(0.221)	0.024
Cash	1.769*	0.247
	-1,064	0.154
Dividend Yield	-0.795	-0.111
	(0.727)	0.089
Research Development	-0.000	-1.51e-07
	(0.000)	0.000
Capital Expenditures	-6.026*	-0.842
	-3,157	0.531
Constant	1.182**	-
	(0.572)	-
# of Observations	88	
Pseudo R-squared	0.211	

Table 1.10: Target characteristics in the year before activism - Crisis period 2007 -2013

This table presents the characteristics of firms targeted during 2007 to 2013 in the year prior to activism. We decompose our full sample (2000–2013) into two parts; before and after the crisis period. For crisis period, we include the years from 2007 to 2013. Target firms' characteristics are compared with a matching sample using benchmark of size, book–to–market value, and 2–digit SIC codes. Table 1.1 provides detailed definition about the variables. The data on accounting measures is extracted from using Thomson Reuters Datastream. We report summary statistics including mean, median, and standard deviation for both target and nontarget samples. Column VII exhibits the difference in medians between target and matched firm, and column VIII reports the Wilcoxon signedrank test p-value to demonstrate the level of statistical significance in medians. All variables are winsorized at 1%.

Characteristics	Target firms			Matching firms			Median comparison[1]	
	Mean	Median	Sd	Mean	Median	Sd	Difference	p-val
Market Value ($mil.)	961.75	257.78	2527.90	1068.63	261.49	2420.86	-3.71	0.0237
Sales ($mil.)	862.22	260.02	1694.81	830.87	97.13	1607.09	162.89	0.0210
Tobin's Q	2.15	1.48	2.00	1.78	0.63	4.23	0.85	0.0046
Book-to-market	0.69	0.54	0.79	0.57	0.59	1.54	-0.05	0.3878
Growth	1.17	1.05	0.89	1.17	1.01	1.42	0.04	0.1578
ROA	-0.003	0.03	0.19	-0.15	-0.00	0.62	0.03	0.0034
Book Leverage	0.54	0.39	0.69	1.78	0.63	4.23	-0.24	0.3709
Leverage	1.37	0.52	7.76	0.22	0.16	1.91	0.36	0.2364
Market Leverage	0.31	0.26	0.23	0.22	0.07	0.26	0.19	0.0635
Cash (% Assets)	0.14	0.09	0.14	0.29	0.16	0.29	-0.07	0.0157
Dividend Yield	2.33	1.73	1.98	0.02	0.00	0.12	1.73	0.0077
Payout	0.05	0.06	0.69	-0.01	0.00	0.47	0.06	0.6245
R&D	0.11	0.08	0.12	0.12	0.00	0.30	0.08	0.9443
Profit	-0.69	0.03	2.71	-0.07	0.03	0.37	0.00	0.2636
Assets ($mil.)	1670.56	380.50	5242.40	1364.16	162.03	3203.39	218.47	0.0108

[1] Wilcoxon signed rank test for differences in medians between the target and the matched firms.

Table 1.11: Firm characteristics during crisis period 2007 - 2013 using propensity score matching

This table reports the results gained using propensity score matching approach. For a set of 263 target firms, we match them with 545 non-target firms using propensity score during 2007 to 2013. In model, we include firm characteristics, industry, and year. All variables are well-defined in table 1.1. ***, **, * indicate 1%, 5%, and 10% level of statistical significance.

Variables	Sample	Treated	Control	Difference	S.E.	T-test
*L*MV	Unmatched	4.898	6.588	-1.689	0.304	-5.54
	ATT	5.283	5.62	-0.342	0.476	-0.72
*L*Sales	Unmatched	18.63	20.232	-1.599	0.347	-4.60
	ATT	18.811	19.57	-0.762	0.556	-1.37
Growth	Unmatched	2.123	1.275	0.848	0.433	1.96
	ATT	1.145	1.421	-0.275	0.231	-1.19
Profit	Unmatched	-0.964	-0.159	-.804	0.288	-2.79
	ATT	-0.052	-0.633	0.580	0.414	1.40
ROA	Unmatched	-0.228	0.0155	-0.244	0.074	-3.26
	ATT	0.008	-0.106	0.114	0.087	1.32
Tobin's Q	Unmatched	2.22	2.811	-.587	0.426	-1.38
	ATT	2.476	2.302	.173	0.891	0.19
Book/Market	Unmatched	0.342	0.576	-0.233	0.189	-1.23
	ATT	0.530	0.693	-0.163	0.164	-0.99
Book	Unmatched	0.503	0.328	0.175	0.085	2.13
Leverage	*ATT*	0.274	0.390	-0.116	0.113	-1.03
Market	Unmatched	0.268	0.193	0.074	0.045	1.63
Leverage	*ATT*	0.148	0.218	-0.070	0.068	-1.02
Leverage	Unmatched	2.700	2.509	0.191	0.347	0.55
	ATT	3.252	3.330	-0.078	0.800	-0.10
Dividend	Unmatched	0.282	0.260	0.022	0.149	0.15
Yield	*ATT*	0.201	0.00	0.201	0.121	1.65
R&D	Unmatched	0.194	0.072	0.122	0.048	2.53
	ATT	0.103	0.116	-0.0131	0.051	-0.26
CapEx	Unmatched	4.938	5.692	-0.754	1.406	-0.54
	ATT	5.371	5.36	0.0111	2.828	0.00
*L*Assets	Unmatched	19.037	20.387	-1.350	0.3134	-4.31
	ATT	19.046	19.749	-0.702	0.487	-1.44

Table 1.12: *CARs* **for multiple event windows and statistical significance**

The table reports cumulative abnormal returns for multiple event–windows and their statistical significance for a sample of 551 firms targeted over the period of January 2000 to December 2013. The longest event window spans over (–20, +5) or 26 days. The event-date is the day when an activist officially announces its holding in target firm upon crossing 5% or more ownership stake. The price data to compute daily returns is extracted from using Thomson Reuters Datastream. ***, **, * indicates 1%, 5%, and 10% level of significance.

Event Window	CARs
(-20, +5)	5.34% ***
(-10, +5)	5.14%***
(-10, +10)	5.43%***
(0, +15)	2.80%***

Table 1.13: Cross-section of *CARs* and types of activism

The following table reports the OLS regression results. The dependent variable is cumulative abnormal returns computed at multiple event-windows around the announcement dates in the short-run. We regress *CARs* obtained from various event-windows against well- defined types of activism and estimates are illustrated in four models. All regression control for size of firm, industry and year fixed effects. Firm size (logarithm of market capitalization), and long-term debt (ratio of natural logarithm of long term debt to the sum of natural logarithm of total debt and market value of equity) are deviated from median value. The activism categories are general undervaluation, capital structure, business strategy, sale of the target firm, and corporate governance. All categories are non-mutually exclusive. The types of activism are dummies; General Undervaluation is set to 1 if fund simply states its objective in its transaction purpose to maximize value without any confrontation, 0 otherwise; Capital Structure is equal to 1, if fund targets the company with clear stated goal of changing in capital structure in its purpose of transaction, 0 otherwise; Business Strategy is set to 1, if fund explicitly describes its objective as to suggest changes in target's business direction, 0 otherwise; Sale of Target is set to 1, if fund mentions its goal to sell partially or fully its target, 0 otherwise; Corporate Governance is equal to 1, if fund describes its objective to involve in its target governance matters, 0 otherwise. The cumulative abnormal returns are regressed into four separate models with multiple event windows of (-20,+5), (-10,+10), (-10,+5), and (0, +15). The standard errors (in parentheses) are adjusted for heteroskedasticity. *, **, and *** indicate 10%, 5%, and 1% level of statistical significance.

Independent Variables	***Dependent Variable: CARs***			
	CAR(-20,+5)	CAR(-10,+5)	CAR(-10,+10)	CAR(0,+15)
MV	-0.026***	-0.017***	-0.017**	-0.010*
	(0.008)	(0.006)	(0.007)	(0.005)
LEV	0.004	0.003	0.002	-0.002
	(0.003)	(0.002)	(0.002)	(0.002)
General Undervaluation	0.028*	0.039***	0.042***	0.019*
	(0.015)	(0.011)	(0.012)	(0.010)
Capital Structure	0.122**	0.095**	0.077	-0.028
	(0.050)	(0.047)	(0.050)	(0.065)
Business Strategy	0.092**	0.075**	0.079**	0.033
	(0.038)	(0.034)	(0.039)	(0.028)
Sale of target	0.044	0.015	0.031	0.046**
	(0.035)	(0.025)	(0.027)	(0.019)
Governance	0.019	0.011	0.008	0.004
	(0.048)	(0.028)	(0.041)	(0.049)
Year	Y	Y	Y	Y
Industry	Y	Y	Y	Y
Observations	355	355	355	355
R2	0.090	0.108	0.082	0.027
Adjusted R2	0.076	0.094	0.068	0.013

Table 1.14: Cross–section of *CARs* and types of activism – crisis effect

This table reports the OLS regression results for cross–section of *CARs* as dependent variable against the well defined categories of activism for various event windows. Following the specification of Maier et al. (2011), the crisis dummy is set to 1 if the observation falls in the period from July 2007 to December 2013. We incorporate crisis dummy. All regression control for size of firm, industry and year fixed effects. Firm size (logarithm of market capitalization), and long-term debt (ratio of natural logarithm of long term debt to the sum of natural logarithm of total debt and market value of equity) are deviated from median value. The activism categories are general undervaluation, capital structure, business strategy, sale of the target firm, corporate governance, and Chapter 11. All categories are non-mutually exclusive. The types of activism are dummies which take value 1 if an activist explicitly states its objective to intervene in firm with pre–specified purpose. The cumulative abnormal returns are regressed into four separate models with multiple event windows of (-20,+5), (-10,+10), (-10,+5), and (0, +15). The standard errors are adjusted for heteroskedasticity and reported in parentheses for each coefficient. *, **, and *** indicate 10%, 5%, and 1% level of statistical significance.

Ind. Variables	***Dependent Variable: CARs***			
	CARs (-20, +5)	*CARs* (-10, +5)	*CARs* (-10,+10)	*CARs* (0,+15)
Crisis	0.102***	0.119***	0.124***	0.139***
	(0.030)	(0.023)	(0.025)	(0.029)
MV	-0.013**	-0.011*	-0.013*	-0.015**
	(0.006)	(0.006)	(0.006)	(0.006)
LEV	0.141***	0.040	0.049	0.083
	(0.051)	(0.040)	(0.039)	(0.051)
General Undervaluation	-0.052	-0.004	-0.043	-0.045
	(0.044)	(0.040)	(0.041)	(0.045)
Capital Structure	0.023	-0.019	-0.019	0.004
	(0.061)	(0.061)	(0.063)	(0.067)
Business Strategy	0.033	0.048	0.050	0.013
	(0.036)	(0.034)	(0.037)	(0.039)
Target Sale	0.001	0.047	0.041	0.036
	(0.065)	(0.058)	(0.053)	(0.071)
Governance	-0.037	-0.017	-0.029	-0.034
	(0.045)	(0.042)	(0.047)	(0.046)
Chapter 11	-0.043	-0.062	-0.079	-0.150**
	(0.075)	(0.064)	(0.064)	(0.071)
Year	Y	Y	Y	Y
Industry	Y	Y	Y	Y
Observations	355	355	355	355
Adjusted R-squared	0.095	0.172	0.165	0.104

Table 1.15: Cross–section of *CARs* and activism types – Crisis interactive terms

This table reports the OLS regression results for cross–section of *CARs* as dependent variable against the well defined categories of activism for various event windows. Following the specification of Maier et al. (2011) study, the crisis dummy is set to 1 if the observation falls in the period from July 2007 to December 2013. To assess the crisis effect, we create crisis interactive dummies for each category. All regression control for size of firm, industry and year fixed effects. MV (logarithm of market capitalization), and LEV (ratio of natural logarithm of long term debt to the sum of natural logarithm of total debt and market value of equity) are deviated from mean value. The activism categories are General Undervaluation, Capital Structure, Business Strategy, Target Sale, Corporate Governance, and Chapter 11. All categories are non-mutually exclusive. The types of activism are dummies which take value 1 if an activist explicitly states its objective to intervene in firm with pre–specified purpose. The cumulative abnormal returns are regressed into four separate models with multiple event windows of (-20,+5), (-10,+10), (-10,+5), and (0, +15). The standard errors are adjusted for heteroskedasticity and reported in parentheses for each coefficient. *, **, and *** indicate 10%, 5%, and 1% level of statistical significance.

Ind. Variables	***Dependent Variable: CARs***			
	CARs (-20, +5)	*CARs* (-10, +5)	*CARs* (-10, +10)	*CARs* (0, +15)
MV	-0.012*	-0.011*	-0.011*	-0.014**
	(0.006)	(0.006)	(0.006)	(0.007)
LEV	0.131***	0.041	0.041	0.085
	(0.048)	(0.039)	(0.039)	(0.051)
General Value* Crisis	0.043	0.081***	0.081***	0.078**
	(0.031)	(0.025)	(0.025)	(0.032)
Capital Structure* Crisis	0.122	0.001	0.001	0.132
	(0.097)	(0.089)	(0.089)	(0.105)
Business Strategy* Crisis	0.134**	0.137**	0.137**	0.124*
	(0.059)	(0.061)	(0.061)	(0.067)
Target Sale* Crisis	0.070	0.092	0.092	0.131*
	(0.066)	(0.057)	(0.057)	(0.071)
Governance* Crisis	0.025	0.050	0.050	0.042
	(0.055)	(0.054)	(0.054)	(0.062)
Chapter 11* Crisis	0.097*	0.053	0.053	0.019
	(0.052)	(0.042)	(0.042)	(0.049)
Year	Y	Y	Y	Y
Industry	Y	Y	Y	Y
Observations	355	355	355	355
Adjusted R-squared	0.091	0.170	0.170	0.092

Table 1.16: Cross-section of *CARs* and activism types with crisis interactive terms using full model specification

We regress *CARs* obtained from multiple event-windows against types of activism with crisis interactive terms in three separate models. Following the specification of Maier et al. (2011), the crisis dummy is set to 1 if a firm is targeted during the period from July 2007 to December 2013. In model I, column (1), we regress *CARs* for 26 days using full specifications including crisis, industry and year fixed effects. For column (2), we do not include crisis since it is highly correlated with types of activism, and year fixed effects. In column (3), we do not include crisis dummy, industry, and year fixed effects. We exercise similar model specifications for *CARs* for (-10, +5), and (-10, +10) event-windows. All regressions control for size and leverage which are not reported for the sake of space. The standard errors are adjusted for heteroskedasticity and reported in parentheses for each coefficient. *, **, and *** indicate 10%, 5%, and 1% level of statistical significance.

Ind. Variables	***Dependent Variable: CARs***								
	CARs (-20, +5)			*CARs (-10, +5)*			*CARs (-10, +10)*		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Gen. Undervaluation	-0.032	-0.090**	-0.011	-0.015	-0.062	0.019	-0.027	-0.107**	-0.007
	(0.052)	(0.045)	(0.032)	(0.045)	(0.041)	(0.029)	(0.053)	(0.049)	(0.035)
Capital Structure	0.044	0.003	0.030	0.015	-0.006	0.027	0.016	-0.034	0.004
	(0.062)	(0.069)	(0.065)	(0.078)	(0.077)	(0.074)	(0.082)	(0.084)	(0.079)
Business Strategy	-0.013	-0.045	0.000	0.005	-0.030	0.016	-0.016	-0.064	-0.010
	(0.048)	(0.044)	(0.042)	(0.037)	(0.035)	(0.035)	(0.049)	(0.045)	(0.044)
Target Sale	0.004	-0.024	0.001	0.037	0.019	0.036	0.026	-0.012	0.022
	(0.063)	(0.078)	(0.069)	(0.070)	(0.075)	(0.062)	(0.066)	(0.087)	(0.074)
Governance	-0.043	-0.053	-0.010	-0.051	-0.061	-0.019	-0.042	-0.060	-0.013
	(0.054)	(0.062)	(0.061)	(0.046)	(0.042)	(0.041)	(0.060)	(0.066)	(0.064)
Chapter 11	-0.027	0.016	0.013	-0.054	-0.000	0.032	-0.144	-0.080	-0.057
	(0.093)	(0.071)	(0.046)	(0.091)	(0.062)	(0.047)	(0.096)	(0.070)	(0.050)
Crisis	0.114	-	-	0.020	-	-	0.145	-	-
	(0.114)	-	-	(0.100)	-	-	(0.125)	-	-
Gen. Value* Crisis	0.035	0.061*	0.061*	0.022	0.092***	0.092***	0.035	0.097***	0.094***
	(0.083)	(0.034)	(0.034)	(0.078)	(0.027)	(0.026)	(0.089)	(0.035)	(0.035)
Capital Structure* Crisis	0.005	0.070	0.068	0.068	0.026	0.037	0.028	0.107	0.106
	(0.129)	(0.116)	(0.107)	(0.126)	(0.114)	(0.103)	(0.141)	(0.128)	(0.121)
Bus. Strategy* Crisis	0.079	0.155**	0.126*	0.090	0.151**	0.123*	0.058	0.159**	0.128
	(0.074)	(0.071)	(0.072)	(0.071)	(0.068)	(0.071)	(0.081)	(0.077)	(0.079)
Target Sale* Crisis	0.021	0.045	0.064	0.002	0.038	0.063	0.005	0.082	0.101
	(0.111)	(0.091)	(0.090)	(0.103)	(0.084)	(0.080)	(0.122)	(0.101)	(0.095)
Governance* Crisis	0.019	0.038	0.027	0.069	0.084	0.073	0.022	0.054	0.050
	(0.084)	(0.084)	(0.081)	(0.084)	(0.068)	(0.071)	(0.094)	(0.089)	(0.087)
Industry	Y	Y	N	Y	Y	N	Y	Y	N
Year	Y	N	N	Y	N	N	Y	N	N
Observations	355	355	355	355	355	355	355	355	355
Adjusted R-squared	0.184	0.089	0.064	0.224	0.169	0.119	0.191	0.092	0.065

Table 1.17: Long-term performance in target firms – Time series analysis

We report the results obtained from using propensity score matching approach in time-series setting. Target firms are matched with industry peers based on firm characteristics, 2-digit SIC codes in similar year using propensity score. The dependent variable is the net difference between the firm characteristic in year after activism minus year before activism. The independent variable is a dummy taking value 1 if a firm is targeted in the year before activism, 0 otherwise. The coefficient on *Activism Dummy* is interpreted as average effect of activism after one year. For each regression, we use vector of control variables including industry, and year fixed effects. Firm characteristics are well-defined in table 1.1. The standard errors are adjusted for heteroskedasticity and reported in parentheses for each coefficient. *, **, and *** indicate 10%, 5%, and 1% level of statistical significance.

Independent Var.	***Dependent Variable*** *Change in firm characteristic one year after activism*										
	Size		***Valuation***		***Operational Efficiency***		***Distribution***		***Investment***		***Profitability***
	MV	Sales	Q	BM	Growth	Cash	DY	Payout	R&D	CapEx	Profit Margin
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
ATET											
Activism	-685.6	52.27	-2.139	-0.876	-0.287	-0.227***	-0.484	-2.552	-0.0765	1.727***	10.33*
Dummy	(741.0)	(568.0)	(1.460)	(0.625)	(0.393)	(0.080)	(0.383)	(4.653)	(0.085)	(0.505)	(5.692)
# Observations	121	122	118	121	115	51	188	102	97	110	113

Table 1.18: Long-term performance of target firms after activsim – Cross-sectional analysis

The following table presents one year performance in target firms using propensity score approach in cross-sectional setting. Each target firm is matched with nontarget firm using propensity score. The dependent variable is change in firm characteristic in excess of matching firm in one year after the activism. The independent variable is *Activism Dummy* which takes value 1 if a firm has been targeted in year before activism. To control for fixed effects, we include firm size (measured as natural logarithm of market capitalization) both in linear and quadratic form, industry, and year dummies. We winsorize size variable at standard 1%. The standard errors are adjusted for heteroskedasticity and reported in parentheses for each coefficient. *, **, and *** indicate 10%, 5%, and 1% level of statistical significance.

Independent Var.	***Dependent Variable*** *Change in firm characteristic after one year compared to matching firm*														
	Size			Valuation		Profitability		Leverage			Distribution		Investment		
	MV	Sales	Assets	Q	BM	Growth	ROA	Profit	LEV	ML	Cash	Divid. Yield	Payout	CapEx	R&D
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
ATET															
Activism Dummy	1,739.880*	79.750	-757.301	-3.958	2.972*	-1.119	53.456**	12.686	-2.439	-0.385*	-0.418	-0.900	-1.812	1.792	0.010
	(1,041.461)	(293.164)	(466.532)	(4.113)	(1.615)	(0.949)	(21.125)	(11.605)	(1.777)	(0.230)	(0.468)	(0.628)	(7.109)	(17.662)	(0.136)
# Observations	77	121	116	102	91	61	88	78	75	33	117	83	91	61	74

Table 1.19: Characteristics of targets in first year post-activism — Time series analysis

The table reports the characteristics of target firms for the year after activism and compares it with a matching sample based on size/book-to-market/2-digit SIC industry. The sample consists of 551 firms targeted by 112 hedge funds over the period of 2000 to 2013. Market Value is a firm stock price times number of shares outstanding and is measured in dollars. Sales represent a firm annual sales in dollars. Tobin's Q is defined as (long term debt + the market value of equity/ long term debt + the book value of equity). Book to Market ratio in a firm is expressed as book value of equity/market value of equity. Growth in sales is annual percentage growth in sales. Book Leverage is defined as debt/(debt + book value of equity), Leverage is measured total debts / total equity, Market Leverage is defined as debt/ (debt + market value of equity), Cash as a percentage of assets is defined (cash + cash equivalents)/assets, Dividend Yield is defined as (common dividend + preferred dividend)/(market value of common stock + market value of preferred stock), Payout is defined as total dividend / net income before extraordinary items, Capital Expenses are measured as a percentage of assets, Research and Development is measured as a percentage of assets, Profitability is operating profit margin and measured as EBIT / Net sales. The entire set of data is derived from Thomson Reuters Datastream. We report the mean, median, and standard deviation for both target and nontarget samples. Column VII exhibits the difference in medians between target and matched firm, and column VIII reports the p-value to demonstrate the level of significance in medians. All variables are winsorized at 1%.

Characteristics	Target firms			Matching firms			Median comparison[1]	
	Mean	Median	Sd.	Mean	Median	Sd.	Difference	p-val
Market Value ($mil.)	982.66	257.78	2,332.29	828.22	194.16	2,032.86	63.62	0.0675
Sales ($mil.)	880.09	273.44	1,672.67	550.80	66.35	1,172.26	207.09	0.0000
Tobin's Q	2.90	1.48	6.28	3.15	1.57	8.42	-0.090	0.4687
Book-to-market	-2.74	0.48	41.01	0.18	0.47	5.63	0.01	0.0000
Growth	1.10	1.02	0.81	1.15	1.07	1.06	-0.05	0.3178
ROA	-0.10	0.03	0.76	-20.42	0.00	74.41	0.03	0.0037
Book Leverage	0.58	0.31	1.77	1.58	0.91	3.74	-0.6	0.0000
Leverage	0.32	0.24	0.41	0.33	0.19	0.71	0.05	0.1913
Market Leverage	0.27	0.21	0.27	0.19	0.03	0.25	0.18	0.0005
Cash (% Assets)	0.14	0.07	0.17	0.30	0.18	0.27	-0.11	0.0000
Dividend Yield	0.46	0.00	1.35	0.01	0.00	0.06	0.00	0.0143
Payout	6.09	0.00	17.19	3.51	0.00	13.55	0.00	0.2740
Capital Exp.	4.14	1.90	6.52	42.86	2.12	99.27	-0.22	0.1573
R&D	0.10	0.01	0.24	0.13	0.01	0.27	0.00	0.0916
Profit	-1.90	0.04	12.07	0.86	1.00	1.93	-0.96	0.0000
Assets ($mil.)	1,466.47	297.97	4,209.40	906.89	114.48	2,774.57	183.49	0.0001
Liquidity	8.83	2.06	60.39	3.39	2.03	4.63	0.030	0.8697

[1] Wilcoxon signed rank test for differences in medians between the target and the matched firms.

Table 1.20: Changes in characteristics in year before and after activism — Cross-sectional analysis

This table presents the difference in medians of targets and nontargets in year before and after activism. The targets are matched with peers based on size/book-to-market/2-digit SIC industry. The sample consists of 551 firms targeted by 112 hedge funds over the period of 2000 to 2013. The entire set of data is retrieved from using Thomson Reuters Datastream. We report the mean, median, and standard deviation for both target and nontarget samples. Column I and II report the differences in means and medians for targets, column III and IV presents differences in means and medians for nontarget firms. Column V exhibits the difference in change in medians and VI reports the Wilcoxon signrank test p–values to demonstrate level of significance in medians. All variables are winsorized at 1%.

Characteristics	Target firms (After-Before Activism)		Matching firms (After-Before Activism)		Median comparison[1]	
	ΔMean	ΔMedian	Δ Mean	ΔMedian	Δ Difference	Wilcoxon signrank test p-val
ΔMarket Value (mil.)	-5.20	0.00	108.00	76.17	-76.17	0.2565
ΔSales (mil.)	10.87	-5.76	62.88	26.01	-31.77	0.6875
ΔTobin's Q	0.34	-0.070	-1.02	-0.80	0.73	0.0282
ΔBook-to-market	-1.64	0.03	-1.55	-0.04	0.07	0.0085
ΔGrowth	-0.01	-0.02	-5E+14	-0.05	0.03	0.0190
ΔROA	-0.06	0.00	20.24	-0.01	0.01	0.0510
ΔBook Leverage	0.12	0.02	0.55	-0.14	0.16	0.3148
ΔLeverage	-0.51	-0.03	0.08	-0.03	0.00	0.2112
ΔMarket Leverage	0.01	0.02	-0.01	0.03	-0.01	0.7394
ΔCash (% Assets)	-0.01	-0.01	0.00	0.03	-0.04	0.7275
ΔDividend Yield	0.01	0.00	0.01	0.00	0.00	0.8139
ΔPayout	6.09	0.00	-3.34	0.00	0.00	0.7749
ΔCapital Exp.	4.01	1.89	-42.74	-2.11	4.00	0.0108
ΔR&D	0.00	-0.01	-0.01	0.00	-0.01	0.8347
ΔProfit	0.72	0.00	-7.18	-0.99	0.99	0.0000
ΔAssets (mil.)	40.26	-58.64	12.15	5.95	-64.59	0.9341

[1] Wilcoxon signed rank test for differences in medians between the target and the matched firms.

Table 1.21: Impact of crisis on target firms performance – time series analysis

The table reports the difference in medians between two sub-groups in target firms before and after the crisis period. For pre-crisis period, we include all firms targeted during 2000 to 2006. For post-crisis period, we include firms targeted within 2007 to 2013. The data on accounting measures is retrieved from using Thomson Reuters Datastream. We report the mean, median, and standard deviation for both subsamples. Column I to III report the mean, median, and standard deviation for target firms before crisis period, and from column IV to VI mean, median, and standard deviation for target firms during and after crisis period are presented. Column VII exhibits the difference in medians and VIII reports the Wilcoxon signed-rank test p-values to demonstrate level of significance in medians. All variables are winsorized at 1%. Firm characteristics are well-defined in table 1.1.

Characteristics	Post-crisis target firms			Pre-crisis target firms			Median comparison[1]	
	Mean	Median	Sd.	Mean	Median	Sd.	Difference	p-val
Market Value ($mil.)	5.77	5.61	2.12	5.27	5.28	1.83	0.33	0.0877
Sales ($mil.)	5.81	5.91	2.38	5.55	5.70	1.87	0.21	0.0861
Tobin's Q	1.88	1.51	2.08	1.72	1.41	1.17	0.1	0.7609
Book-to-Market	0.58	0.52	1.54	0.53	0.51	1.05	0.01	0.4527
Growth	1.15	1.05	0.62	1.12	1.04	0.44	0.01	0.8995
ROA	-0.22	0.01	1.04	-0.00	0.05	0.20	-0.04	0.0092
Book Leverage	0.54	0.37	1.03	0.47	0.39	0.54	-0.02	0.7567
Leverage	2.74	1.97	2.34	0.31	0.28	0.27	1.69	0.0000
Market Leverage	0.31	0.21	0.30	0.34	0.27	0.30	-0.06	0.2653
Cash (% Assets)	0.68	0.08	2.05	0.70	0.01	2.53	0.07	0.1123
Dividend Yield	0.30	0.00	0.87	0.54	0.00	1.32	0.00	0.0260
Capital Exp.	5.95	2.43	11.72	0.05	0.03	0.07	2.4	0.0000
R&D	0.15	0.02	0.38	0.04	0.00	0.11	0.02	0.0020
Profit	-0.50	0.03	1.80	-0.11	0.05	1.16	-0.02	0.0059
Assets ($mil.)	6.23	6.34	2.17	5.92	5.93	1.52	0.41	0.0297

[1] Wilcoxon signed rank test for differences in medians between the target and the matched firms.

Table 1.22: Impact of crisis on target firms performance — Cross-sectional analysis

The table reports the difference in medians between two sub-groups in target firms before and after the crisis period in excess of matching sample firms. We compare target firms with matching sample firms based on size/book-to-market value/ 2-digit *SIC* industry codes. For pre-crisis period, we include all firms targeted during 2000 to 2006. For post-crisis period, we include firms targeted within 2007 to 2013. The data on accounting measures is retrieved from using Thomson Reuters Datastream. We report difference in means, medians, and standard deviations for both subsamples. Column I to III report the difference in means, medians, and standard deviations for target firms for the period ((2007–13) - (2000–06)) and from column IV to VI difference in means, medians, and standard deviations for nontarget firms for the period during ((2007–13) - (2000–06)). Column VII exhibits the difference in medians and VIII reports the Wilcoxon signed-rank test p-values to demonstrate level of significance in medians. All variables are winsorized at 1%. Firm characteristics are well-defined in table 1.1.

Characteristics	Target firms			Matching firms			Median comparison[1]	
	ΔMean	ΔMedian	ΔSd	Δ Mean	ΔMedian	ΔSd	Δ Difference	Wilcoxon signrank test p-val
ΔMarket Value (mil.)	1.26	1.64	2.89	0.29	0.24	2.43	1.40	0.0164
ΔSales (mil.)	1.17	1.21	3.51	1.20	0.81	3.20	0.40	0.8490
ΔTobin's Q	0.36	0.29	2.70	-1.12	-0.37	2.97	0.66	0.0023
ΔBook-to-market	0.56	0.50	1.55	0.51	0.51	1.04	-0.01	0.4679
ΔGrowth	-0.21	-0.05	1.72	-0.11	0.01	1.21	-0.06	0.9916
ΔROA	-0.22	-0.01	1.13	-0.03	0.04	0.22	-0.05	0.0860
ΔBook Leverage	0.52	0.36	1.04	-0.69	0.00	1.89	0.36	0.0000
ΔLeverage	2.29	1.60	2.49	0.06	0.07	0.41	1.53	0.0000
ΔMarket Leverage	0.10	0.10	0.40	0.17	0.13	0.39	-0.03	0.2419
ΔCash (% Assets)	0.43	-0.11	2.56	0.02	-0.11	1.08	0.00	0.4997
ΔDividend Yield	0.36	0.00	0.95	0.50	0.00	1.26	0.00	0.1898
ΔCapital Exp.	4.10	2.37	5.07	-0.03	-0.00	0.14	2.37	0.0000
ΔR&D	0.02	0.00	0.54	-0.05	0.00	0.22	0.00	0.3841
ΔProfit	-1.75	-1.10	2.33	-1.32	-0.98	1.86	-0.12	0.8367
ΔAssets (mil.)	1.16	1.32	2.86	1.14	1.00	2.41	0.32	0.4459

[1] Wilcoxon signed rank test for differences in medians between the target and the matched firms.

Table 1.23: Performance of target firms before and after the crisis – Time series analysis

We regress change in characteristics in firms targeted during 2006 and 2007 after two years of activism (i.e., in years 2008 and 2009) against a set of dummies and vector of control specfications. In vector of dummies we include $'Fund\ Presence\ in\ Year_t$ – is dummy which is equal to 1 if an activist exists in target firm in first year of activism. $Fund\ Presence\ in\ Year_{t+1}$ — is dummy which takes value 1 if activist fund exists in target firm in second year of activism. *Activist Hedge Fund* – is dummy which is equal to 1 if another activist fund (fund out of sample) targets the firm during 2006 and 2007. In vector of control variables, we include firm size which is measured as natural logarithm of market capitalization. Firm age is measured using Compustat definition; firm year minus year of first stock price and incorporated into the model in natural logarithm form. *Q* and Book/Market value indicate firm valuation, *ROA* and Profit Margin show firm profitability, debt capacity is represented by Book Leverage, firm distribution policy is illustrated by Dividend Yield, and investment in target firm is measured by means of Research and Development, and Capital Expenditure. All regressions control for industry and year fixed effects. The standard errors are adjusted for heteroskedasticity and reported in parentheses for each coefficient. ***, **, * indicates the 1%, 5%, and 10% level of statistical significance.

Variables	***Valuation***		***Profitability***		***Debt***	***Distribution***	***Investment***	
	Q	Book/Market	ROA	Profit Margin	Book Leverage	Divid. Yield	R&D	CapEx
Fund Presence	-1.332	1.430	0.711**	1.636*	0.108	0.264	0.463*	0.052
in $Year_t$	(1.431)	(1.761)	(0.305)	(0.865)	(0.414)	(0.334)	(0.227)	(0.050)
Fund Presence	1.086	-0.006	-0.171	-0.215	-0.174	-0.468**	-0.338*	-0.005
in $Year_{t+1}$	(0.845)	(0.629)	(0.178)	(0.183)	(0.271)	(0.178)	(0.192)	(0.021)
Activist Hedge	-0.571	-1.131	0.120	0.262	0.176	0.070	0.222	-0.017
Fund	(0.668)	(0.904)	(0.194)	(0.282)	(0.310)	(0.132)	(0.199)	(0.020)
MV	-0.319	-0.248	-0.091	-0.246	0.167	0.021	-0.044	-0.001
	(0.313)	(0.477)	(0.081)	(0.209)	(0.126)	(0.075)	(0.096)	(0.010)
Firm Age	1.546	-1.695	-0.253	-0.784	0.119	-0.534***	-0.096	0.004
	(1.083)	(1.371)	(0.201)	(0.624)	(0.266)	(0.184)	(0.194)	(0.025)
Constant	-6.012	5.389*	-0.022	0.481	0.240	1.772***	-0.054	-0.105
	(3.495)	(2.920)	(0.463)	(1.079)	(0.553)	(0.426)	(0.572)	(0.073)
Industry	Y	Y	Y	Y	Y	Y	Y	Y
Year	Y	Y	Y	Y	Y	Y	Y	Y
Observations	26	30	30	29	30	30	26	30
Adjusted R2	0.098	0.355	-0.069	0.168	-0.128	0.525	-0.125	0.184

Table 1.24: Performance of target firms before and after the crisis – Cross-sectional analysis

The table reports the estimates for net change in characteristics in firms targeted in 2006 and 2007 after two years of fund activism (i.e., in years 2008 and 2009) against a set of dummies and vecotor of control specfications. In vector of dummies we include '*Fund Presence in* Year$_t$ – which is equal to 1 if an activist exists in target firm in first year of activism. *Fund Presence in Year*$_{t+1}$ – is dummy which takes value 1 if activist fund exists in target firm in second year of activism. *Activist Hedge Fund*– is dummy which is equal to 1 if another activist fund (fund out of sample) targets the firm during 2006 and 2007. In vector of control variables, we include firm size which is measured as natural logarithm of market capitalization. Firm age is measured using Compustat definition which is firm year minus year of first stock price and incorporated into the model in natural logarithm form. We regress two separate models for each firm characteristic; first with industry and year fixed effects, second, without industry and year effects. Variables with subscript *ind* indicates the results without industry and year dummies in regression. *Q* and Book/Market value indicate firm valuation, *ROA* and Profit Margin show firm profitability, debt capacity is represented by Book Leverage, firm distribution policy is illustrated by Dividend Yield, and investment in target firm is measured by means of Research and Development, and Capital Expenditure. The standard errors are adjusted for heteroskedasticity and reported in parentheses for each coefficient. ***, **, * indicates the 1%, 5%, and 10% level of statistical significance.

Independent Variables	***Profitability***				***Valuation***				***Debt***		***Investment***			
	ROA	ROA$_{ind}$	Profit	Profit$_{ind}$	Q	Q$_{ind}$	BM	BM$_{ind}$	BL	BL$_{ind}$	RD	RD$_{ind}$	CapEx	CapEx$_{ind}$
Fund Presence	0.36	-0.21	4.39*	-0.59	0.67	0.23	0.97	0.85	-0.88	-0.81	0.88*	0.38	0.11	0.21*
in Year$_t$	(2.23)	(1.12)	(2.12)	(1.71)	(0.77)	(0.38)	(1.01)	(0.55)	(1.03)	(0.67)	(0.45)	(0.28)	(0.09)	(0.10)
Fund Presence	-0.84	-0.72	-0.79	0.28	0.18	0.48	0.48	0.53	-0.70	-0.44	-0.45	-0.35	-0.03	-0.03
in Year$_{t+1}$	(1.41)	(0.93)	(1.43)	(1.11)	(0.37)	(0.47)	(0.41)	(0.33)	(0.52)	(0.41)	(0.28)	(0.34)	(0.05)	(0.04)
Activist Hedge	-0.37	-0.01	0.57	-0.98	-0.03	-0.13	-0.39	-0.47	-0.21	-0.31	0.69	0.29	-0.06	-0.03
Fund	(1.10)	(0.89)	(1.44)	(1.50)	(0.61)	(0.35)	(0.37)	(0.30)	(0.73)	(0.42)	(0.58)	(0.39)	(0.05)	(0.03)
MV	-0.78	-0.43	-1.67	-0.71	-0.38	-0.24	0.16	0.14	-0.31	-0.36	0.05	0.08	0.01	-0.00
	(0.91)	(0.51)	(1.04)	(0.61)	(0.57)	(0.32)	(0.24)	(0.19)	(0.31)	(0.21)	(0.31)	(0.16)	(0.02)	(0.02)
Firm Age	0.84	0.87	-2.67*	-0.43	0.12	0.29	0.02	0.18	-0.56	-0.35	-0.42	-0.12	0.08	0.04
	(1.35)	(0.98)	(1.48)	(1.03)	(0.42)	(0.46)	(0.65)	(0.48)	(0.59)	(0.42)	(0.28)	(0.27)	(0.05)	(0.04)
Constant	-4.13	-2.52	2.89	0.81	-2.04	-0.93	0.22	-0.28	1.80	1.81	1.28	0.03	-0.37**	-0.29**
	(3.84)	(2.58)	(4.70)	(2.90)	(2.85)	(1.15)	(1.58)	(1.28)	(1.55)	(1.15)	(1.78)	(0.69)	(0.15)	(0.13)
Industry	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N
Year	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N
# Observations	25	25	30	30	30	30	29	29	30	30	26	26	30	30
Adjusted R2	-0.30	-0.05	0.11	-0.01	-0.19	-0.01	-0.09	0.10	0.14	0.10	-0.17	-0.03	0.19	0.18

Table 1.25: Abnormal returns and types of activism – Impact of large holding in firm

The table reports the coefficients for types of activism by regressing *CARs* obtained from multiple event-windows. We present type of activism by means of dummy which takes value 1 if an activist fund explicitly describes its purpose of transaction in Schedule 13D filing. Variable 13F is a dummy which is equal to 1 if a fund holds more than $100 million in target firm prior to filing Schedule 13D to the SEC of the US. The variable pre-activism return presents the six-months daily average returns' performance prior to Schedule 13D filing. The standard errors are adjusted for heteroskedasticity and reported in parentheses for each coefficient. *, **, *** illustrate 10%, 5%, and 1% level of statistical significance.

Independent Variables	***Dependent Variables: CARs***		
	CARs (-20, +5)	CARs (-10, +5)	CARs (0, +15)
MV	0.004	0.000	-0.003
	(0.009)	(0.006)	(0.006)
LEV	0.156***	0.038	-0.009
	(0.052)	(0.037)	(0.037)
Pre–activism Return	4.594	-0.910	-5.348*
	(4.765)	(3.412)	(3.412)
13F	0.003	-0.002	-0.021
	(0.032)	(0.023)	(0.023)
General Undervaluation	0.072*	0.049**	0.046*
	(0.054)	(0.038)	(0.036)
Capital Structure	0.041**	0.002**	0.053*
	(0.076)	(0.054)	(0.049)
Business Strategy	0.026**	0.023**	0.024**
	(0.047)	(0.034)	(0.032)
Target Sale	-0.027	0.033	0.005
	(0.077)	(0.055)	(0.051)
Governance	-0.043	-0.058	-0.058
	(0.057)	(0.041)	(0.027)
Chapter 11	-0.056	-0.128	0.352**
	(0.287)	(0.206)	(0.177)
Industry	Y	Y	Y
Year	Y	Y	Y
Observations	324	324	297
Adjusted R-squared	0.170	0.237	0.100

Table 1.26: Size and leverage effect on cross-section of abnormal returns during crisis period

We regress multiple event-windows against a set of activism types with crisis interactive terms. Types of activism and crisis are represented by means of dummy. Crisis period covers from July 2007 to December 2013. We do not report vector of control variables which includes size, leverage, average 6-months daily pre-activism returns, Schedule 13F, industry and year fixed effects for the sake of space. Firm size and leverage are in natural logarithmic form and demeaned. The standard errors are adjusted for heteroskedasticity and reported in parentheses for each coefficient. ***, **, * demonstrate 1%, 5%, and 10% level of statistical significance.

Independent Variables	*Dependent Variable*		
	$CARs(-20,+5)$	$CARs(-10,+5)$	$CARs(-10,+10)$
Crisis	0.189	0.128	0.128
	(0.154)	(0.117)	(0.117)
General Undervaluation	-0.026	-0.005	-0.005
	(0.070)	(0.058)	(0.058)
Capital Structure	0.044	-0.002	-0.002
	(0.090)	(0.109)	(0.109)
Business Strategy	-0.014	0.006	0.006
	(0.069)	(0.048)	(0.048)
Target Sale	-0.022	0.046	0.046
	(0.085)	(0.085)	(0.085)
Governance	-0.056	-0.064	-0.064
	(0.083)	(0.061)	(0.061)
General Value* Crisis	-0.094	-0.102	-0.102
	(0.116)	(0.094)	(0.094)
Capital Structure* Crisis	0.011	0.003	0.003
	(0.133)	(0.127)	(0.127)
Business Strategy* Crisis	0.148	0.077	0.077
	(0.105)	(0.082)	(0.082)
Target Sale* Crisis	0.026	-0.099	-0.099
	(0.148)	(0.124)	(0.124)
Governance* Crisis	0.004	-0.019	-0.019
	(0.128)	(0.092)	(0.092)
General Value* Crisis* MV	-0.027	-0.024	-0.024
	(0.019)	(0.016)	(0.016)
Business Strategy* Crisis* MV	0.003	0.010	0.010
	(0.024)	(0.020)	(0.020)
Target Sale* Crisis* MV	0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)
Governance* Crisis* MV	0.000*	0.000	0.000
	(0.000)	(0.000)	(0.000)
Default* Crisis* MV	-0.000	-0.000*	-0.000*
	(0.000)	(0.000)	(0.000)
Capital Structure* Crisis* Lev	0.824***	0.437**	0.437**
	(0.296)	(0.215)	(0.215)
# Observations	324	324	324
Adjusted R-squared	0.119	0.185	0.185

PAPER 2

TEST SPECIFICATIONS, CORRECT MODELLING, AND SENSITIVITY OF LONG–RUN ABNORMAL RETURNS IN HEDGE FUND TARGET FIRMS

Zazy Khan

ABSTRACT. Following the literature on test–specifications, correct modelling, and detectability of long-run stock performance in event study framework, this study tests the performance of monthly stock returns of 589 firms targeted by 112 hedge funds over the period of January 2000 to December 2013. For an estimation window of (–12, +36) months, it addresses two fundamental questions; first whether active targets (13D) outperform the passive targets (13G) in recent financial–crisis; and second whether long–horizon abnormal returns still pronounce when corrected for biases and test-specifications. To investigate these concerns, a number of methodologies including cumulative abnormal returns, buy–and–hold abnormal returns, and calendar–time portfolio approach using various matching criteria are applied. Our initial findings suggest that 13D firms perform relatively better than 13G firms, however, underperform the PE targets. Moreover, when matching criteria are well-defined, then estimates appear generally significant with improved power of the tests.

Keywords: Hedge funds, event studies, test–specifications, correct–modelling, biases, long–run returns

JEL classification: G12; G14

2.1 Introduction

A well established body of literature has been consistently analyzing the long–run performance of the stock returns following the major corporate events in the last three decades.[1] The reported findings in this literature initially suggest a great deal of potential synergies and wealth effect for the investors; however abnormality in returns is critically viewed as market inefficiency as pointed out by Fama (1998). He argues that when approaches to measure long–run abnormal returns are controlled for various statistical tests then as a result abnormality either becomes marginal or disappears.

The commonly used methods to detect abnormality in long-term returns are subject to various biases and yield misspecified test-statistics as emphasized by Lyon et al. (1999), and returns are likely subject to bad-modelling (Fama, 1998). One of the severe outcomes emerging from misspecified test statistics is that probability of empirical rejection rate exceeds from the theoretical rejection rate in testing the abnormality. Earlier studies by Barber and Lyon (1996, 1997); Lyon et al. (1999), and Kothari and Warner (1997) have shed enough light on these biases including measurement, new listing, rebalancing, and skewness bias among others.

The documented literature in fund activism suggests that fund related activism has promised positively significant daily returns in the short–run around the announcement dates, and partly monthly returns in the long-term to associated investors. However, so far there has been no peculiar attempt to test the long-run performance in targets, particularly in the wake of recent financial crisis. Recently, Bebchuk et al. (2014) using a sample covering period of 1994–2007, analyze the long–term stock performance of the target firms in subsequent three and five years event-window following the fund-activism and find that targets long term value is not deteriorated as propagated by critics. In addition, their findings suggest that market initial appreciation in stock prices is a good anticipation of long-term intervention's effect. However, on methodological grounds, their research is likely subjects to the aforementioned biases and test-specifications.

[1] These corporate events include mergers and acquisitions (Agrawal et al., 1992), (Bessembinder and Zhang, 2013), dividend initiation, omission, and reduction (Boehme and Sorescu, 2002; Michaely et al., 1995), initial public offering and seasonal equity offering (Bessler and Thies, 2007; Brav and Gompers, 1997; Eckbo et al., 2000; Jegadeesh et al., 1993; Loughran and Ritter, 1996; Ritter, 1991), share repurchase (Ikenberry et al., 1995), splits (Ikenberry et al., 1995), and new exchange listing (Dharan and Ikenberry, 1995; Ikenberry et al., 1996) among others.

The approaches to detect abnormality in returns normally include cumulative abnormal returns (MacKinlay, 1997), buy-and-hold abnormal returns (Lyon et al., 1999), and calendar–time portfolio abnormal returns (Fama, 1998; Lyon et al., 1999). These approaches typically use carefully constructed benchmarks either using well-defined firm-specific characteristics or reference portfolio. However, the outcomes from using different methodologies vary and subject to researcher's choice. Cumulative abnormal returns approach suffers from compounding effect (Barber and Lyon, 1997), and upwardly biased (Kothari and Warner, 1997). Buy-and-hold returns approach is occasionally preferred over cumulative abnormal approach due to better statistical properties, however the documented results in Eckbo et al. (2000) study suggest that buy–and–hold returns also suffer from bad modelling and yield misspecified test-statistic in norandom samples (Lyon et al., 1999). In addition, holding period methodologies ignore cross-sectional dependence among event firms abnormal returns which are overlapping in calendar-time and likely produce overstated test-statistics (Fama, 1998). Calendar-time portfolio approach is considered more reliable measure since it systematically avoids biases, e.g., new listing and rebalancing, and in addition it resovles partly cross-sectional dependence among firm's abnormal returns. However, calendar-time portfolio approach also suffers from underweighting (overweighting) observations from periods with large (small) cross-section in unbalanced panels (Hoechle et al., 2009). Given these issues related with each approach, we fundamentally question which one approach would be better to analyze target firms long-run returns performance following the fund announcement? In addition, how an appropriate choice of methodology can possibly reduce the associated biases and provide approximately precise estimates?

To answer these questions, this study aims to test the abnormality in target's returns over the long–horizon following fund activism before and after the recent financial crisis. Using a universe of uniquely hand collected data consisting of 589 actively targeted firms extracted from Scheduel 13D, and 898 passively targeted firms retrieved from Schedule 13G with an additional sample of 273 private equity firms to evaluate the monthly stock performance in actively target firms. To test the significance of long–term abnormal returns in targets with improved test-specifications, this study attempts to examine whether target firms perform better than nontargets in pre and post-crisis, and whether abnormality in returns still pronounces when approaches to measure them are corrected for several biases and test-specifications. In addition, this study attempts to explain the cross-sectional variation in target firms' abnormal returns arising because of applying different matching criteria and sample composition.

Test-specifications using cumulative abnormal returns approach tends towards negative bias implicitly induced by cross-sectional returns accumulation. Our initial finding suggests that using Fama-French three-factor model yields positively skewed estimates which contrasts with (Barber and Lyon, 1997) who document that cumulative abnormal returns experience significantly negative biases in test-statistics when returns are computed in excess of a reference portfolio. However, using carefully constructed benchmak based on well-defined firm characteristics yield negative test-statistics. In our analysis, skewness bias is identified as a reason to yield negative cumulative abnormal returns and as a result it leads the empirical rejection rate to exceed the theoretical rejection rate. The specifications of test-statistics using buy-and-hold returns yield negative estimates in aggregate. Using Fama-French three factor model as a reference portfolio yields increasingly negatively skewness biases in estimates.

The study analyzes the long-run stock performance broadly into two stages. In first part, we construct a wide array of benchmarks which allow us to test the power of test-statistics using various approaches for multiple monthly event-windows. In second part, we compute mean monthly abnormal returns by employing several methodologies on different event-windows using event-study framework. The results are interesting and carry novelty in the sense that results yielding from different methdologies using various matching criteria vary substantially. The *CARs* over (–12, +36) month longest event-window indicates that target and nontargets significantly negatively underperform the returns on a value-weighted reference portfolio of Fama–French three-factor model including market index, size, and value. When comparing targets' performance with nontargets, the target firms yield better performance than nontarget firms from hedge fund but underperform matching firms from private equity sample. When these results are controlled for crisis effect, no significance change is observed. Buy-and-hold abnormal returns approach produces persistently significantly negative results. The mean monthly abnormal returns in excess of reference portfolio which is Fama–French three-factor model yields significantly negative abnormal returns for 12-month, 24-month and 36-month event-windows. However, in comparison with nontarget firms (13G), significantly positive abnormal returns are realized which increase for longer event-window. The estimates for mean monthly abnormal returns using calendar-time portfolio approach appear in line with other approaches. Using reference portfolio of Fama-French three-factor model, we experience significantly negative results, however magnitude on these estimates reduce over the subsequent longer event-windows.

This paper contributes on several fronts to the ongoing debate on hedge fund activism and uncovers some related insights. First, it leads the hedge fund research on analyzing the

long-run abnormal returns in target firms for activism. The documented hedge fund literature so far has not enough explored the detectability of misspecifications of implied test-statistics thus accuracy of produced estimates in long–run event studies remain yet unquestioned. Prior studies have been mainly concentrating on either cumulative or holding-period methodology focusing trivially on matching criteria. Nonetheless; these studies have been yielding significant returns. To critically question the robustness of previously documented findings, this study investigates by taking into account all possible test-statistics and hence suggests reasonable remedy to reduce these issues in future research.

The study potentially draws a distinction from the prior literature on hedge fund activism by extracting matching firms sample from similar set of hedge funds. Prior documented studies have been using the matching sample constituting on firms drawn from private equity, mutual firms, or out–of–sample nonhedge funds (for details, see, Klein and Zur (2009), Brav et al. (2008), Greenwood and Schor (2009)). Matching firms from similar set of hedge funds primarily allow us to control for the quantitative and qualitative characteristics associated with funds.

In addition, this study employs a number of approaches to test for the long–run abnormal returns. These approaches are cumulative abnormal returns, buy–and–hold abnormal returns and the calendar–time portfolio returns among others within event-study framework. Moreover, these methodologies are carried out by using various models demonstrating specific test–power. To evaluate the long–run abnormal returns of the target/event firms, we construct the matching criteria on several firm–specific characteristics for a matching event firm and reference portfolios. By doing so, we control for the well-known biases in existing studies.

The rest of the paper is organized as follows: The chapter 2 reviews the relevant literature on biases. Chapter 3 explores the prevalent methodologies to mitigate the biases. Chapter 4 focuses on data construction, and chapter 5 identifies the methods to construct the matching criteria. Chapter 6 presents analysis and the results, and finally chapter 7 concludes the paper.

2.2 Literature review

2.2.1 Various biases and their treatment

The event studies of long-run abnormal returns typically suffer from various types of biases. These biases arise due to mis-specifications in applying bad / incorrect modelling, test-statistics, and evaluating benchmarks. As a result the empirical rejection rate likely exceeds the theoretical rejection rate and consequently leads to type I and type II error. In this section, we uncover several biases arising primarily because of incorporating different methodologies, deficiencies in data sources, and in particular, due to estimation techniques.

2.2.2 Measurement bias

Barber and Lyon (1997) document that cumulative abnormal returns are biased estimator of the long–run buy–and–hold abnormal returns. On the grounds of statistical properties and better characteristics, they prefer to use buy-and-hold returns over cumulative abnormal returns in detecting abnormal returns, and hence define it measurement bias.

2.2.3 New listing

New listing bias arises in the long–run event studies because of new entrants in the reference portfolio. The event firms generally have long post–event history of returns, whilst the firms which constitute the index, include new firms, in particular begin their trading subsequent to the event month. With new entrants, Ritter (1991) argues that firms that go public normally underperform the equally–weighted market index, however Brav et al. (2000) find that this underperformance is confined to small high–growth firms. Over the longer period of analysis following event, it is likely that firms going public constituting overwhelming portion of the newly listed firms, thus the result is downwardly biased estimate of the long–horizon return from investing in a passively holding reference portfolio. Thus, therefore, it leads potentially to new listing bias.

2.2.4 Re–balancing bias

This type of bias occasionally arises when the compounded returns of a reference portfolio, such as an equally–weighted market index, are typically calculated assuming periodic; for

example monthly rebalancing, while returns on sample firms are compounded without rebalancing. Constructing referene portfolios as described usually do not accurately reflect the returns earned on a passively buy–and–hold strategy in investing equally–weighted portfolios. Lyon et al. (1999) argue two reasons for inaccuracy; first, the underlying portfolio return assumes periodic rebalacing, say monthly, to maintain equal weights. This procedure of rebalancing leads to an inflated long-horizon return on the reference portfolio, which can likely be attributed to bid–ask bounce and nonsynchronous trading.

2.2.5 Skewness bias

Normally such biases appear in inferences drawn from applied approaches; for instance, cumulative abnormal returns usually report positive skewed inference compared to negatively biased results by buy–and–hold abnormal returns. This occurs because of other biases including new listing, rebalancing among others as argued by Barber and Lyon (1997).

2.2.6 Sampling bias

Sampling bias arises when data is attributed to different deciles using the benchmark of size and other target firm characteristics. Barber and Lyon (1997) argue that categorizing the data into different size and book–to–market deciles may cause the reference portfolios and three–factor model to yield misspecified test statistics. Additionally, using size/book–to–market value matching firm approach yields well–specified test statistics in all types of size and book–to–market deciles except for large size firms.

2.3 Approaches to compute the abnormal–returns

A number of methodologies consistently applied to measure the long–term performance in target's stock following the corporate event. As discussed in section 2.2.1, these approaches are subject to several statistical properties, biases, and test-specifications. In this section, we discuss the applied methodologies and will draw the inferences in a more precise way.

2.3.1 Cumulative abnormal returns

To compute cumulative abnormal returns (*CARs*-henceforth) for a target firm i after observing an event of interest for a specific period of time, say 12 months, the abnormal return AR_i, which is the difference between security R_i less expected return ER_i is aggregated for the entire 12 months in the following way;

$$CAR_{i12} = \sum_{i=1} AR_{i12} \tag{2.1}$$

Fama (1998) advances three factors to favour *CARs*. First, asset pricing models commonly assure that normally distributed returns and normality is a better approximation for shorter horizons than longer ones. In a recent study by Knif et al. (2013) advocating *CARs* over buy–and–hold returns and calendar–time portfolio approach by arguing that *CARs* yield better performance in sub–periods of investigation. Second, empirical tests of asset pricing models in general typically use monthly returns. Moreover, there is less evidence that asset pricing models are used to detect abnormality in longer period covering three and five years. And the last but not least is that longitude of abnormal returns to be over-stated when returns are compounded. Using various approaches including control firm, the bootstrapped, skewness–adjusted t–statistic, and pseudo–portfolio approach in randon samples, Lyon et al. (1999) conclude that all of these methods yield most likely well–specified test–statistics for cumulative abnormal returns as well as for buy–and–hold approach. They further argue that *CARs*, despite being less–skewed, the t–statistic are also yielded well–specified. And lastly, sampling biases including size, book–to–market, pre–event returns, calendar clustering, industry clustering, and over–lapping returns affect *CARs* in parallel ways to buy-and-hold returns.

However, apart from simplicity and easiness in computation, *CARs* demonstrate a few disadvantages from economic perspective. In cases, when *CARs* are accumulated for a specific period of interest based on simple returns, the output yields inaccurate measures of period. For instance, considering a period of 12 months, it produces the product of monthly returns rather to aggregate them.

2.3.2 Buy–and–hold abnormal returns

Buy-and-hold abnormal returns (*BHARs*-hereafter) differ from *CARs* while compounding the monthly returns. As Barber and Lyon (1997) point out that *CARs* ignore compounding effect

contrary to *BHARs* which take into account the effect of compounding and consequently making it less reliable measure to estimate long-run abnormal returns. Adding more months to post-event period yields more compounding difference than non-compounding (Knif et al., 2013, see, for more details). Barber and Lyon (1997) argue that if the returns on an individual security is more volatile than a market index returns, then *CARs* in terms of magnitude will be greater than *BHARs* provided *BHARs* is less than or equal to zero. To deal with compounding effect, Knif et al. (2013) suggest that those monthly or yearly observations appearing with compounding effect should be tested separately.

An equally important question arises whether to use *CARs* or *BHARs*; however, as Ritter (1991) suggests, it depends on the research question we are interested in. Barber and Lyon (1997), for example, consider a case of twelve month *CARs* and an annual *BHARs*. Dividing the twelve month *CARs* by 12 yields a mean monthly abnormal return. Thus, a test of the null hypothesis that the mean monthly abnormal return of the sample firms during the event year is equal to zero; is not a test of the null hypothesis that the mean annual abnormal return is equal to zero. To test the latter hypothesis, Barber and Lyon (1997) propose to use *BHARs*.

Referring to the compounding effect which appears in measuring long-run abnormal returns, Barber and Lyon (1997) name it measurement bias. Barber and Lyon (1997) find that *CARs* is a biased estimator of *BHARs*. Kothari and Warner (1997) find that cumulated returns are upwardly biased and describe it an increasing function of the proportionate bid-ask spread of event firms and suggest that using *BHARs* approach may alleviate bias in abnormal returns occurring due to accumulation (see Blume and Stambaugh, 1983; Roll, 1983, for more details). In our analysis, we are interested in the wealth effect experienced by an investor in post–activism period of 13D announcement, so therefore *BHARs* approach seems more convincingly to be used.

Following the description of Barber and Lyon (1997) to compute the holding period abnormal returns for an individual stock, we construct following setting:

$$HPAR_{it} = \sum_{t=1}^{\tau}(1+R_{it})-1) \tag{2.2}$$

Where HPR_{it} is the holding period return for firm i during the period from t to τ. R_{it} represents the daily return on common stock of the firm i on day t. In next step, returns

from this individual stock are adjusted in excess of matching sample firm or using matching portfolio (equally weighted market index).

$$ER_i(t,\tau) = \sum_{t=1}^{\tau}(1+R_{it}) - \sum_{t=1}^{\tau}(1+R_{mt}) \tag{2.3}$$

Where $ER_i(t,\tau)$ indicates the excess return for security i from the period t to τ. In case, if an event firm i is delisted (after being acquired, some firms are fully owned by activists and do not report their pricing data to Datastream) prior to certain holding period, then an surrogate return series is substituted into the analysis.

To compute *BHARs* for a firm i, the difference between return on event-firm less the return on matching firm or a reference portfolio (equally–weighted index) is computed using the specifications of Barber and Lyon (1997);

$$BHAR_{it} = \sum_{t=1}^{\tau}[1+R_{it}] - \sum_{t=1}^{\tau}[1+E(R_{it})] \tag{2.4}$$

To test the hypothesis of no event effect or alternatively of no mean monthly abnormal returns, we employ the following conventional t–statistic:

$$t_{BHAR} = (BHAR)n \mid s \tag{2.5}$$

Based on statistical distribution and inferences and cross–sectional correlation of returns in the long–run, the use of *BHARs* is controversially debated among researchers. To measure investor experience precisely, Barber and Lyon (1997) suggest *BHARs* over other measures, however they find that computation of *BHARs* using reference portfolio such as market index carry implicit misspecification and subjects to new listing, rebalancing, and skewness biases. In a recent study, Knif et al. (2013) highlight the potential problem of cross–sectional independence in long–run returns which further inflate the magnitude of variance or risk in reference portfolios and cast doubt on the statistical inferences.

To mitigate these concerned issues, we follow the approach suggested by Barber and Lyon (1997) and use matching sample firm based on size and book–to–market value to evaluate the abnormal returns performance in each target firm. Using a well-constructed matching sample firm helps to mitigate issues such as new listing, rebalancing and skewness biases. In addition, to test the abnormality in long-run returns, we employ convential t-statistic (2.5), since it is based on the cross-sectional standard deviations of the abnormal returns during the

period of analysis.

2.3.3 Calendar–time portfolio approach

In section 2.3.1 and section 2.3.2, we discuss the issues of bad-modelling and misspecifications related with cumulative and buy-and-hold methodologies. Thus, statistical inferences drawn from using these approaches are arguably less reliable. In addition, previous studies on the detectability of abnormal returns suffer from a potential problem described as cross-sectional dependence among sample firms. Any methodology that ignores the cross-sectional dependence in event firms' returns, particularly in cases in which returns are overlapped in calendar time, are likely to produce overstated t-statisitcs (Fama, 1998). As Mitchell and Stafford (2000) find empirical evidence that holding period methodologies are likely to produce overstated test-statistics. To control for cross-sectional correlation in sample firms, Fama (1998) advocates the calendar-time portfolio approach (*CTPA*) as proposed in seminal studies by Jaffe (1974); Mandelker (1974).

Calendar-time portfolio approach which is also known as Jensen alpha approach statistically demonstrates properties better than cumulative abnormal returns and buy–and–hold return approach. Lyon et al. (1999) argue that it primarily helps in mitigating the issue of cross–sectional correlation among individual firms and yields test statistics which is more robust in non-random samples. However, Hoechle et al. (2009) argue that such statistical robustness is conditional to investor's segregation and limited to the analysis of a single binary investor characteristics.

While *CTPA* partly resolves the issue of cross-sectional dependence in firms' returns, it is likely that model using *CTPA* may experience misspecifications, in particular when sample is nonrandom. Hoechle et al. (2009) propose an improved technique which generalizes the calendar-time portfolio apporach and argue that the new technique is much capable of dealing with continuous and multivariate investor characteristics.[2]

Following the specifications of Lyon et al. (1999), we use both the calendar–time portfolios (incorporating Fama–French three–factor model) and mean monthly calendar–time abnormal returns.

[2]Discussion of this generalized calendar-time portfolio and its implications are beyond our study.

2.3.3.1 The Fama–French three–factor model and calendar–time portfolio

For each calendar month i, we form a portfolio comprising all firms that experience the same event (in this case the announcement of Schedule 13D with the SEC) during the period of i to j. For one year long–run abnormal returns, it will be 12 months prior to the event month. The monthly portfolio returns are computed as the equally–weighted average of monthly returns of all firms in the portfolio. Then these excess portfolio returns are regressed against Fama–French three factor model as follows:[3]

$$R_{pt} - R_{ft} = \alpha_i + \beta_i(R_{mt} - R_{ft}) + s_i SMB_t + h_i HML_t + \varepsilon_{it} \tag{2.6}$$

Where R_{pt} is the monthly return on the calendar time portfolio, R_{ft} is the return on one month Treasury bill rate, $R_{mt} - R_{ft}$ is the excess return on the value–weighted market index, size factor, SMB_t is the return on value–weighted portfolios of small stock less the return on value–weighted portfolio of big stock. HML_t measures the difference between the return on portfolios of high book–to–market stocks and low book–to–market stocks. The coefficient of α_i, the intercept, is interpreted as the mean monthly abnormal return of the event portfolio and hypothesized as zero monthly abnormal return. Varying in number of firms in each month, to estimate the regression coefficients, we follow Liu (2003) and use both ordinary least squares OLS and weighted least square WLS methods.[4]

2.3.3.2 Mean monthly calendar–time abnormal returns

Assume that the event period of interest is three years. For each calendar month, calculate the abnormal return (AR) for each security using the returns on the reference portfolio R:

$$AR_t = R_{it} - R_{pt} \tag{2.7}$$

In each calendar month t, calculate a mean abnoraml return (MAR_t) across firms in the portfolio:

$$MAR_t = \sum_{t=1}^{n_t} x_{it} AR_{it} \tag{2.8}$$

[3]For computing Fama-French three factors model, [1]downloadable from Fama – French Database- http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html.

[4]Lyon et al. (1999) argue that variations in number of firms from month to month most probably yield heteroskedastic error terms. To correct for this problem, they suggest to perform weighted least squraes estimation.

Where n_t is the number of firms in the portfolio in the month t. The weight x_{it} is $\frac{1}{n}$, when abnormal returns are equally–weighted, and $\frac{MV_{it}}{\sum MV_{it}}$, when abnormal returns are value weighted. A grand mean monthly abnormal returns $(MMAR)$ is calculated:

$$MMAR_t = \frac{1}{T}\sum_{t=1}^{T} MAR_t \tag{2.9}$$

Where T is total number of calendar months. To test the null hypothesis of zero mean monthly abnormal returns, a t–statistic is calculated using the time–series standard deviation of the mean monthly abnormal returns:

$$t(MMAR) = \frac{MMAR}{\sigma\frac{(MAR_t)}{\sqrt{T}}} \tag{2.10}$$

2.4 Data collection and variable construction

2.4.1 Hedge funds sample

Primarily, a sample of 200 hedge funds is obtained upon request from Barclayhedge.com (private) database with assets under management (AUM– hereafter) and monthly net returns. Of this, funds functioning only in the U.S. are chosen. At next stage, the funds investing in equities under various categories including global macro, global, event driven, market driven among others are shortlisted. To this sample, we add more funds found in hedge fund literature and on related websites. A list of at least 500 randomly chosen funds is assembled. To this extent, the details about fund holdings (AUM) and acquired stakes in firms are unknown. To make it further diversified and well-balanced sample, we perform a search test in the Securities and Exchangd Commission's EDGAR search file with the first name of fund in our list and retrieve additional funds. This process helps in to add more funds to the list which precisely marks about 800 activist hedge funds. From these 800 funds, we drop funds functioning as abitrageurs or taking positions for short period trading purposes. This leaves our initial activist sample to 127 funds involved in activism. To avoid any possible selection bias, the funds are chosen regardless of their characteristics e.g. fund size (AUM), previous filing record, performance, and characteristics about fund managers.

At next stage, each fund is searched in EDGAR system for its record from January 2000 to December 2013. Funds usually report several mandatory files during the period, they operate. When a hedge fund acquires 5% or more ownership stake in a publicly listed firm with intent to intervene in the business course of a firm, it is officially required to report the

13D Schedule within 10 days to the Securities and Exchange Commission (SEC henceforth) of the U.S. under the 'Securities Exchange Act of 1934' in order to regulate the transaction for certain purposes in the secondary market.[5] The Schedule 13D indicates the filer as an activist and provides the details about filer name, the issuer name and identity as an asset class (bank, money manager), the number of total shares outstanding and their form (ordinary or preferred stock), payment methods and related costs, the purpose of transaction, filer holdings in total outstanding shares, and other necessary documentation in the course of transaction's proceedings.[6]

The Schedule 13D discloses essential information about filer's identity. Item 2 entitled as "Identity and Background" describes the reporting person's business address and type, record about filer's, if any, criminal and civil proceedings in last five years. However, it does not mention explicitly the filer's type whether it is hedge fund or non-hedge fund. Thus, to clarify any doubts about fund's identification and position, we examine thoroughly each fund's personal webpage and verify it with Factiva and other related websites. During this systematic search process, some funds are found offering services simultaneously for hedge funds as well as for private equity funds. We trace the parent investment companies which manage these funds and check their identification. If the filer is found non-hedge fund, we simply exclude it. To give an example from the list of activist funds, Deephaven Capital Management LLC, which manages hedge funds and invests in fixed income securities and in private equity funds. To make sure whether it is classified as hedge fund, we check its website and record on past transactions in SEC to confirm its identification.

Using EDGAR's system to retrieve 13D filings could possibly bias the sample toward big funds and small firms. To acquire a meaningful stake in a firm for activism, a fund is required to invest a substantial part of holding capital. However, some activist funds have involved in target firms with ownership stake less than 5%, thus do not appear in EDGAR's system. For example, in recent period, Sandell Asset Management after acquiring merely 2% stake in JDS Uniphase Corp. (operating in networks and optical products), urged the target to consider a proposal of divesting some subsidiary assets. Following this suggestion,

[5]The Schedule 13G is a mandatory disclosure statement for the persons subject to Section 13(g). The qualified institutional investor is requiresd to meet two core elements. First, the institution must have acquired the ownership stake in an ordinary course of business and not with the purpose of influencing the control of issuing authority. Second, the issuer must belong to a specific regulatory institution e.g. bank, insurance firms, saving association under Federal Act, registered investment bank among others. The filer (qualified institutional investor) of 13G Filing is required to report within 45 days of the end of calendar year in which the beneficial owner holds more than 5% or within 10 days of the end of the calendar year in which filer holds more than 10% onwership stake.

[6]Schedule 13D and other filings can easily be downloaded through EDGAR filings search on [1]www.sec.gov

JDS announced its plan saying "This is a strategy our board has been actively considering for some time, ..." The effectiveness of proposal in short period is manifested by fund's reputation and its active role in another firm namely Bob Evan Farms Inc., where it acquired four board seats and urged the firm to spin–off particular assets.[7] These events account for a significant portion of the fund-activism. We gather information about such events using various sources including financial press and related websites.[8]

Activist funds file initial Schedule 13D and then frequently report changes to it known as amended file (13D/A). In some cases, these amended files are not reported after first announcement to EDGAR's system. The amended files are used to follow the developments on fund activism during a specific period. In addition, to know how long the fund stayed in firm (in later part of analysis, these amended files are well explained). A notable example is Del Mar Asset Management, LP when it acquired 4.38% stake in Kennedy-Wilson Holdings, Inc. and announced 13D Filing on November 16, 2009. However, EDGAR's system does not report amendments following the initial filing, thus, all such cases are not considered.

A structurally well-defined procedure of multiple cross-checking and scrutinization leaves the sample with 112 U.S. hedge funds demonstrating the average characteristics of industry. In comparison with seminal study by Brav et al. (2008) who analyze 236 activist hedge funds over the period of 2001 to 2006, this study investigates 13D Disclosuers filed by 112 activist funds for a wide period starting from January 2000 to December 2013. Our sample composition in terms of activists' distribution resembles to Boyson and Mooradian (2011) study who investigate 111 activist hedge funds owned by 89 hedge fund management firms over the period of 1994 to 2005.[9] Table 2.1 represents the distribution of the activist funds over the period of 2000–2013. An overview of the sample depicts the monotonic trend. The number of activist funds on average do not vary from 2002 to 2005, however, just before crisis and in following years, an increasing trend is observed. Out of 760 fund and firm pairs (repeated in some cases), we have 688 firms uniquely targeted by 112 funds. On average, each activist fund targets 6 firms over the sample period. However, some funds exceptionally

[7] [1]http://blogs.wsj.com/moneybeat/2014/09/10/activist-sandell-urged-jds-to-explore-options/?KEYWORDS=hedge+fund+2+equity+stake.

[8] An important criticism is drawn on activist's successful campaign by seeking insights to know how activists systematically gain board seats or influnce firm to implement their suggested plan by holding even less than 5% ownership stake. To gain insights into this puzzle, activists normally propose their agenda to inclined but reluctant large shareholders including pension funds, mutual funds, private equity funds, and more possibly with other hedge funds with whom they can find common grounds. Activists lead the campaign on behalf of other institutional sharedholders by dividing the monitoring cost proportionately. [1]http://business.financialpost.com/2014/11/15/how-activist-hedge-funds-on-steroids-have-become-a-boardroom-enemy/

[9] How well our sample is diversified and representative of the industry? According to global research firm Preqin [1]https://www.preqin.com/, currently more than 400 activist hedge funds functioning worldwide. Of these 400 active funds, 60% are US based thus comprising 240 funds from which we assemble our sample with 112 activist funds (47%).

(e.g., Harbinger Capital Partners Master Fund, Carl Ichan C, Jana Partners LLC, and VP Partners LLC, among others) engage in, on average, more than 20 firms in sample period which demonstrates their wide activist role.

2.4.2 Target firms sample

For a comprehensive list of 760 Schedule 13D events with the announcement dates, we retrieve 688 firms which are uniquely targeted by 112 activst hedge funds over the period of January 2000 to December 2013. For about 9% cases (760–688), some firms are targeted repeatedly in similar months, so therefore in order to avoid repetition in analysis, we drop the firm occuring twice, however we strictly consider the purpose of transaction for which firm is targeted. At next stage, these firms are searched into the Thomson Reuters Datastream for their DS Mnemonic Codes (identification codes). During search process, a large part of firms do not appear in Datastream, thus we drop them from our sample. Our well–defined search process shortlists 589 U.S. firms, ultimately. These firms are publicly traded at $NYSE/AMEX/NASDAQ$ exchanges.[10]

For a comprehensive sample of 589 target firms, we extract data on their stock prices and for accounting figures from their balance sheets, income and cash flow statements, respectively. Stock prices are daily based and start prior to January 2000 to December 2013.

Of these 589 firms, a large number of target firms are reported as either dead or completely buyout, merged, or delisted from Datastream during the course of activism. Given that, the database does not explain any reason for disappearing firms. The missing annual accounting figures account for approximately 20% of entire sample. However, these caveats have been noticed by prior fund-related studies. Among others, Greenwood and Schor (2009) reduce their sample size approximately half to the firms available in Compustat but find it arguably upward biased to small firms.

During the course of activism, a hedge fund keeps on following with the target firm and files several amendments known as 13D/As. These amended files reveal the fund's consideration about the target contemporary performance and its strategic plans regarding future policies. In the majority of these cases, a fund demands merely a formal communication for investment purpose, however, sometimes, it recommends an entire change in

[10]In comparison with first chapter, the number of firms have been improved. We correctly identify firm codes for those companies which are merged in other firms after some period.

the course of actions including displacement of CEO, board management, bargaining for appropriate deals in mergers and acquisitions (*M&As*), corporate and governance matters. In order not to miss any important information, we go through these amended files in particular and gather all theoretical information on relevant items. In case of a significant change to the previously submitted purpose of the transaction (e.g., if a fund initially purchases the stock for portfolio investment by having no intention of playing an active role at managerial level and later on alters it to participate in corporate activities as an aggressive/hostile investor) then this amended file would be considered as a separate case. However, earlier studies report that these follow up events do not affect the significance of the overall results (see, e.g., (Greenwood and Schor, 2009)). In this sample, 3500 amended files out of total 4260 (6 amendments per initial announcement) constitute about 80% of the total sample.

2.4.3 Matching firms sample

2.4.3.1 Passive firms–13G filings

As discussed in the section 2.4.1 that when an activist crosses a threshold by acquiring 5% or more ownership stake in a publicly listed firm and reveals explicitly no interest to influence the control in firm, then it is mandatory for the acquirer to report Schedule 13G within 45 days at the end of calendar year in which the investor holds ownership. In case of holding 10% or more stake, the duration to file Schedule 13G announcement restricts to 10 days at the end of calendar year. We experience that an activist also acquires firm for longer period with nonactive purpose by filing 13G to the SEC. This intuitively motivates to a comparative analysis and raises question to investigate whether firms actively targeted perform better than non–actively targeted firms. In other words, to evaluate the performance of firms reported in 13D Schedules, we use the firms reported in 13G Form. We gather all reported 13G disclosures for the similar set of hedge funds for which we collect 13D files over the period of January 2000 to December 2013. From these 13G Files, we gather all relevant information including firm name, percentage of holding to total ownership, and type of shares (common versus preferred stock). Unlike 13D Schedule, 13G Form is distinctively exempted from several clauses to report.[11]

Initially we collect 955 firms from 112 hedge funds reporting 13G Filings over the period of January 2000 to December 2013. At next stage, we search these firms in Thomson

[11] In some cases, funds initially report 13D Schedule to the SEC, however later on they are observed to change the status to 13G depending on investment strategy.

Reuters Datastream database to retrieve their DS Mnemonic Codes (identification codes) in order to collect data. For a small number of firms, which constitute approximately 6% of entire sample, however we do not find codes, thus these firms are dropped from our sample. For the rest of 898 firms, we extract data on daily and monthly stock prices and annual accounting figures from using Datastream. All matching firms are US based and listed at *NYSE/AMEX/NASDAQ* exchanges.

2.4.3.2 Private equity target firms

To evaluate the target firms' stock performance, we use an additional matching sample consisting of firms targeted by private equity management companies. This sample comprises of 273 firms targeted by 195 US private equity companies over the period of January 2000 to December 2013. The targeted firms are registered at *NYSE/ AMEX / NASDAQ* exchanges. We gather data on these firms daily, and monthly stock prices and annual accounting figures from using Bloomberg database.[12]

2.4.4 Crisis definition

For the analyses of daily and monthly stock returns, we divide the data into two sub-groups, for the period before crisis, it starts from January 2000 to July 2007, and for the period during and after crisis, it begins from July 2007 and lasts until December 2013. For the annual accounting analyses, the observations for the crisis begin from 2007 and onward.[13].

For stock returns, the crisis is measured by means of a dummy variable which takes the value one, if Schedule 13D is filed from July 2007 and ends at 2013. In similar fashion, for accounting analyses, crisis is equal to one, if Schedule 13D is reported in year 2007 and onward. Prior studies considering recent crisis impact have been using a similar definition (For detail, e.g., see, Becht et al. (2014); Ben-David et al. (2012); Maier et al. (2011)). In the

[12]Using passive firms targeted by similar hedge funds as a matching sample could possibly arise a potential problem of selection bias and could lead to inaccurate inferences.

[13]The crisis in sub-prime sector which started in early 2007 subsequently trickled down to the financial institutions including banks, holding companies, investment banks, and brokerage houses in the mid of 2007. A general concensus among academicians define the recent financial crisis period from July 2007 till December 2009. Maier et al. (2011) explain the definition of crisis by stating "at the end of June 2007, hedge funds of the investment bank Bear Stearns, which had invested overwhelmingly in the sub-prime mortgage market, were among the first to struggle". (see for details, 'Bear Stearns says battered hedge funds are worth little', New York Times, July 18, 2007., [1]http://www.nytimes.com/2007/07/18/business/18bond.html?_r=0.

sample, one third observations fall in the period following the financial crisis.

2.4.5 Data caveats

2.4.5.1 Non–random sample selection

We extract target and matching firms from similar set of activist hedge funds which grants, in principle an advantage that it allows to control for the quantitative and qualitative characteristics of activist funds. Thus, the determinants which may affect an activist decision whether to target a firm or not are entirely subject to firm characterisitcs and should be accounted for. Prior activism-related literature (Boyson and Mooradian, 2011; Brav et al., 2008; Klein and Zur, 2006) has documented on funds choice and find that target firms are generally characterized as small in market capitalization, holding excessive cash, and operationally well profitable in the year before activism. Fund-related activism critics (see, for detail, Coffee and Palia (2014)) raise fundamental question on post-activism target's performance and argue that it may be attributed to fund's good choice rather than fund's suggested actions in firm's business course. Thus, it originates the problem of selection bias stemming from unobservable heterogeneity. To resolve this potential issue in sample, literature (Rosenbaum and Rubin, 1983) suggests to use an appropriate model setting e.g., propensity score matching to analyze the conditional probability of covariates determining the firm selection.[14]

2.4.5.2 Missing data

Over the course of analysis, a nontrivial fraction of the both sample firms including target and nontargets either delist, merge or stop reporting their monthly prices to Datastream and Bloomberg respectively. In this study, 19% of the event firms and approximately 25% of the non-event firms (conservative figures) report their monthly prices either unchanged or missing in the subsequent years of activism. This could possibly be due to fully acquired by the activist fund or to going private or due to bankruptcy. To construct the matching sample using annual accounting data based on size, book–to–market value and other firm-specific characteristics, once again we experience similar situation. Datastream and Bloomberg provide figures either unchanged or missing which might yield inaccurate estimates and lead to incorrect inferences.

[14]We have discussed this issue in detail in our first chapter about an activist's firm selection based on some observables, and as a result it leads to causality issue. To treat this problem, we use propensity score methodology.

In contrast with missing price data on delisted or dead firms, we have sufficient observations on benchmark portfolio.[15] One solution could be to remove missing firms from sample, however, it could lead to downward bias of removing small targets. An appropriate remedy is suggested by Greenwood and Schor (2009) to form a surrogate matched portfolios, that is to substitute the matching portfolio return with value–weighted return or vice versa.

In literature analyzing the long-run returns' performance (not necessarily fund-related), studies in general are carried out using relatively longer panel (normally covering two decades). Whereas in this study, we consider comparatively a shorter period of 13 years which yields approximately 156 monthly observations. A longer panel allows not only more observations to be examined, but likely helps in detecting the relevant biases in data and yields the test–statistics to identify the differences in outcomes occuring in different methodologies. In addition, a longer panel yields the estimates which are more representative to the population estimates.

2.4.5.3 Industry concentration and month clustering

Unlike previous studies (Brav et al., 2008), both target and nontarget firms sample mainly drawn from few concentrated industries and both follow similar patterns of fund activism. Firms in financial and sevices sectors are accumulated in fund's portfolio with some marginal differences (17% and 13% for targets, 17% and 19% for nontargets) depicting funds strategic trend of forming portfolio for investment. However, both samples dominantly concentrate around manufacturing industry (39% and 36% respectively). A possible outcome of concentration could be that abnormal returns mainly driven from a single industry and as a result the inferences could lead to biased estimates.[16] In addition, both samples share approximately 6% firms in common. We check their announcement dates in samples and if find them occurring simultaneously, then we test for the abnormality of returns separately.

Monthly price observations in both samples heavily cluster in months. The distribution of activist funds can be viewed as extensively filing Schedule 13D announcements during 2005 to 2008. In contrast, this pattern begins 2 years earlier for Schedule 13G announcements (for details table 1, panel B). Thus, the overwhelming majority of the monthly observations cluster during this specific period which may derive the returns biasedly to specific period

[15]The benchmark portfolio is Fama-French three factors including value-weighted market index, SMB, and HML.

[16]An additional analysis could be to analyze the cross-sectional distribution of returns across different industry sectors and to examine the impacts of crisis on that sector.

due to induced cross–sectional correlation.

2.4.6 Summary statistics

Figure 2.1 exhibits cumulative abnormal returns for targets and nontarget firms over the period of 12 months prior to the announcement month and 36 months following the announcement month. *CARs* are compared in two ways; first, we compute abnormal returns for target and nontarget firms in excess of Fama and French (1993) well-constructed six value-weighted portfolios formed on size, and book-to-market value. Second, target firms' long-run abnormal returns are compared with nontarget firms.

When comparing targets and nontargets with reference portfolio, we find that target firms underperform the reference portfolio formed on size, and book-to-market value. The underperformance begins from 12 months before the announcement month and steadily increases over the period of next three years. Similar trends are observed for nontarget firms, however the magnitude for negative returns differ. Firms targeted by private equity underperform the reference portfolio except for a brief period (approximately for 6 months following the announcement month).

In comparison with nontargets, firms targeted for activism show mixed performance. To compare with matching firms targeted by private equity, target firms show underperformance in monthly returns. Over the period of analysis, the net gap in both graphs steadily increases which remains the same until end of three years. While matching long-run performance in active firms with nonactive firms targeted by similar hedge funds, we find clear depiction of better performance in firms induced by fund activism. Firms acquired by activist funds for nonactive purpose or with intention not to influence the management, perform much poorly than the firms targeted by activism. The incurred losses in nontargets are almost 4 times more than target firms, thus a better performance in targets could be attributed to fund activism.

Figure 2.2 and figure 2.3 display *CARs* for targets and nontargets before and after the crisis. We decompose *CARs* for the full sample period into pre and post-crisis period to examine which part of analysis is inducing negativity into the returns. Figure 2.2 exhibits *CARs* in target firms before and after the crisis. A comparative view depict clearly two trends; first, target firm underperform the reference portfolio regardless the crisis period. Second *CARs* in pre and post-crisis period fall, however in post-crisis period, the short fall is much steeper. In comparison with figure 2.3, target firms perform in both period before and after

the crisis.

Table 2.1, panel A reports the distribution of activist hedge funds over the period of January 2000 to December 2013. Interestingly, the number of funds does not vary significantly, howeve a small degree of spike is observed in the years approaching to the financial crisis. Panel B depicts the chronological distribution of the target and nontarget firms acquired by similar activist hedge funds over the period of January 2000 to December 2013. An overview of the figures demonstrate that there is a steady growth in activist events before onsetting the recent financial crisis. An overwhelming majority of the events takes place in early 2000s and steadily increase prior to financial crisis which is consistent with events distribution documented by Greenwood and Schor (2009) and Boyson and Mooradian (2011). One reason for the dramatic increase in activist events is well advanced by Greenwood and Schor (2009) stating that hedge fund might have replaced the role of pension and mutual funds once occupied in 90's and early 2000's. The other factor could be the expansion in the hedge fund industry in post 2000's when investment was comparatively better rewarded by fund–related activism. A notable downfall in the events following the recent financial crisis is attributed to the outflow of capital from hedge fund industry and prudent behaviour of the investor. Panel C delineates 2-digit SIC industry classification for targets (13D) and nontargets (13G). Firms from manufacturing sector are most likely prone to fund activism followed by firms functioning in financial and services sector. Firms industry distribution is partly in line with Boyson and Mooradian (2011); Klein and Zur (2006) documenting majority of targets and nontargets from manufacturing and business services.

2.5 Methodologies

2.5.1 Test statistics, matching firm, and reference portfolios

Barber and Lyon (1997) argue that use of reference portfolio to compute *CARs* is severely flawed and likely prone to measurement, new listing, and skewness biases.[17] While using it in computing *BHARs* may arise potential issues of new listing, rebalancing, and skewness biases. Alternatively, a matching sample based on firm-specific characteristics is suggested to measure the long–run performance in returns. Matching sample approach controls for much of cross-sectional dependence in firms' returns and improves the specifications for

[17]For the graphical presentation of *CARs*, we use reference portfolio based on Fama and French (1993) carefully constructed six value-weighted portfolios formed on size, and book-to-market value.

statistical test. As a result, improved power of test-specification is attributed to similarity in return skewness both in sample and matching firms' stocks (Cowan and Sergeant, 2001). We use matching sample approach using well-defined firm characteristics to analyze the power of test-specifications.

2.5.1.1 Matching firm selection

Fama (1998) explains by arguing that performance in long–run abnormal returns is sensitive to the underlying criterion, confined to detect abnormality. A trivial change in evaluating benchmark may cause possibly significant difference in returns. In their seminal study, Fama and French (1992) argue that firm characteristics in general and size and book–to–market in particular explain much of the cross-sectional and time-series variation in targets stock returns. In this section and in what follows, to assess the abnormality in the target firms and to check the robustness of results, we form two matching samples based on carefully well-defined firm characteristics: *(i)* Size/industry/book–to–market value; and *(ii)* Size/industry/pre–event stock performance.

2.5.1.2 Size/industry/book–to–market value

To detect the abnormality in long-run stock returns within event-study framework, a commonly well-defined benchmark is to carefully construct the matching sample based on size, industry and book-to-market vlaue. It functions twofold; first it identifies the underlying biases implicitly prevalent in sample composition, and second it helps in minimizing such biases to a considerable extent (Barber and Lyon, 1997). Size-specification controls for the biases associated with event firms sample-size. Moreover, if industry is a factor determining cross-sectional abnormal returns, clustering or concentration in a single industry might lead to misspecified model problem. As for industry concentration is concerned, Barber and Lyon (1997) using simulation on randomly constructed sample, document that if sample is mainly drawn from similar two-digit SIC codes, then empirical rejection level appears much higher than theoretical rejection level. However their analyses reveal that if sample firms are drawn from more than four two-digit SIC codes, it possibly eliminates the misspecification. Matching event firms based on book-to-market value explains the cross–sectional dependence of abnormal returns. Fama and French (1992) find a significantly positive cross-sectional relationship between expected stock returns and book-to-market value and explain that due to this defining feature, book-to-market ratio is subsequently added into their three-factor model (Fama and French, 1993). In addition, we also find that firms targeted by hedge funds are generally succeeded by improved stock performance, thus we might expect that sample firms

on average experience lower book-to-market values than non-target firms. Thus, to narrow down the benchmark, we add an additional firm-specification and that is book-to-market value.

To proceed with matching criterion, initially each target firm is matched with nontargert firm based on industry classification. Both event and nonevent firms are sorted on two-digit *SIC* industry codes. In nonevent firms sample, firms whose codes are not matched with event-firms codes are dropped from sample. At next stage, we choose the non-event firms whose market value of equity fall between 70% to 130% of market value of the event-firm a month before being targeted by activist fund. Finally, we match the nonevent firms having book-to-market value closest to the book-to-market value of event-firms. In doing so, we experience a considerable reduction to our sample.

2.5.1.3 Size/industry/pre–event stock performance

Pre–announcement returns realization is a common notion prior to event notification. Highly liquid and efficient market likely perceives the fund anticipated movement in target and predicts the associated potential outcomes with Schedule 13D notification. Fama (1998) provides a comprehensive list on studies documenting major corporate events and their pre-announcement impact on prices. In hedge fund industry, as it has seen in short-run, market normally positively reacts to the fund announcement of filing 13D (see, for details, Brav et al. (2008), and Greenwood and Schor (2009)).

Using a simulation model on data from 1973 to 1994, Lyon et al. (1999) calculate preceding six–month buy–and–hold returns on firms in sample and rank accordingly in size deciles based on their prior event–announcement returns' performance. The documented results explain that the distribution of abnormal returns is different for high pre–event return firms and low pre–event firms. More precisely, for the firms with high pre–event momentum, convential t–statistics are positively biased for one–year horizon and negatively biased for three and five year horizons. Thus, it is highly expected that pre–event stock performance using as a measure to evaluate the target firms abnormal performance could possibly allow to control for the misspecification in test–statisitcs.

Following the literature evaluating corporate event's impact ((Agrawal et al., 1992; Bessembinder and Zhang, 2013; Eckbo et al., 2000), we construct the matching sample using pre–event stock performance 12 months prior to the event month. To do it systematically,

we initially choose the non–event firms whose market value of equity in event month falls between 70% and 130% of market value of the event–firm at the same time. Then at next stage, we select the firm with the closest 12–months pre–event performance to construct the final sample.

2.5.1.4 Reference portfolio–Fama–French three factors

In order to evaluate target firm return's performance, we use Fama–French three factors which are constructed using six size and book–to–market benchmark portfolios including market return $(R_{mt} - R_{ft})$, the excess return on the market measured as value–weighted return on all $NYSE$, $AMEX$, and $NASDAQ$ stocks less one-month Treasury bill rate. SMB factors measures the average return on three small value-weighted growth portfolios minus the average return on three big value–weighted growth portfolios. HML measures the average return on two value–weighted high growth portfolios less return on two low growth portfolios (see, for details, Fama and French (1993)).

From the 12–months pre–event estimation window to post–announcement 36–months, we compute a corresponding observation for each factor matching to the observations of target firm. For the missing or unchanged event-firm observations, we use surrogate observation by computing average of previous observations.

2.6 Results

2.6.1 Cumulative abnormal returns approach

2.6.1.1 Test specifications and biases in *CARs*

Table 2.2 reports t-statistics using *CARs* approach by employing various benchmark specifications in three separate panels. The reported figures for t-statistics are obtained using multiple benchmarks including top deciles for market capitalization, book-to-market value, and prior performance for 12-, 24-, and 36–months. In parenthesis, bottom 10% deciles are also reported for size-specifications. For the benchmark using market value, book-to-market, and prior performance, the abnormal returns are computed using matching sample drawn from 13D files and private equity (PE) firms respectively, and their test-statistics are reported using one sample comparison test. Remaining benchmarks are calculated using Fama-French

three factor loadings. We report for each benchmark the mean abnormal returns, skewness, and kurtosis on 1%, 5%, and 10% respecitvely. In all tests, the principal hypothesis is that mean abnormal return during the event is equal to zero.[18]

While discussing *CARs* for different esimation windows, magnitude on mean abnormal return using benchmark based on size, book-to-market and prior performance improves significantly and tends to bias positively with larger event window. Similar patterns emerge in skewness measure. However, kurtosis varies for different benchmarks.[19] Our matching sample approach yields well-specificied test-statistic which is in-line with Barber and Lyon (1997) documented findings using simulation. Barber and Lyon (1997) attribute the positive bias to positive monthly abnormal returns resulting from new listing bias. However, this reasoning is less convincing in analyses where non-random sampling is used to compute *CARs* on equally-weighted market index (for instance, in this study, matching sample firms remain similar for all periods).

In addition, when Fama–French three–factor loadings are used in computing test-statistic for full sample, results appear interestly different.[20] Mean monthly abnormal returns eventually become negatively biased; nonetheless, magnitude on skewness increases on 12, 24, and 36-month event- window. Barber and Lyon (1997) argue for negative abnormal bias in Fama-French three-factor model by explaining that it is induced by the new listing bias. The increased skewness bias in long-horizons is justified to the fact that when event firms are not well matched on specific characteristics then new listing bias still exists and causes positive skewness bias. Thus, using Fama-French three factor model approach likely to yield well-specified test-statistics.

We explore further notable results in casese when targets are matched with nontargets based on well-defined firm-characteristics including size, book-to-market value, prior performance, or alternatively with industry. *CARs* obtained from using firm-characteristics yield well-specified test-statisitc. Both criteria (industry/size/book-to-market and industry/size/pre-event performance) yield increasingly negatively mean monthly abnormal returns which significantly distinguishes from zero on all level of significance. The level of positive skew-

[18] In an unreported table, *CARs* results for 12-months pre-announcement period and for entire period of (-12, +36) are also calculated.

[19] In PE sample, a big portion of firms go private after being targeted and thus does not report the accounting figures to database which makes sample upward size-bias (big firms are partially acquired which report their accounting data even after event). To treat this bias, we use surrogate observations taking the average of past observations.

[20] The test-statistics are computed for event-firms using market index, Fama-French three factor model.

ness arising from cross-sectional dependence using equally-weighted market index reduce and gradually becomes negative on longer horizons.

In sum, when matching criteria are well-defined for measuring long-run abnormal returns, then *CARs* using equally-weighted market index yield well-specified test-statistics which help in mitigating new listing bias, and skewness bias.[21]

2.6.1.2 Cumulative abnormal returns

In the light of above discussion regarding test-specifications and matching criteria, we move directly to our *CARs* results and compare them with existing studies. Table 2.9 reports the *CARs* for the 589 target firms for 12–month pre–announcement to 36–month post–announcement event-window over the period of January 2000 to December 2013. To compare with nontargets, table 2.10 exhibits the *CARs* for 898 non-event firms over the similar period of January 2000 to December 2013. To compute *CARs*, we use Fama–French three-factor specifications for both target and nontargets. The reported t-statisitc tests the hypothesis whether event firms outperform the non–event firms in four years or in (–12, +36) month event-window.

Compared to fund activism-related documented *CARs*, however this study yields insignificantly negative *CARs*. For full sample, using (-12, +36) month event - window approximately -0.80 points *CARs* are realized compared to 0.10 points documented by Greenwood and Schor (2009) analyzing pre-cisis 1993 – 2006 period over 18 month event - window. In comparison with matching sample firms, for (–12, +36) month event-window, realized *CARs* are –2.36 points, which is approximately three times lower (greater in magnitude) than event firms' *CARs* suggesting that activist's targets perform relatively better. This considerable difference in *CARs* could be possibly attributed to size effect. In analysis of firm characteristics, the targets on average are found two times larger than nontargets measured in market value which may cause this difference in *CARs*, as *CARs* are likely subject to bid-ask bounce in small firms.[22] Another possible explanation to the meaningful difference in *CARs* is given as the fact that firms are possibly misvalued while computing their *CARs*. As Loughran and Ritter (2000) argue that while using equally–weighted benchmark to compute long-run abnormal returns, if misvaluations in small firm pronounce more than large firm, then the

[21] The results for value-weighted market index are still process and are expected to explain better the cross-sectional dependence of cumulative abnormal returns.

[22] Difference between mean monthly *CARs* in targets and nontargets specifies that on average both mean values are not different than each other.

tests that weight firms equally should find greater abnormal returns than the tests that weight firms by market capitalization. In our previous analyses we computed *CARs* for targets and nontargets by using Fama–French three- factor model giving equal weights to each firm in the sample. Thus, insignificance in *CARs* is economically justified. On the contrary, when *CARs* are computed using matching sample firms based on size and book–to–market value then estimates clearly demonstrate significance.[23]

To obtain further insights on cross-sectional variation in target firms long-run abnormal returns, two different matching criteria are used. Prior studies documenting event impact on long-run abnormal returns appear less successful in determining the cross-sectional variations in returns. As Fama (1998) argues that evolved outcomes from these events are highly sensitive to trivial changes in matching criteria. In our analyses, target firms generate negative abnormal returns in post-announcement period indicating the underperformance to the extent that target firms are not less riskier than nontarget firms. To explain it further, each target firm is matched with nontarget firm (drawn from private equity companies sample) on basis of firm-specific characteristics including market capitalization, two-digit *SIC* code, book-to-market ratio, and prior performance.

In an unreported table explaining *CARs* computed for 12-month pre-announcement to 36-month post-announcement, and using benchmark industry, size, and book-to-market value, we find that PE firms outperform the target firms. The difference in *CARs* is –0.43 points, which is also statistically significant. We observe similar result for matching criterion by replacing book-to-market value with prior performance and find that target firms are outperformed by –0.42 points.[24]

[23]Loughran and Ritter (2000) explain statistical reasoning for the significant misvaluations in small firms compared to large size firms, which has potential implications on this sample. Advancing their argument that a test is likely biased towards high explanatory power with no abnormal returns if it uses a benchmark that is contaminated with many of the firms that are the subject of the test. In our study, target and non-target firms are drawn from similar set of funds which could cast doubts on the test power. However, only 6% firms are commonly shared in both samples, which indeed is a meaningful portion.

[24] Negative *CARs* are arguably because of sample composition. Our sample includes the recent financial crisis period which crucially determines in part the components of long-run abnormal returns in hedge fund industry.

2.6.2 Buy-and-hold abnormal returns approach

2.6.2.1 Test specifications and biases in *BHARs*

Table 2.3 exhibits the specifications of t-statistics using *BHARs* approach in the non-random samples based on various matching criteria for 12-month, 24-month, and 36-month monthly event-windows. Two tailed test results for theoretical cumulative density function are reported for each criterion. An overview of the results clearly reveal that mean average abnormal returns in holding period are negatively biased. Barber and Lyon (1997) argue that negative biases arise due to rebalancing and skewness biases in part contributed by new listing bias too. Using reference portfolio of Fama-French three-factor loadings on target firms' abnormal returns, magnitude on negative skewness steadily increases over longer period as compared to *CARs* results where it becomes eventually positive. Highly negatively skewed biases likely dominate the average abnormal returns toward negative (which is evidenced by negative mean observations), and in addition partly driven by rebalancing bias while forming reference portfolio. An interesting aspect of sorting market capitalization and book-to-market value observations into top and bottom size deciles is that pair-wise t-statistic for the mean abnormal returns generate positively skewed values which in line with Barber and Lyon (1997) simulated results on random samples.

As argued in previous analyses that using matching sample criteria to detect abnormality yields good test-specifications and helps in mitigating the underlying biases. However, employing two carefully constructed equally-weighted criteria i.e., size/book-to-market/industry and size/prior performance/industry upon Fama–French three-factor loadings appear less successful in reducing biases in *BHARs* approach. The average abnormal returns become relatively more negatively skewed. However, some degree of imporovement is observed in longer-horizon (36 - months). Contrary to prior documented studies using matching firm criteria in *BHARs* appraoch, we find less evidence in mitigating biases including new listing, rebalancing, and skewness bias. One potential reason for large difference could be negative abnormal returns driven by significant potion of observations in crisis period.

2.6.2.2 Buy–and–hold abnormal returns

In table 2.3, we discuss test-specifications using *BHARs* approach and investigate whether this approach reduces the associated biases arising because of bad modelling and misspecification. In what follows, we discuss our *BHARs* results obtained from using several monthly event-windows and based on various benchmarks and then compare them with existing

literature on fund-activism and explain the differential effects, if any.

Table 2.5 illustrates the results for *BHARs* for one year prior to Schedule 13D announcement and three years in post–announcemnt. The specification of t–statistics using 12–month, 24–month, and 36–month event-window on the Fama–French three-factor model is presented in all three panels respectively. We construct our settings in the following way; first, we measure abnormal returns for targets and nontargets using Fama-French three-factor model in panel A and B, in second step, we compute abnormal returns for targets using nontarget firms as benchmark using different criteria. By doing so, we gain twofold objectives: first, target and nontarget comparison with reference portfolio and second, target performance against nontarget. In each panel, we regress target firms' returns on reference portfolio factors and report the results for estimates. The t–statistics tests the null hypothesis that the annual abnormal returns during the event period is zero. The p–values are reported for each testable hypothesis.

The results in table 2.5 are noteworthy. We highlight the important figures. In panel A, the coefficient on abnornal returns using equally–weighted reference portfolio for preceeding 12 months is significantly positive and generates more than 7%. Similar trend is persistently observed for succeeding 12-month, 24-month, and 36-month event-windows. In comparison with panel B, in which nontargets abnormal returns are computed using similar reference portfolio, the results are significantly negative. In panel C, we regress nontargets' abnormal returns against targets' abnormal returns to test whether target firms perform better than nontargets. In 12-month window prior to the event-month, nontargets perform better by generating more than 9% returns, however, in post-activism 12-month, and 24-month, 36-month event-window targets significantly perform better. An accumulated 3 years (+1, +36) abnormal returns' performance indicates that firms targeted actively outperformed the firms passively targeted in longer period following the activism. These results are in line with Bebchuk et al. (2014) documented findings who use Fama-French three-factor model and momentum factor on equally-weighted index and report that hedge fund targeted firms perform by 7.24% in (+1, +36) monthly window in pre-crisis period.

We are interested in to examine whether these results hold if we decompose the accumulated period into yearly horizon. To put it into simple, we want to know in which year more abnormal returns are generated? To gain insights into the duration of long-run abnormal returns, we analyze *BHARs* in each separate year from pre-announcement to post-announcement. By doing so, we attempt to explore the cross–sectional dimensions of the

abnormal returns for entire holding period.

Table 2.6 replicates table 2.5 in such a way that for each next 12 months, we regress the model and test the abnormality in returns. In panel A, B, and C the results for pre-announcemnet 12-month and post-announcement 12-month remain the same. Panel C last two columns results are important. In panel C, target firms are matched with nontarget firms using industry, size and book–to–market value. For the second year (during 12–month and 24–month) period, the returns are significantly positive whereas in third year (24–month - 36–month) period, the coefficient on abnormal return generates approximately half of accumulated three years abnormal returns. This indicates that in each year, target firm perform better than nontarget firm.

2.6.3 Calendar-time portfolio approach

2.6.3.1 Test-specifications and related biases in *CTPA*

Table 2.4 presents the test-statistics specifications using calendar-time portfolio approach based on various benchmarks. We classify benchmark description into three precise components: 1) size deciles, 2) reference portfolio, 3) firm-specific characteristics. Beginning with Fama–French three-factor model, a seemingly improvement is observed in longer–horizon skewness which primarily remains negative, however gradually reduces. Interestingly, the mean abnormal returns remains the unchanged. Our *CTPA* results perform better than those obtained in section 2.6.2.2 over the similar period of interest indicating that this approach is likely much effective in addressing the issue of cross–sectional dependence and other associated biases. Moreover, when using size deciles specification, the results are interesting and worthnoting. Using market capitalization top decile, t-statistic yields lower mean abnormal returns however skewness tends to zero. In bottom decile, this outcome pronounces more where skewness biases significantly reduces. The improved results are in part attributed to calendar-time portfolio approach which systematically constitutes the reference portfolio in such a way that it accounts for new listing and rebalancing biases. In contrast to this improvement, t-statistic yields unfavourably skewed biased results when we use book-to-market top deciles. Finally, our well-tested benchmark based on firm-specific characteristics does not seem to be providing some promising results. Using size/ book-to-market/ industry benchmark likely increases skewness bias whereas size/ prior performance / industry benchmark provides mix results. In second panel of 24-months, skewness increases which is possibly driven by some large negative observations during that period. In a nutshell, the matching

firm approach in our analyses proves less helpful in mitigating the biasness.

2.6.3.2 Calendar–time portfolio returns

In this section, we discuss abnormal returns generated over 12-month, 24-month, and 36-month event-window using calendar-time portfolio approach. Applying this approach may allow us to examine the wide array of testable hypotheses as well as to explore the factors explaining the cross-sectional variations in returns arising due to various approaches. Moreover, the appropriate applicability of this approach is veiwed as to overcome possible statistical problems associated with *CARs* and *BHARs* approaches.

To compute abnormal returns for each firm i, we form a portfolio consisting of all j firms experiencing similar event within τ months prior to the event month. Since for any given month, the number of firms in reference portfolio may vary, so therefore we use both ordinary least squares (OLS) and weighted least squares (WLS). The reported intercept is interpreted as the mean monthly abnormal return of the event portfolio across all months.

Table 2.7 exhibits the $CTPA$ results using equally-weighted Fama-French three-factor model in three separate panels. Panel A using OLS and WLS for 12-month, 24-month, and 36-month monthly event-windows for compounding effect and reports monthly abnormal returns for target firms. Panel B uses in similar procedure however reports results for yearly horizon. Panel C presents mean monthly abnormal returns for nontarget firms using three-factor model.

Inconsistent with what we experience using *BHARs* approach in table 2.5, $CTPA$ results show negative price drift for consecutive 12, 24, and 36 months in post-announcement horizons in panel A. We observe across the event-windows that as post-event period extends, lower the abnormal returns appear. The reduction in mean abnormal returns is explained by the procedure with which these returns are computed. For each next observation in reference portfolio, the number of firms forming portfolio increases thus as a result portfolio returns systematically marginally reduce. However, we are less interested in magnitude rather much in sign. The mean monthly abnormal return following event announcement significantly negative by –1.2% on 12-month, –0.8% for 24-month, and –0.7% for 36-month period. Bebchuk et al. (2014) using four-factor model specifications (momentum), report significantly positively 25% abnormal returns for (+1, +36) event-window for pre-crisis period.

In comparison with nontarget firms, targets perform relatively better. In panel B, *CTPA* results for nontarget firms using Fama-French three-factor model are reported. When comparing 12-month post-event performance, nontargets mean monthly abnormal returns insignificantly decrease by 1.5% which is lower for targets (1.2%). Thus, targets outperform nontargets by (0.3 points) in one year. Comparing mean abnormal returns estimates and their respective test-specifications, we observe two trends; first, when using linear OLS model settings, the t-statistics values reject null hypothesis for all monthly event-windows which is incontrast with nontargets estimates where we find test-statistics values of not rejecting the null hypothesis. Second, this practice is reversed in WLS model setting in which test-statistics rejects null in targets and does not reject in nontargets at standard 5% level of significance.

The empirical analysis based on calendar-time portfolio approach using Fama-French three-factor model yields conservative results presented in table 2.7. Lyon et al. (1999) argue with two reasonings; first, Fama-French three factor model implicitly assumes linearlity in the components forming the portfolio, however this assumption is less likely valid particularly between size and book-to-market factors. Second, the assumption of no interaction among three factors is likely violated rather this interaction between returns and book-to-market value more pronunces for small firms.

In table 2.8, using Fama-French three-factor model specifications, we compute and test the zero mean monthly abnormal returns. The mean monthly abnormal returns for 12-month, 24-month, and 36-month event window is 0.8% and do not vary over the period. The test-specification value for not rejecting the null hypothesis of zero mean monthly abnormal returns is also within the bounds of 5% significance level.

2.6.4 Crisis effect

In our previous analyses, we test the hypothesis of mean abnormal returns for full sample period using various approaches based upon several benchmarks and find negative results in aggregate. We ask fundamental question whether these negative long-run abnormal returns for full period are driven by the observations mainly falling in the crisis period. To test this hypothesis, we divide the data into two sub-samples, i.e., pre financial crisis starting from January 2000 to July 2007, and post financial crisis beginning from July 2007 to December 2013.

Table 2.9 presents the results for *CARs* and *BHARs* when crisis dummy is incorporated into the models. We report abnormal returns for target and nontargets in excess of equally-

weighted Fama-French three-factor model before and after the crisis period. Panel A reports results for full sample and decomposes them into panel B for pre-crisis and panel C for post-crisis period.

Cumulative abnormal returns for pre-crisis period are lower (negative in magnitude) than post-crisis period for (–12, +36) monthly event-window, however both estimates are insignificant as indicated by t-statistic. In an unreported table, we test the mean difference in abnormal returns before and after the crisis period and find it significant. These results are well illustrated by graphical presentation in figure 2.2 and 2.3 where we can see *CARs* underperform reference portfolio.

In contrast with *CARs* buy-and-hold abnormal returns reduce more in post-crisis period than pre-crisis period as the difference can be seen. The estimate for abnormal returns in pre-crisis period (–12.2%) is significantly negative. In an untabulated result, we test the difference between mean abnormal returns for before and after the crisis period, and we do not reject the null hypothesis.

These results are in line with our previous analyses. We then change the matching sample setting to detect the abnormality and test whether these results hold when we introduce different matching sample. To do so, we compare target sample with private equity targets and compute *CARs* in pre- and post-crisis period. The abnormal returns on non-event firms are computed using Fama French three factor loadings including market return, *SMB*, and *HML*. In an auxiliary results, non-event firms *CARs* surprisingly fall upto –0.76 points, however, post-crisis returns are distributed evenly starting from negative –0.20 and going upto maximum 0.52 points before falling down to -0.015 points. These figures are in contrast with event-firms results which remain almost unchanged in pre- and post-crisis. In an unreported tabular results, a pairwise non-parametric t–statistic is tested to check whether active targets perform better than non–targets private equity firms in pre or post-crisis period. The reported figures reveal that mean monthly abnormal difference is significant which is consistent with the previous results.

2.7 Summary and concluding remarks

The discussion on long–run abnormal returns following the corporate event has been long standing in literature and their statistical significance at times is controversial. These abnor-

mal returns are subject to various biases arising from bad modeling and misspecifications in applied tests. The relevant literature has been identifying these biases as well as proposing reasonably remedial measures to mitigating them. The documented studies in fund-related activism, however have been seen as paying relatively less attention to these biases and reporting the figures which are less likely robust to these issues.

Using a uniquely hand-collected set of data consisting of 589 firms extracted from Schedule 13D announcements, and 898 firms retrieved from Schedule 13G announcements by similar set of 112 hedge funds over the period of January 2000 to December 2013, this study centrally investigates two questions; first, whether target firms perform better than nontarget firms in long-horizon abnormal returns before and after the recent financial crisis, second, whether abnormality in these returns still pronounces when we control for various biases and misspecifications in testing methodologies.

In addressing these relevant concerns, we primarily utilize the literature documented by Barber and Lyon (1996, 1997); Lyon et al. (1999), who at great extent discuss the empirical power and specifications of test-statistics used in event–study framework to detect the abnormality in stock returns following a certain corporate event. The study comprehensively analyzes the fund-initiated events in target firms by exploring two different perspectives; first, it examines the power of test-statistic by constructing a wide array of benchmarks. After identifying an appropriate well-defined benchmark, at second stage, it tests for the abnormality in monthly stock returns applying multiple approaches which include cumulative abnormal returns, buy-and-hold abnormal returns, and calendar-time portfolio approach.

Using various benchmarks including reference portfolio, matching sample, and market index we find that cumulative abnormal returns using equally-weighted market index yield well-specified test-statistics which helps in mitigating new listing and skewness bias. To test the abnormality in monthly returns we use Fama-French three-factor model and find insignificantly negative abnormal returns for (–12, +36) month event-window. These results invariably remain the same even when we control for crisis effect. In contrast with cumulative abnormal returns approach, buy-and-hold abnormal returns method using Fama-French three-factor model as a benchmark appears more effective in addressing biases. Using buy-and-hold abnormal returns approach, we find that estimates are significantly negative for full sample period for the (–12, +36) month event-window, however, the magnitude is lower than the coefficients on cumulative abnormal returns. In addition, the estimates obtained in post-crisis period are significantly different than pre-crisis period. When using calendar-time portfolio

approach, the test-specifications are well-identified by constructing benchmark based on size deciles. Additionally, the reference portfolio which is systematically constituted to detect abnormality also helps in mitigating new listing and rebalancing bias. Regarding mean monthly abnormal returns, calendar-time portfolio approach generates returns lowest in magnitude, however significant for (–12, +36) month event-window.

An equally important finding is that over the period of (–12, +36) monthly event-window, long-run abnormal returns in target firms relatively perform better than returns in nontarget firms, however underperform the returns obtained from private equity firms. In general, the results for full sample is significantly negative. We also find that our applied methodologies partly control for the biases, however, in presence of overlapping in calendar–time and cross–correlation in abnormal returns, the yielded estimates are questionable.

In the wake of recent financial crisis, this study suggests several methodological implications for the researchers and policy makers to reconcile their views on emerging abnormal returns based on costly interventions. Moreover, these studies add more empirical evidence to the existing broad literature on hedge fund impacts on target firms' performance taking into account the recent financial crisis.

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Figure 2.1: Monthly cumulative abnormal returns for the period of (-12, +36) month

This graph plots the monthly cumulative abnormal returns for target firms (13D), and nontarget firms (13G) and private equity firms respectively. *CARs* are calculated for event and nonevent firms using Fama and French (1993) well-constructed six value-weighted portfolios formed on size, and book-to-market value. Target firms are extracted from Schedule 13D, a mandatory file reported by activist hedge fund indicating its intent to influence the firm's internal governance. Non-target firms are retrieved from Schedule 13G, a mandatory report submitted to the SEC by an activist showing no interest to influence firm's management. To evaluate performance in 589 target firms' returns, we use 898 nontargets firms acquired by similar 112 hedge funds. In addition to hedge fund sample, we use an additional sample of 273 firms acquired by private equity firms over the period of January 2000 to December 2013. An announcement date indicates the notification day, when a fund crosses a threshold of acquring 5% or more ownership stake in a target firm. Monthly price data is extracted from using Thomson Reuters Datastream and Bloomberg databases.

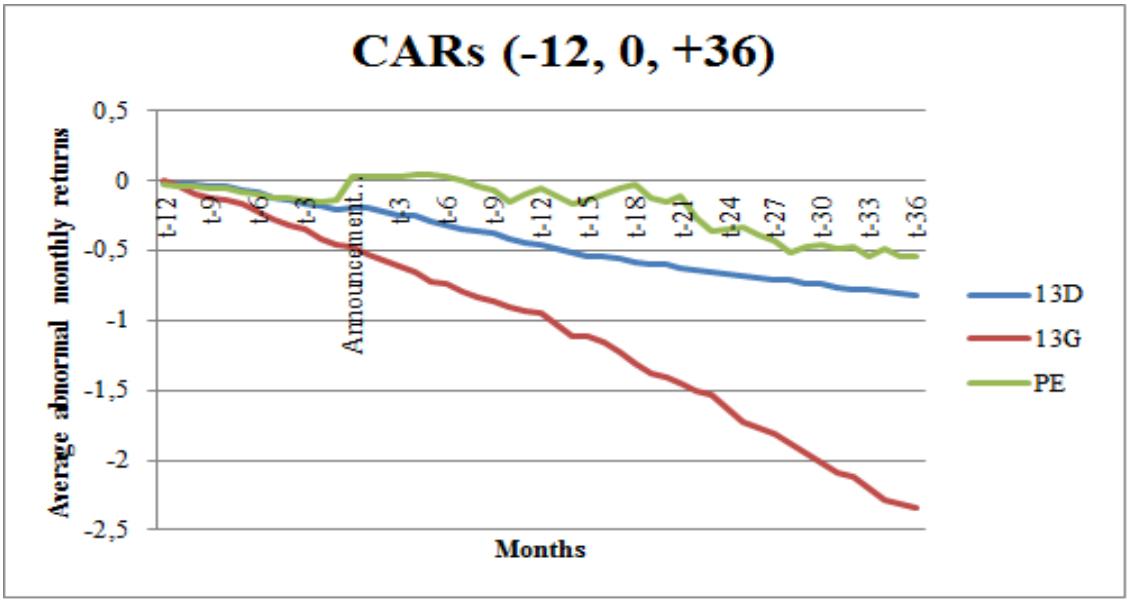

Figure 2.2: CARs for 13D firms during (-12, +36) month event-window in pre and post crisis

Monthly cumulative abnormal returns are decomposed into pre- and post financial crisis period. Figure 2.2 plots *CARs* for 551 target firms and figure 3 exhibits 898 nontarget firms over the period of January 2000 to December 2013. We use Fama and French (1993) well-constructed six value-weighted portfolios formed on size, and book-to-market value to evaluate the performance in targets and nontargets long-term returns. Pre-cisis period begins from January 2000 and ends at June 2007, whereas post-crisis preiod starts at July 2007 and lasts until December 2013.

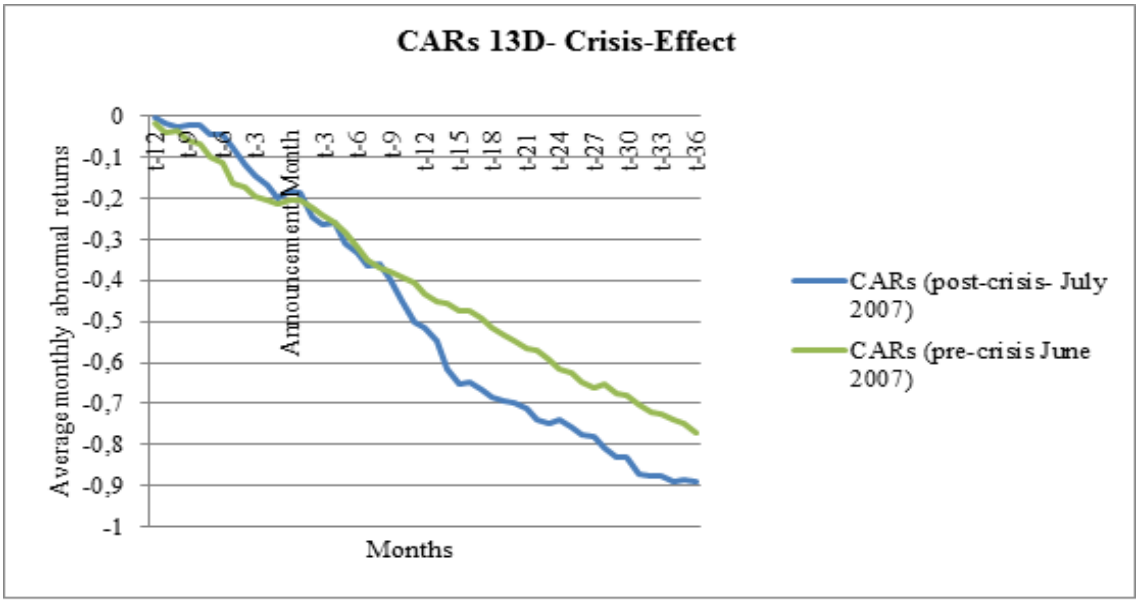

Figure 2.3: CARs for 13G firms during (-12, +36) month event-window in pre and post crisis

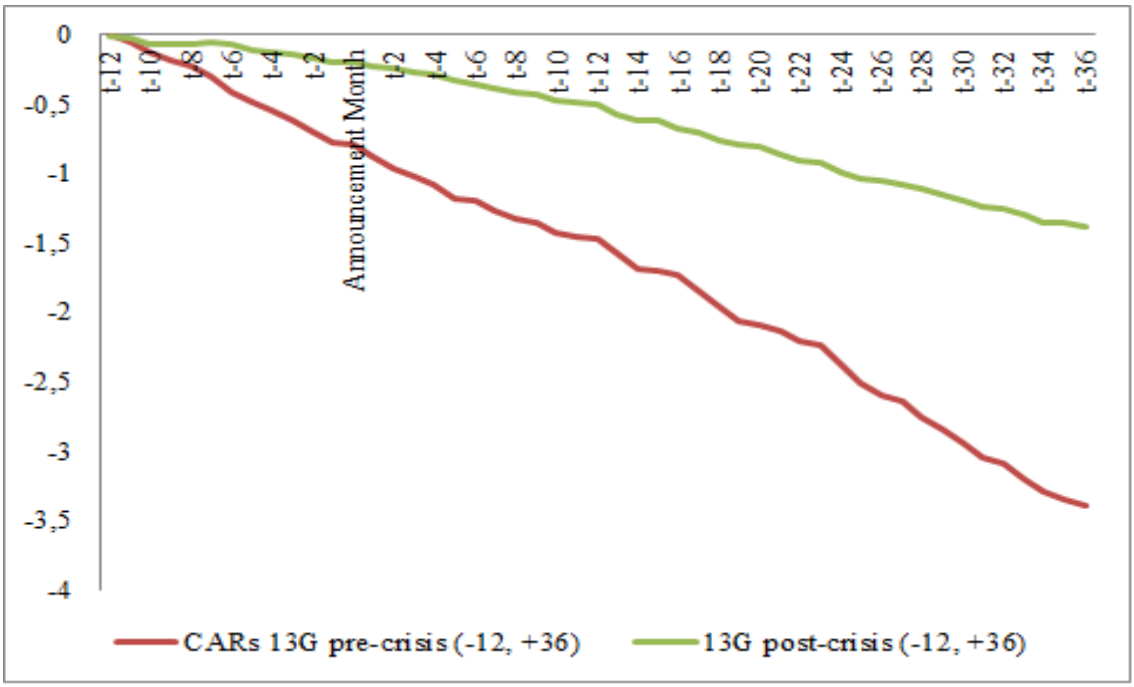

Table 2.1: Chronological distribution of sample data

Panel A: Chronological distribution of funds

Year	Number of Funds	% of sample
2000	10	8.93%
2001	4	3.57%
2002	7	6.25%
2003	6	5.36%
2004	7	6.25%
2005	7	6.25%
2006	14	12.50%
2007	11	9.82%
2008	10	8.93%
2009	10	8.93%
2010	12	10.71%
2011	6	5.36%
2012	4	3.57%
2013	4	3.57%
Total	**112**	**100.00%**

Panel B: Chronological distribution of event and non-event firms

Year	No. of events (13D)	% of sample	No. of non- events (13G)	% of sample
1999	1	0.17%	1	0.11%
2000	31	5.26%	12	1.34%
2001	36	6.11%	28	3.12%
2002	37	6.28%	37	4.12%
2003	41	6.96%	78	8.69%
2004	39	6.62%	92	10.24%
2005	64	10.87%	77	8.57%
2006	69	11.71%	148	16.48%
2007	83	14.09%	122	13.59%
2008	56	9.51%	83	9.24%
2009	26	4.41%	55	6.12%
2010	54	9.17%	87	9.69%
2011	33	5.60%	42	4.68%
2012	11	1.87%	22	2.45%
2013	8	1.36%	14	1.56%
Total	**589**	**100%**	**898**	**100%**

Panel C: Industry representation of target and nontarget firms

Industry	**SIC Code**	**No. of 13D firms**	**% of sample**	**No. of 13G firms**	**% of sample**
Agriculture	01-09	0	0%	0	0%
Mining	10-14	35	6%	110	12%
Construction	15-17	22	4%	9	1%
Manufacturing	20-39	241	41%	327	36%
Transportation	40-49	64	11%	72	8%
Wholesale	50-51	16	3%	16	2%
Retail trade	52-59	38	6%	34	4%
Finance	60-67	98	17%	156	17%
Services	70-89	75	13%	174	19%
Total		**589**	**100**%	**898**	**100**%

Table 2.2: Test-specification using *CARs* in post-activism years

The table reports the specifications of t-statistics using *CARs* in nonrandom samples based on various matching criteria for the period of 12-month, 24-month, and 36-month of post-announcement of Schedule 13D filing in three separate panels. The *CARs* are calculated as $CAR_{i12} = \sum_{i=1} AR_{i12}$ for each target firm matched with nontarget firm on two criteria; i) size/industry/book-to-market value; ii) size/industry/prior performance. The statistical significance in abnormal returns is tested using parametric pairwise t-test, based on the cross-sectional standard deviations of the abnormal returns. Top-row values are theoretical cumulative density function in percentage. The null hypothesis tested is that the average long-term abnormal stock return is equal to zero. p-values are reported to show the significance of t-statistic. ***, **, * denote the level of significance for 1%, 5%, and 10% respectively in a two tailed test.

Panel A: 12-month CARs

Theoretical CDF	**0.5**	**99.5**	**2.5**	**97.5**	**5.0**	**95.0**	**Mean**	**Skew**	**Kurtosis**
Market value									
Size deciles (13D-13G)	0.028	0.127***	0.041	0.114***	0.047	0.108***	0.078)	-0.927	2.715
	(0.051)	(0.153***)	(0.064)	(0.139***)	(0.070)	(0.134***)	(0.102	(0.135)	(2.693)
(13D-PE)	-0.153	-0.046***	-0.059	-0.059***	-0.13	-0.066***)	-0.099	0.458	1.639
	(-0.139)	(0.050***)	(-0.114)	(0.025***)	(-0.104)	(0.015***	(-0.044)	(0.546)	(2.076)
Book-to-market									
Size deciles (13D-13G)	0.025	0.184***	0.045	0.163***	0.054	0.154***	0.104	-0.188	1.600
(13D-PE)	-0.079	0.075***	-0.059	0.056***	-0.050	0.046*	-0.002	1.029	3.632
Prior performance									
Size deciles (13D-13G)	0.144	0.502***	0.189	0.456***	0.221	0.435***	0.323	-0.355	1.668
(13D-PE)	0.111	0.204***	0.123	0.192***	0.128	0.187***	0.158	0.343	2.499
Market Index	-0.178	-0.038***	-0.160	-0.056***	-0.152	-0.064***	-0.108	-0.038	1.862
Fama-French three-factor model	-0.226	-0.049***	-0.203	-0.072***	-0.193	-0.082***	-0.138	-0.023	1.797

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... table 2.2 continued

Theoretical CDF	0.5	99.5	2.5	97.5	5.0	95.0	Mean	Skew	Kurtosis
Fama-French with momentum	-0.163	-0.034***	-0.146	-0.513***	-0.139	-0.058***	-0.098	0.219	1.841
Equally-weighted market index									
A: Size, book-to-market, industry	-0.07	-0.0275***	-0.064	-0.037***	-0.062	-0.035***	-0.048	0.449	2.340
B: Size, prior performance, industry	-0.105	-0.032***	-0.095	-0.041***	-0.091	-0.045***	-0.068	0.536	1.821
Panel B: 24-month CARs									
Market Index									
Size Deciles (13D-13G)	0.123	0.316***	0.145	0.293***	0.155	0.283***	0.219	0.389	2.049
	(0.139)	(0.326***)	(0.160)	(0.304***)	(0.170)	(0.294***)	(0.232)	(0.180)	(1.561)
(13D-PE)	-0.118	-0.065***	-0.112	-0.071***	-0.109	-0.074***	0.092	0.562	1.957
	(0.004)	(0.341***)	(0.042)	(0.302***)	(0.060)	(0.285***)	(0.172)	(0.476)	(1.98)
Book-to-market									
Size decile (13D-13G)	0.142	0.402****	0.171	0.373***	0.185	0.359***	0.272	0.337	1.761
(13D-PE)	-0.087	0.372*	-0.035	0.320*	-0.01	0.296*	0.142	1.195	3.384
Market Index	-0.275	-0.133***	-0.259	-0.150***	-0.252	-0.157***	-0.204	0.364	1.755
Fama-French three-factor model	-0.359	-0.171***	-0.337	-0.192***	-0.327	-0.202***	-0.265	0.264	1.755

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... table 2.2 continued

Theoretical CDF	**0.5**	**99.5**	**2.5**	**97.5**	**5.0**	**95.0**	**Mean**	**Skew**	**Kurtosis**
Fama-French with momentum	-0.241	-0.116***	-0.226	-0.130***	-0.220	-0.137***	-0.178	0.237	2.029
Equally-weighted market index									
A: Size, book-to-market, industry	-0.156	-0.063***	-0.145	-0.073***	-0.140	-0.078***	-0.109	-0.492	1.908
B: Size, prior performance, industry	-0.125	-0.071***	-0.119	-0.078***	-0.116	-0.080***	-0.098	0.608	2.747
Panel C: 36-month CARs									
Market Value									
Size Deciles (13D-13G)	0.252	0.544***	0.284	0.512***	0.299	0.497***	0.398	0.352	1.725
	(.172)	(0.316***)	(0.188)	(0.30***)	(0.195)	(0.292***)	(0.244)	(0.432)	(2.28)
(13D-PE)	-0.087	-0.018***	-0.079	-0.026***	-0.077	-0.298***	-0.053	0.326	1.749
	(.194)	(0.592***)	(0.237)	(0.549***)	(0.258)	(0.528***)	(0.393)	(0.226)	(1.84)
Book-to-market									
Size Deciles (13D-13G)	0.242	0.455***	0.266	0.432***	0.277	0.421***	0.349	-0.080	1.850
(13D-PE)	0.154	0.602***	0.203	0.553***	0.226	0.530***	0.378	0.033	1.288
Market Index	-0.335	-0.204***	-0.320	0.218***	-0.314	-0.225***	-0.269	0.572	2.106
Fama-French three-factor model	-0.456	-0.269***	-0.436	-0.290***	-0.426	-0.30***	-0.363	0.386	1.950

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... table 2.2 continued

Theoretical CDF	0.5	99.5	2.5	97.5	5.0	95.0	Mean	Skew	Kurtosis
Fama-French with momentum	-0.306	-0.183***	-0.292	-0.195***	-0.286	-0.201***	-0.244	0.341	2.019
Equally-weighted market index									
A: Size, book-to-market, industry	-0.295	-0.130***	-0.275	-0.148***	-0.267	-0.157***	-0.212	-0.478	1.768
B: Size, prior performance, industry	-0.226	-0.123***	-0.215	-0.134***	-0.209	-0.139***	-0.174	-0.392	1.990

Table 2.3: Test-specification using *BHARs* in post-activism years

The table reports the specifications of t-statistics using *BHARs* in nonrandom samples based on various matching criteria for the period of 12-month, 24-month, and 36-month in post-announcement of Schedule 13D filing in three separate panels. The *BHARs* are calculated as $BHAR_{i12} = \sum_{i=1} AR_{i12}$ for each target firm matched with nontarget firm (PE) on two criteria; i) size/industry/book-to-market value; ii) size/industry/prior performance. Target firms are 589 firms, and non-event firms are 898 firms from Schedule 13G, and 273 firms targeted by private equity companies in US market. Monthly price data for target and nontarget firms are extracted from Thomson Reuters Datastream and Bloomberg respectively. The prices are taken at the end of each month trading day. For each pre-announcement return, the first monthly observation starts from preceeding month that is $m_0 - m_1$. The similar procedure is adopted for calculating the post-announcement returns. The statistical significance for abnormal return is tested using the parametric pairwise t-test, based on the cross-sectional standard deviations of the abnormal returns. We test null hypothesis that the average monthly abnormal return is equal to zero. p-values are reported to show the significance of t-statistic. ***, **, * denote the level of significance for 1%, 5%, and 10% respectively in a two tailed test.

Panel A: 12-month BHARs

Theoretical CDF	**0.5**	**99.5**	**2.5**	**97.5**	**5.0**	**95.0**	**Mean**	**Skew**	**Kurtosis**
Market value deciles									
(13D-13G)	0.028	0.127***	0.041	0.114***	0.047	0.108***	0.078	-0.927	2.715
(13D-PE)	-0.159	-0.046***	-0.144	-0.060***	-0.138	-0.067***	-0.103	0.407	1.636
Book-to-market deciles									
(13D-13G)	-0.086	0.078	-0.065	0.057	-0.055	0.048	-0.004	-1.559	5.234
(13D-PE)	-0.215	0.106	-0.173	0.065	0.155	0.047	-0.0544	-0.913	4.252
Market index	-0.309	-0.121***	-0.289	-0.140***	-0.280	-0.149***	-0.215	-0.399	3.661
Fama-French three-factor model	-0.035	-0.016***	-0.033	-0.018***	-0.032	-0.019***	-0.026	-1.27	11.121
Equally-weighted market index									
A: Size, book-to-market, industry	-0.021	-0.005***	-0.019	-0.006***	-0.018	-0.007***	-0.013	-1.890	1.062

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... table 2.3 continued

Theoretical CDF	0.5	99.5	2.5	97.5	5.0	95.0	Mean	Skew	Kurtosis
B: Size, prior performance, industry	-0.045	-0.018***	-0.042	-0.021***	-0.041	-0.022***	-0.031	-3.059	1.755

Panel B: 24-month BHARs

Theoretical CDF	0.5	99.5	2.5	97.5	5.0	95.0	Mean	Skew	Kurtosis
Market value deciles									
(13D-13G)	0.107	0.291***	0.128	0.270***	0.137	0.260***	0.199	0.432	2.064
(13D-PE)	-0.341	0.989	-0.189	0.837	-0.119	0.767	0.324	2.472	7.877
Book-to-market deciles									
(13D-13G)	-0.023	0.070	-0.012	0.059	-0.007	0.055	0.024	-1.307	6.320
(13D-PE)	-0.192	0.378	-0.127	0.313	-0.097	0.283	0.093	2.576	1.065
Market index	-0.320	-0.065***	-0.294	-0.091***	-0.282	-0.104***	-0.193	0.052	3.985
Fama-French three-factor model	-0.031	-0.015***	-0.030	-0.017***	-0.029	-0.018***	-0.024	-1.555	11.062
Equally-weighted market index									
A: Size, book-to-market, industry	-0.022	-0.0104***	-0.021	-0.012***	-0.020	-0.012***	-0.016	-1.462	6.047
B: Size, prior performance, industry	-0.039	-0.019***	-0.037	-0.021***	-0.036	-0.022***	-0.029	-2.484	1.286

Panel C: 36-month BHARs

Theoretical CDF	**0.5**	**99.5**	**2.5**	**97.5**	**5.0**	**95.0**	**Mean**	**Skew**	**Kurtosis**
Market value deciles									
(13D-13G)	0.231	0.507***	0.261	0.476***	0.275	0.462***	0.369	0.336	1.698
(13D-PE)	1.048	6.374***	1.629	5.793***	1.906	5.516***	3.711	1.056	2.620
Book-to-market deciles									
(13D-13G)	-0.011	0.064**	-0.003	0.055**	0.001	0.052**	0.026	-0.562	5.502
(13D-PE)	-0.035	0.184**	-0.011	0.160**	0.001	0.149**	0.075	0.239	4.946
Market index	-0.791	-0.205***	-0.732	-0.264	-0.702***	-0.293***	-0.497	-0.914	10.340
Fama-French three-factor model	-0.028	-0.014***	-0.0278	-0.015***	-0.026	-0.016***	-0.021	-1.513	13.546
Equally-weighted market index									
A: Size, book-to-market, industry (FF 3 factors)	-0.019	-0.011***	-0.019	-0.011***	-0.018	-0.012***	-0.0154	-1.377	4.807
Target firm - PE firm	-0.049	0.013*	-0.042	0.006*	-0.039	0.003*	-0.018	-2.414	10.465
B: Size, prior performance, industry	-0.027	-0.014***	-0.026	-0.016***	-0.025	-0.016***	-0.021	-1.241	4.637

Table 2.4: Test-specification using Calendar–time portfolio approach in post–activism years

The following table reports the specifications of t-statistics using calendar–time portfolio approach in nonrandom samples based on various matching criteria for the period of 12-month, 24-month, and 36-month in post-announcement of Schedule 13D filing in three separate panels. The *CTPA* returns are calculated in each calendar month *i*, a portfolio is formed comprising of all firms experiencing the same event over the period of interest. Each event firm is matched with nonevent firm on two criteria; i) size/industry/book-to-market value; ii) size/industry/prior performance. The statistical significance in abnormal returns is tested using the parametric pairwise t-test, based on the cross-sectional standard deviations of the abnormal returns. The null hypothesis tested is that the average monthly abnormal return is equal to zero. p-values are reported to show the significance of t-statistic. ***, **, * denote the level of significance for 1%, 5%, and 10% respectively in a two tailed test.

Panel A: 12-month CTPA

Theoretical CDF	**0.5**	**99.5**	**2.5**	**97.5**	**5.0**	**95.0**	**Mean**	**Skew**	**Kurtosis**
Size									
Top decile	-0.0347	0.028	-0.028	0.021	-0.024	0.018	-0.003	0.226	5.327
Bottom decile	-0.176	0.116	-0.146	0.085	-0.131	0.070	-0.030	0.913	20.196
Book-to-market									
Top decile	-0.069	0.011**	-0.060	0.003**	-0.056	-0.001**	-0.028	-0.270	5.129
Market index	-0.115	-0.014***	-0.104	-0.024***	-0.099	-0.029***	-0.064	8.533	85.473
Fama-French three-factor model	-0.036	0.004**	-0.032	0.001**	-0.030	-0.001**	-0.016	-0.312	4.86
Equally-weighted market index									
A: Size, book-to-market, industry	-0.018	0.003*	-0.015	0.001*	-0.014	0.000*	-0.007	-0.062	3.840
B: Size, prior performance, industry	-0.043	-0.005***	-0.039	-0.009***	-0.037	-0.011***	-0.024	-0.060	5.101
Panel B: 24-month CTPA									
Size									

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... table 2.4 continued

Theoretical CDF	**0.5**	**99.5**	**2.5**	**97.5**	**5.0**	**95.0**	**Mean**	**Skew**	**Kurtosis**
Top decile	-0.030	0.024	-0.024	0.018	-0.021	0.015	-0.003	0.089	4.50
Bottom decile	-0.227	0.054*	-0.197	0.024	-0.182	0.009*	-0.086	-0.318	10.072
Book-to-market									
Top decile	-0.023	0.016	-0.019	0.012	-0.017	0.010	-0.003	-1.190	7.217
Market index	-0.101	-0.051***	-0.096	-0.056***	-0.094	-0.059***	-0.076	8.073	92.788
Fama-French three-factor model	-0.036	0.003**	-0.032	-0.001**	-0.030	-0.002**	-0.016	-0.347	5.091
Equally-weighted market index									
A: Size, book-to-market, industry	-0.019	0.002**	-0.017	0.001**	-0.016	-0.001**	-0.008	-0.179	3.908
B: Size, prior performance, industry	-0.045	-0.004***	-0.041	-0.008***	-0.039	-0.010***	-0.025	-0.439	5.614
Panel C: 36-month CTPA									
Size									
Top decile	-0.029	0.021	-0.024	0.016	-0.021	0.013	-0.004	0.108	4.896
Bottom decile	-0.163	-0.007***	-0.146	-0.024***	-0.138	-0.033***	-0.085	-0.014	3.421
Book-to-market									
Top decile	-0.023	0.016	-0.019	0.012	-0.017	0.010	-0.003	-1.190	7.217
Market index	-0.096	-0.047***	-0.091	-0.052***	-0.088	-0.054***	-0.071	8.621	100.380
Fama-French three-factor model	-0.035	0.002**	-0.031	-0.001**	-0.030	-0.003**	-0.016	-0.284	5.556
Equally-weighted market index									
A: Size, book-to-market, industry	-0.016	0.001**	-0.014	-0.001**	-0.014	-0.001**	-0.007	-0.291	5.986
B: Size, prior performance, industry	-0.042	0.009*	-0.036	0.004*	-0.033	0.001*	-0.016	0.071	4.871

Table 2.5: Buy-and-hold long-run abnormal returns in post–activism years

This table reports the average buy-and-hold abnormal returns for the period that extends from pre-announcement 12-months to 36-months in post-announcement of Schedule 13D filing and Schedule 13G filing in three separate panels. The monthly returns are computed for 589 target firms and 898 firms targeted by similar set of 112 hedge funds in the U.S. All data is extracted from Thomson Reuters Datastream. The prices are taken at the end of each month trading day. The abnormal returns for each firm is computed using Fama-French three-factor model comprising on six equally-weighted portfolios formed on size, book-to-market. The risk-free rate is one month U.S. Treasury bill rate. For each pre-announcement return, the first monthly observation starts from preceeding month that is $m_0 - m_1$. The similar procedure is adopted for calculating the post-announcement returns. The statistical significance of each of the average long-term abnormal common stock return is tested using the parametric t-test, based on the cross-sectional standard deviations of the abnormal returns. The null hypothesis tested is that the average long-run abnormal return is equal to zero. p-values are reported to show the significance of t-statistic. ***, **, * denote the level of significance for 1%, 5%, and 10% respectively, in a two tailed test.

	Reference benchmark	**No. of obs.**	**Statistics**	**Pre-announcement**	**Post-annoucement**		
				12-month	*12-month*	*24-month*	*36-month*
A	Fama-French equally-weighted portfolio (13D - FF three factors)	589	Estimates	0.076	-0.062	-0.076	-0.074
			p-value	0	0	0	0
			t-statistic	0.56	-0.28	-0.63	-9.17
			Constant	9.87***	10.7***	10.0***	3.1***
			% of negative abnormal returns	61.97	57.05	57.22	42.11
B	Fama-French equally-weighted portfolio (13G - FF three factors)	887	Estimates	-0.000	0.000	-0.001	-0.012
			t-statistic	-0.08	0.06	-0.3	-4.07
			Constant	11.903***	11.9***	11.8***	11.9***
			p-value	0	0	0	0
			% of negative abnormal returns	67.43	58.23	52.74	44.93
C	Reference portfolio - Non-event firm 13G (13D - 13G)	589	Estimates	-0.094	0.086	0.028	0.124
			t-statistic	-0.55	0.91	0.21	1.07
			Constant	11.90***	10.5***	11.2***	12.4***
			p-value	0	0	0	0
			% of negative abnormal returns	60.22	55.19	54.65	46.82

Table 2.6: Buy-and-hold abnormal returns for yearly horizon of accumulation

This table reports abnormal returns for each separate year in three separate panels. For each yearly-horizon, we compute abnormal return for each 12-months. The monthly returns are computed for 589 target firms and 898 firms targeted by similar set of 112 hedge funds in the U.S. All data is extracted from Thomson Reuters Datastream. The prices are taken at the end of each month trading day. The abnormal returns for each firm is computed using Fama-French three-factor model comprising on six equally-weighted portfolios formed on size, book-to-market. The risk-free rate is one month U.S. Treasury bill rate. For each pre-announcement return, the first monthly observation starts from preceeding month that is $m_0 - m_1$. The similar procedure is adopted for calculating the post-announcement returns. The statistical significance of each of the average long-term abnormal common stock return is tested using the parametric t-test, based on the cross-sectional standard deviations of the abnormal returns. The null hypothesis tested is that the average long-run abnormal return is equal to zero. p-values are reported to show the significance of t-statistic. ***, **, * denote the level of significance for 1%, 5%, and 10% respectively, in a two tailed test.

	Reference benchmark	**No. of obs.**	**Statistics**	**Pre-announcement**	**Post-annoucement**		
				12-month	*12-month*	*24-month*	*36-month*
A	Fama-French equally-weighted portfolio (13D - FF three factors)	589	Estimates	0.076	-0.062	-0.054	-0.053
			p-value	0	0	0	0
			t-statistic	0.562	-0.285	-0.361	-6.714
			Constants	9.871***	10.720***	24.302	15.09
			% of negative abnormal returns				
B	Fama-French equally-weighted portfolio (13G - FF three factors)	887	Estimates	-0.000	-0.001	-0.009	-0.015
			t-statistic	-0.083	-0.414	-3.916	-7.351***
			Constants	11.90***	11.832***	23.793***	35.792***
			p-value	0	0	0	0
			% of negative abnormal returns				
C	Reference portfolio - Non-event firm 13G (13D - 13G)	589	Estimates	-0.094	0.086	0.032	0.066
			t-statistic	-0.552	0.915	0.233	0.357
			Constants	11.884***	10.449***	22.259***	31.643***
			p-value	0	0	0	0
			% of negative abnormal returns				

Table 2.7: Calendar-time portfolio returns: Fama-French three factor model

This table reports the average calendar-time portfolio monthly abnormal returns from pre-announcement 12 months to 36 months of post-announcement for the event firms filing 13D and 13G. The calendar-time portfolio returns are regressed against Fam-French three-factor model and estimates for intercept are reported using following regression: $R_{pt} - R_{ft} = \alpha_i + \beta_i(R_{mt} - R_{ft}) + s_i SMB_t + h_i HML_t + \varepsilon_{it}$. In calendar time portfolio approach, for each firm i, we form a portfolio consisting of all j firms experiencing same event within τ months prior to the given month. For each firm i, the number of firms in reference portfolio varies; so therefore, we use both ordinary least squares (OLS) and weighted least squares to estimates the regressor intercept alpha. the average abnormal montly return. The weights used in computing the WLS is the number of firms in each portforlio for every event firm. The monthly returns are computed for 589 firms filing 13D and 898 firms filing 13G targeted by similar set of 112 hedge funds in the U.S. market over the period of January 2000 to December 2013. The prices are taken at the end of each month trading day. The abnormal returns for each firm is computed using Fama-French three factors comprosing on six equally-weighted portfolios formed on size, book-to-market. The risk-free rate is one month U.S. Treasury bill rate. For each pre-announcement return, the first monthly observation starts from preceeding month that is $m_0 - m_1$. The similar procedure is adopted for calculating the post-announcement returns. The statistical significance of each of the average long-term abnormal common stock return is tested using the parametric t-test, based on the cross-sectional standard deviations of the abnormal returns. The null hypothesis tested is that the average long-term abnormal common stock return is equal to zero. p-values are reported to show the significance of t-statistic. The number of observations is the total nubmer of months in each regression. ***, **, * denote the level of significance for 1%, 5%, and 10% respectively. in a two tailed test.

Panel A: CPTA - Post Announcement monthly abnormal returns

		12-month	**24-month**	**36-month**
OLS	Intercept	-0.012	-0.008	-0.007
	t-statistics	-1.410	-0.970	-0.920
	No. of observations	160	168	168
WLS	Intercept	-0.019	-0.016	-0.015
	t-statistics	-38.11	-51.40	-66.41
	No. of observations	160	168	168

Panel B:Duration of Post announcement monthly abnormal returns

		12-month	**24-month**	**36-month**
OLS	Intercept	0.006	-0.014	0.001
	t-statistics	0.300	-0.810	1.130
	No. of observations	160	160	168

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... table 2.7 continued

		12-month	24-month	36-month
WLS	Intercept	0.005	-0.003	0.002
	t-statistics	-2.33	-3.19	20.44
	No. of observations	160	160	160

Panel C. Post announcement monthly abnormal returns for 13G firms for three years

		12-month	24-month	36-month
OLS	Intercept	-0.015	-0.015	-0.013
	t-statistics	-2.212	-2.337	-2.193
	No. of monthly observations	154	154	154
WLS	Intercept	0.000	0.000	0.000
	t-statistics	-0.930	-0.440	-0.410
	No. of monthly observations	154	154	154

Table 2.8: Monthly calendar-time portfolio returns: Fama-French three factor model

Monthly abnormal returns (AR_{it}) for each firm are calculated using the returns on the Fama-French three factors value-weighted market index, value-weighted small stocks minus big stocks, and value-weighted high book-to-market value minus low book-to-market value: $R_{pt} - R_{ft} = \alpha_i + \beta_i(R_{mt} - R_{ft}) + s_i SMB_t + h_i HML_t + \varepsilon_{it}$. In each calendar month t, we calculate a mean abnormal return $MAR_t = \sum_{t=1}^{n_t} x_{it} AR_{it}$, where n_t is the number of firms in the portfolio in the month t. The weight, $x_i t$, is $1/n_t$, when abnormal returns are equally weighted. A grand mean monthly abnormal returns MMAR is calcuated: $MMAR_t = \frac{1}{T}\sum_{t=1}^{T} MAR_t$ where T is the total number of calendar months. To test the null hypothesis of zero mean monthly abnormal returns, a t-statistics is calculated using time-series standard deviation of the mean monthly abnormal returns: $t(MMAR) = \frac{MMAR}{\sigma\frac{(MAR_t)}{\sqrt{T}}}$.

The reason for using this simple method is to eliminate the possible cross-sectional dependence occurring because of industry clustering and making choice of inappropriate modelling when reference portfolio is based on non-random firms. The monthly returns are computed for 589 firms filing 13D and 898 firms filing 13G targeted by similar set of 112 hedge funds in the U.S. over the period of January 2000 to December 2013. The prices are taken at the end of each month trading day. The risk-free rate is one month U.S. Treasury bill rate. For each pre-announcement return, the first monthly observation starts from preceeding month that is event month $m_0 - m_1$. The similar procedure is adopted for calculating the post-announcement returns. The statistical significance of each of the average long-term abnormal common stock return is tested using the parametric t-test based on the cross-sectional standard deviations of the abnormal returns. The null hypothesis tested is that the mean monthly long-term abnormal common stock return is not different than zero. p-values are reported to show the significance of t-statistic. The number of observations is the total nubmer of months in each regression. ***, **, * denote the level of significance for 1%. 5%. and 10% respectively.

	12-month	**24-month**	**36-month**
MAR	1.263	1.260	1.261
MMAR	0.008	0.008	0.008
Number of months	150	150	150
Standard deviation	0.101	0.101	0.101
Std. Dev. / Sqr 150	0.008	0.008	0.008
t-statistic	1.023	1.021	1.022

Table 2.9: Long-run abnormal returns and crisis effect – event-firms (13D)

The following table reports the results for various approaches including *CARs*, *BHARs*, and *CTPA* when crisis impact is taken into account. The entire set of monthly stock prices for 589 target firms covering January 2000 to December 2013 is divided primarily into two sub-groups; pre-crisis staring from January 2000 to June 2007; post-crisis period starting from July 2007 to December 2013. Panel A reports the results for full sample. *CARs*, and *BHARs* are calculated using Fama-French three factors including market index, *SMB*, and *HML*. Calendar-time portfolio returns for each firm in each month are computed by averaging the returns on a portfolio formed by consisting of all firms experiencing similar event in last 12-, 24- and 36-months. Panel B, and Pancel C reports the results for pre- and post-crisis period respectively. A pairwise t-test is conducted to test the difference between targets and nontargets abnormal returns. p-values specify the level of significance for test-statistic. ***, **, * indicates the level of significance at 1%, 5%, and 10% respectively.

		CARs	**BHARs**	**CTPA**
Full sample (Jan. 2000- Dec. 2013)	Return in points	-0.819	- 0.067	-
	t-statisitcs	9.934	-1.799	-
	p-value	0.000	0.0730	-
	No. of observations	589	589	589
Pre-crisis (Jan. 2000-June 2007)	Return in points	-0.888	-0.054	-
	t-statisitcs	-10.950	-0.473	-
	p-value	0.000	0.637	-
	No. of observations	347	347	347
Post-crisis (July 2007-Dec. 2013)	Return in points	-0.769	-0.083	-
	t-statisitcs	6.222	-1.999	-
	p-value	0	0.047	-
	No. of observations	242	242	242

Table 2.10: Long-run abnormal returns and crisis effect – 13G firms

This table reports the results for cumulative abnormal returns in nontarget firms when we control for crisis effect in analysis. The sample consists of monthly stock prices for 898 firm covering January 2000 to December 2013, and divided into two sub-groups; pre-crisis staring from January 2000 to June 2007; post-crisis period starting from July 2007 and lasts at December 2013. When an activist acquires a fund with more than 5% ownership stake and files Schedule 13G to the SEC of US with no intent of influencing firm's internal governance then it is known as passively targeted firm. We use passively targeted firms by similar hedge fund to evaluate the actively targeted firm's performance.

		CARs	**BHARs**	**CTPA**
Full sample	Return in points	-1.227	-	-
	p-value	0.000	-	-
	t-statisitcs	-10.436	-	-
	No. of observations	898	898	898
Pre-crisis (Jan. 2000- June 2007)	Return in points	-3.397	-	-
	p-value	0.000	-	-
	t-statistic	-	-	-
	No. of observations	480	480	480
Post-crisis (July 2007- Dec. 2013)	Return in points	-1.377	-	-
	p-value	0.000	-	-
	t-statistic	-12.577	-	-
	No. of observations	418	418	418

PAPER 3

HEDGE FUND DECISION MAKING: EVIDENCE FROM TARGET FIRM LEVERAGE

Zazy Khan

ABSTRACT. Hedge fund targets have experienced unprecedented upsurge in leverage following the recent financial crisis. This study examines whether increase in target leverage affects a fund decision of holding stake in firm. We investigate the link between different components of a firm capital structure and their subsequent effects on fund strategy of retaining the target. Using a hand collected data on 543 US listed firms over the period of 2000 to 2013, we show that leverage explains the cross-sectional variation in fund decision of holding the target. The significance of leverage pronounces in the first year and becomes marginal in the second year after activism when we control for crisis effect. Activists prefer to restructure the debts prior to their exit after first year of activism. We also find that increase in leverage is utilized to improve investment and payout policy in targets.

Keywords: Hedge funds, leverage, capital structure, target firms

JEL classification: G12; G14

3.1 Introduction

"Have fund-owned firms become more leveraged?" Is the question which is circulating in mainstream financial press since the outbreak of financial crisis of 2007-2009.[1] An analysis of recent fund–acquired targets reveals that leverage ratio has achieved unprecedentedly new levels.[2][3] The upsurge in leverage level in post–crisis period in particular, is partly explained by the Fed's recent policy of quantitative easing which led to record low interest rates and

[1] See, e.g.,[1] http://ww2.cfo.com/credit/2013/04/leverage-ratios-surge-at-large-companies/

[2] From 11% in 2012 to 13% in 2013. S&P Capital IQ.

[3] Following the literature, we measure the leverage as a ratio of total debt to total equity.

consequently enticed to high borrowings from financial intermediaries.[4] Hedge funds which are structurally characterized by leveraging targets availed this opportunity and channelized it for the activism. The fundamental question arises whether this increased level of leverage in targets creates any obstacle for the activist fund to sell its holdings at premium.

Numerous studies in hedge fund literature have empirically shown that funds likely target financially growth firms– suggesting corporate changes to targets capital structure and take managerial actions which lead target's stock to reflect its fundamental value. [5] Activists preferably target cash excessive firms to achieve two central objecitves; first, to mitigate agency issues related with cash hoarding, and second to distribute excess cash among shareholders. In addition with depleting excess cash, activists on the other hand channelize the firm–associated financial intermediaries to provide more leverage to finance certain projects. Given the lower interest rates, a stimulus in high demand for debt from traditional sources would certainly alter the components of capital structure.

This study augments Greenwood and Schor (2009) work, which documents that fund–related activism increases the likelihood of a target firm being taken over at higher premium in the period following fund activism. However, contrary to their study, we attempt to explore whether this decision of selling the stock in target is subject to existing level of leverage in the firm. Despite the signifcant recovery of the hedge fund industry in the post-crisis period,[6] the target firms are getting more leveraged and as a result this increase in leverage is affecting considerably various components of the cost of capital. The proportionate changes in cost of capital ultimately transmit into firm's capital structure and thus affect the ability to payback the debts. In addition, different level of cost of capital (precisely cost of debt) determines the price which allows a potential buyer to offer to the activist fund. The activist fund typically acquires largely concentrated stake in target and intents to sell it after having offer reasonably higher than holding price assuming other things remain the same. The buyer presumably evaluates the stock on its fundamental parameters particularly taking into account the target's existing capital structure. Given this information, higher level of leverage lowers the odds for a fund to sell its stock at higher premium, rather it extends the holding period to restructure the debts.

[4]See e.g. Anne-Sylvaine Chassany; Finance: return of the buyout kings, March 7, 2014.

[5]Hedge fund theoritians (Bratton, 2006; Briggs, 2007; Kahan and Rock, 2007).

[6]According to Hedge Fund Research (HFR), a leading fund research firm, the assets under management in hedge fund industry have achieved new level of $2.85 trillion dollars in fourth quarter of 2014.

In addition, this study endeavours to explore the channels to which these additional borrowings are allocated. Prior documented studies on fund activism find that activists introduce innovative techniques to enhance firm's productivity which may enable their targets to be more competitive. To do so, funds increase allocation towards investment component in the long-term as documented by Klein and Zur (2006) who find that post-activism one year accounting performance shows that target firms experience substantial improvement in investment component including capital expenditures and research and development. We hypothesize that additional borrowings are used to improve the investment in targets. To test this hypothesis, we evaluate the changes in targets capital expenditures and research and development in one year following activism and find that one year post–activism capital expenditures have significantly increased. In addition, we also hypothesize that increase in leverage is positively correlated with firm's distribution policy. To test this hypothesis, we examine the changes in firm's dividend yield and payout ratios in one year post-activism.[7]

Using a universe of 4260 Schedule 13D files and their subsequent amendments filed by 112 hedge funds over the period of 2000-2013, we extract data for 543 firms listed in the U.S. and examine whether increased level of leverage affects the fund decision of holding stock in target firm. In answering this question, we initially compare the characteristics of the targets with a matching sample of nontarget firms based on a well-defined benchmark of size/ book to market value/ 2–digit *SIC* industry codes. The difference in medians are tested using Wilcoxon signed rank test indicating that targets are likely undervalued stock which is consistent with the prior fund–related literature. Additionally, statistically significant estimate on cash variable conforms with the widely accepted argument that targets are in general cash excessive and are likely to be involved in agency-related issues. These results comply with our assumptions which state that active funds target undervalued and cash hoarding stock.

The study uncovers new aspects in activism-related literature and examines yet unquestioned dynamics of target firms' debt structure. It comparatively analyzes the change in leverage before and after the crisis and arguably explains the factors for differential effect. The studies in hedge fund have been widely discussing a fund's leverage as an important element in determing fund's portfolio positions (which is validate and still holds), however, on the contrary, a limited amount of attention is paid to target firms' leverage. Firm's leverage is merely seen as a part of accounting measures while assessing the performance follow-

[7] Anecdotal evidence reveals that activists may suggest firms to increase leverage which could be possbily used as higher payout to existing shareholders. In doing so, these funds are seen proposing it at the end of specific period which could be quarter, mid year, or annually to get reputation in industry and among investors and good compensation for their performance.

ing the fund activism. Unlike previous fund-related studies, however, we are focused on examining whether a fund decision of holding ownership stake in a firm contiguously related with target's leverage. We test the hypothesis whether a firm's leverage is positively related with the fund decision of holding the firm and we find that leverage accounts for much of the variation in fund's decision making. We also find that the activist funds increase the leverage in targets to use it as to provide capital for future long-term investments and as a result to enhance firm's value. However, if existing level of leverage is seen as impacting a fund decision of selling stock at premium, then as a strategy, a fund delays to sell the stock and rather prefers to restructure the debts.

We further investigate whether increased level of leverage in targets is mainly induced by crisis period. To examine it, we anaylze the impact of recent financial crisis on targets' leverage. The findings suggest some interesting insights. Crisis, primarily appears significant in our initial analysis. In the first year following the activism, leverage is significantly distinguishable from zero which holds with the hypothesis of long-term investment stating that funds do not reduce their ownership in first year. However, in second year, both crisis and leverage become insignificant and as a result, we find that fund reduces its ownership. The insignficantly reduced level of leverage after controlling for crisis effect is attributed to the activist's strategy of restructuring debts in targets in the first year of activism. In addition, to assess the impacts of crisis on firm's leverage, in particular post–crisis period, we introduce the interactive terms with crisis. The findings suggest two emerging trends; first, post–crisis leverage in targets has increased, which is consistent with Brav et al. (2008); Klein and Zur (2006) who use pre–crisis sample and document that firms' book leverage increases in the post-activism and find weak correlation between dividend increase and leverage increase. In other words, expropriation of creditors is unlikely to be a source of shareholder gains. It contrasts, however with Boyson and Mooradian (2011) findings, who report substantial reduction to leverage following the activism. The second notable finding is that crisis effect on leverage is significant in first year of activism with and without interactive terms indicating that funds are found in restructuring debts before entering to the second year of activism.

Hedge funds are viewed as myopic investors who take large positions in firms suggesting managerial measures and taking actions which improve the stock price to reflect the firms's fundamentals. However, it is largely propagated that these short–run returns are extracted on the cost of long–term value destruction. Contrary to this view, we find an overwhelming majority of funds present in target firm and participating actively even after two years of

activism.[8] In some cases, activists reduce their shareholding below 5% within first year of activism, however, in aggregate such number accounts for insignificant portion of entire sample. Funds average period of holding stake in firms ranges between one to two years which is consistent with the period reported by Brav et al. (2008). Related to the period of holding stake over long-term, we find that fund presence is subject to existing level of leverage.

The rest of the paper is organized as follows. The second section reviews the documented literature on the impact of capital structure on firm value with anecdotal example. Section 3 sheds light on data collection and variable construction. Section 4 presents summary statistics about activist funds and target firms. Section 5 analyzes the formulation of model, and discusses results for full and crisis period. Section six concludes the paper.

3.2 Literature review

In this section, we review capital structure and firm value related literature broadly into two subjects; first, we explore the studies examining relationship between capital structure, cost of capital, and subsequent impact on value of the firm and we investigate whether changes to a firm's capital structure affects its value. Second, we attempt to find empirical evidence from activism related literature analyzing firm's leverage impact on a acquirer's decision of holding the stock. To latter part of the literature, we provide anecdotal evidence from hedge fund industry in explaining how leverage in activists target firms has increased following the recent financial crisis and its subsequent impact on fund decision making.

3.2.1 Capital structure and firm value

The composition of capital structure in an corporate entity and its impact on firm's value has been long debated in finance literature. In their seminal study, Modigliani and Miller (1958) argue that in a given perfect market setting, firm's value remains irrelevant in relation to changes in capital structure. Since the appearance of this proposition, numerous studies have been explaining the capital structure both theoretically (Miller, 1977; Modigliani and Miller, 1963; Myers, 1977, 1984; Myers and Majluf, 1984) and empirically (Bhandari, 1988; Booth

[8] Bebchuk et al. (2014) tests for the probability of a target firm to be disappeared during crisis due to financial stress and finds that targets insignificantly differ from nontargets.

et al., 2001; Fama and French, 1998; Masulis, 1980; McConnell and Servaes, 1995; Rajan and Zingales, 1995).[9] In addition, a large amount of discussion in literature covers the central question on how to achieve optimal capital structure (Jensen and Meckling, 1976; Myers, 1993). Voulgaris et al. (2004) stress on importance of capital structure composition and argue that it performs a crucial role in a firm's survival, performance, and growth. Firms employ various combinations of debt and equity in an attempt to achieve the optimal capital structure, which involves a tradeoff between cost and anticipated benefits. A number of studies have empirically tested the link between changes to capital structure and subsequent impacts on firm's value (see, e.g., (Bhandari, 1988)). We argue for why we substantially emphasize on firm's capital structure albeit other factors also serve an important role.

3.2.1.1 Debt and firm value

Revisiting Modigliani and Miller (1958) propositions which posit that a firm value invariably reacts to the composition of capital structure, we review the previously documented studies which have argued and tested the capital structure puzzle by discussing the relationship between debt component as a source of financing and changes to firm's value. Jensen and Meckling (1976) argue that an optimal capital structure can be obtained by trading off the agency cost of debt in exchange for the benefit of debt. Explaining changes in two broad forms of capital structure, Masulis (1983) documents that stock prices and firm value is positively related to changes in debt level and leverage. In another important study, Jensen (1986) argues that when firms have more internally accumulated funds than (externally) positive net present value projects, then managers are forced to pay external debts that otherwise might have been invested in projects which have negative net present value. This induces over-investment problem which can be lessened if managers are forced to pay out excess funds for servicing debts. Myers (1993) suggests that a firm with outstanding debts may have the incentive to reject the projects that have positive net present value if the benefits from accepting the project accrue to the bondholders without also increasing shareholder's wealth. This phenomenon is termed as under-investment and may cause harm to the value of the firm, in particular in those firms which have higher propects in future investments. Given these theoretical explanations in Jensen (1986) and Myers (1993) discussions, on the contrary, Stulz (1988) argues that debt financing can possibly have both positive and negative

[9] Harris and Raviv (1991) have well-documented a survey of studies on the theory of capital structure. They broadly classify these studies base on tax, bankruptcy cost, agency cost, information asymmetry, interaction within input or output and corporate considerations.

impacts on the value of firm.

3.2.1.2 Equity and firm value

Unlike debt-source of financing, equity is an internally generated source which might be aggregated by summing paid-up capital, share premium, reserves, and retained earnings. In pecking order theory proposed by Myers (1984) and Myers and Majluf (1984) suggest that there is a hierarchy of firm preferences with regard to the financing of their investments, and that there is no well-defined target debt ratio. This theory proposes that firms finance their needs orderly, initially by using internally generated funds, i.e., undistributed earnings, where there is no existence of information asymmetry, next by less risky debt if additional funds are needed and lastly by risky external equity issues to cover any remaining capital requirements. The order of preferences reflects relative costs of finance which vary for different sources of financing.

3.2.2 Targets leverage in post activism period – anecdotal evidence

The motivation of this study is primarily driven by those events which took place in the wake of recent finacial crisis and led to upsurge in firms leverage following the fund-related activism. In this section, we analyze few anecdotal cases to get answers to the questions we raised in earlier analysis. We are interested in to know whether target firms, on average, exhibit similar level of debt prior to fund activism compared to matching sample firms. In addition, whether targets experience increased level of debts following activists suggested measures. Moreover, we also investigate the reasons behind the upsurge in leverage. And finally, to examine the fund's behaviour in such cases in which target firms are highly leveraged and funds want to exit. In an attempt to explore the working mechanisms between activist and target might explain various dimensions of fund's lockup period, activism dynamics and long-term impacts on firm performance.

3.2.2.1 Harbinger Capital Partners Master Fund 1 Ltd and Spectrum Brands

On September 08, 2009, Harbinger Capital Partners Master Fund 1 acquired 30.5% equity in Spectrum Brands which deals in multiple domestic products.[10] The fund explicitly describes the firm's stock as undervalued in Schedule 13D to the SEC. Such value stock appears as a

[10]The fund in this example is randomly selected to see proceedings in target firm over the course of activism.

potential investment for an activist in which fund suggested measures can lead to increase in price by improving the fundamentals.[11]

After initial 13D filing, Harbinger Master Fund filed several ammendments from the period October 2009 to September 2010, the time when both reached on agreement to transfer the majority interest from acquirer to Harbinger Group Inc.. During this period, acquirer together with other shareholders urged Issuer to merge with another firm namely Battery Merger Sub. On June, 2010, the Issuer announced that its shareholders had adopted and approved the Merger Agreement in accordance with the terms. Prior to the merger agreement, Harbinger Master Fund entered with Spectrum Brands on an agreement which allowed acquirer to contribute 27,756,905 shares of common stock of the Issuer to Harbinger Group Inc. in exchange for 119,909,830 newly issued shares of Harbinger Group Inc. The exchange ratio of 4.30:1:00 highly benefitted the shareholders of Harbinger Master Fund with an offer by $27.36 per share.[12]

3.3 Data collection and variable construction

3.3.1 Hedge fund sample

Primarily, a sample of 200 hedge funds is obtained upon request from Barclayhedge.com (private) database with assets under management (AUM– hereafter) and monthly net returns. Of this, funds functioning only in the U.S. are chosen. At next stage, the funds investing in equities under various categories including global macro, global, event driven, market driven among others are shortlisted. To this sample, we add more funds found in hedge fund literature and on related websites. A list of at least 500 randomly chosen funds is assembled. To this extent, the details about fund holdings (AUM) and acquired stakes in firms are unknown. To make it further diversified and well-balanced sample, I perform a search test in the Securities and Exchangd Commission's EDGAR search file with the first name of fund in our list and retrieve additional funds. This process helps in to add more funds to the list which precisely marks about 800 activist hedge funds. From these 800

[11] On February 3, 2009, Spectrum Brands and its United States subsidiaries filed voluntary petitions in the United States Bankruptcy Court for the Western District of Texas. See, for details, http://www.nbcnews.com/id/29001985/ns/business-us_business/t/spectrum-brands-files-bankruptcy/#.VO8RbUZ0zIU. On July 15, 2009, the Bankruptcy Court entered a written order confirming the Issuer's Joint Plan of Reorganization. On August 28, 2009, the plan became effective and the debtors emerged from reorganization proceedings under the United States Bankruptcy Code. Following fund acquisition on June 8, 2009, the firm board of director approved seven more members to be new directors to the reorganized firm.

[12] [1]http://www.harbingergroupinc.com/phoenix.zhtml?c=118763&p=irol-newsArticle&ID=1470262

funds, we drop funds functioning as abitrageurs or taking positions for short period trading purposes. This leaves our initial activist sample to 127 funds involved in activism. To avoid any possible selection bias, the funds are chosen regardless of their characteristics e.g., fund size (AUM), previous filing record, performance, and characteristics about fund managers.

At next stage, each fund is searched in EDGAR system for its record from January 2000 to December 2013. Funds usually report several mandatory files during the period, they operate. When a hedge fund acquires 5% or more ownership stake in a publicly listed firm with intent to intervene in the business course of a firm, it is officially required to report the 13D Schedule within 10 days to the Securities and Exchange Commission (SEC henceforth) of the U.S. under the 'Securities Exchange Act of 1934' in order to regulate the transaction for certain purposes in the secondary market.[13] The Schedule 13D indicates the filer as an activist and provides the details about filer name, the issuer name and identity as an asset class (bank, money manager), the number of total shares outstanding and their form (ordinary or preferred stock), payment methods and related costs, the purpose of transaction, filer holdings in total outstanding shares, and other necessary documentation in the course of transaction's proceedings.[14]

The Schedule 13D discloses essential information about filer's identity. Item 2 entitled as "Identity and Background" describes the reporting person's business address and type, record about filer's, if any, criminal and civil proceedings in last five years. However, it does not mention explicitly the filer's type whether it is hedge fund or non-hedge fund. Thus, to clarify any doubts about fund's identification and position, we examine thoroughly each fund's personal webpage and verify it with Factiva and other related websites. During this systematic search process, some funds are found offering services simultaneously for hedge funds as well as for private equity funds. I trace the parent investment companies which manage these funds and check their identification. If the filer is found non-hedge fund, I simply exclude it. To give an example from the list of activist funds, Deephaven Capital Management LLC, which manages hedge funds and invests in fixed income securities and

[13]The Schedule 13G is a mandatory disclosure statement for the persons subject to Section 13(g). The qualified institutional investor is requiresd to meet two core elements. First, the institution must have acquired the ownership stake in an ordinary course of business and not with the purpose of influencing the control of issuing authority. Second, the issuer must belong to a specific regulatory institution e.g. bank, insurance firms, saving association under Federal Act, registered investment bank among others. The filer (qualified institutional investor) of 13G Filing is required to report within 45 days of the end of calendar year in which the beneficial owner holds more than 5% or within 10 days of the end of the calendar year in which filer holds more than 10% onwership stake.

[14]Schedule 13D and other filings can easily be downloaded through EDGAR filings search on [1]www.sec.govwww.sec.gov website.

in private equity funds. To make sure whether it is classified as hedge fund, we check its website and record on past transactions in SEC to confirm its identification.

Using EDGAR's system to retrieve 13D filings could possibly bias the sample toward big funds and small firms. To acquire a meaningful stake in a firm for activism, a fund is required to invest a substantial part of holding capital. However, some activist funds have involved in target firms with ownership stake less than 5%, thus do not appear in EDGAR's system. For example, in recent period, Sandell Asset Management after acquiring merely 2% stake in JDS Uniphase Corp. (operating in networks and optical products), urged the target to consider a proposal of divesting some subsidiary assets. Following this suggestion, JDS announced its plan saying "This is a strategy our board has been actively considering for some time, ..." The effectiveness of proposal in short period is manifested by fund's reputation and its active role in another firm namely Bob Evan Farms Inc., where it acquired four board seats and urged the firm to spin–off particular assets.[15] These events account for a significant portion of the fund-activism. I gather information about such events using various sources including financial press and related websites.[16]

Activist funds file initial Schedule 13D and then frequently report changes to it known as amended file (13D/A). In some cases, these amended files are not reported after first announcement to EDGAR's system. The amended files are used to follow the developments on fund activism during a specific period. In addition, to know how long the fund stayed in firm (in later part of analysis, these amended files are well explained). A notable example is Del Mar Asset Management, LP when it acquired 4.38% stake in Kennedy-Wilson Holdings, Inc. and announced 13D Filing on November 16, 2009. However, EDGAR's system does not report amendments following the initial filing, thus, all such cases are not considered.

A structurally well-defined procedure of multiple cross-checking and scrutinization leaves the sample with 112 U.S. hedge funds demonstrating the average characteristics of industry. In comparison with seminal study by Brav et al. (2008) who analyze 236 activist hedge funds over the period of 2001 to 2006, this study investigates 13D Disclosuers filed by 112 activist funds for a wide period starting from January 2000 to December 2013. Our sample

[15] [1]http://blogs.wsj.com/moneybeat/2014/09/10/activist-sandell-urged-jds-to-explore-options/?KEYWORDS=hedge+fund+2+equity+stake.

[16] An important criticism is drawn on activist's successful campaign by seeking insights to know how activists systematically gain board seats or influnce firm to implement their suggested plan by holding even less than 5% ownership stake. To gain insights into this puzzle, activists normally propose their agenda to inclined but reluctant large shareholders including pension funds, mutual funds, private equity funds, and more possibly with other hedge funds with whom they can find common grounds. Activists lead the campaign on behalf of other institutional sharedholders by dividing the monitoring cost proportionately. [1]http://business.financialpost.com/2014/11/15/how-activist-hedge-funds-on-steroids-have-become-a-boardroom-enemy/

composition in terms of activists' distribution resembles to Boyson and Mooradian (2011) study who investigate 111 activist hedge funds owned by 89 hedge fund management firms over the period of 1994 to 2005.[17] Table 3.4 represents the distribution of the activist funds over the period of 2000–2013. An overview of the sample depicts the monotonic trend. The number of activist funds on average do not vary from 2002 to 2005, however, just before crisis and in following years, an increasing trend is observed. On average, each activist fund targets 6 firms over the sample period. However, some funds exceptionally (e.g. Harbinger Capital Partners Master Fund, Carl Ichan C, Jana Partners LLC, and VP Partners LLC, among others) engage in, on average, more than 20 firms in sample period which demonstrates their wide activist role.

3.3.2 Target firms sample

For a comprehensive list of 760 Schedule 13D events with the announcement dates, we retrieve 688 firms which are uniquely targeted by 112 activst hedge funds over the period of January 2000 to December 2013. For about 9% cases (760–688), some firms are targeted repeatedly in similar months, so therefore in order to avoid repetition in analysis, we drop the firm occuring twice, however we strictly consider the purpose of transaction for which firm is targeted. At next stage, these firms are searched into the Thomson Reuters Datastream for their DS Mnemonic Codes (identification codes). During search process, a large part of firms do not appear in Datastream, thus we drop them from our sample. Our well–defined search process shortlists 589 U.S. firms, ultimately. These firms are publicly traded at $NYSE/AMEX/NASDAQ$ exchanges.[18]

For a comprehensive sample of 543 target firms, we extract data on their stock prices and for accounting figures from their balance sheets, income and cash flow statements, respectively. Stock prices are daily based and start prior to January 2000 to December 2013.

Of these 543 firms, a large number of target firms are reported as either dead or completely buyout, merged, or delisted from Datastream during the course of activism. Given that, the database does not explain any reason for disappearing firms. The missing annual accounting figures account for approximately 20% of entire sample. However, these caveats have been

[17] How well our sample is diversified and representative of the industry? According to global research firm Preqin [1]https://www.preqin.com/, currently more than 400 activist hedge funds functioning worldwide. Of these 400 active funds, 60% are US based thus comprising 240 funds from which we assemble our sample with 112 activist funds (47%).

[18] In comparison with first chapter, the number of firms have been improved. We correctly identify firm codes for those companies which are merged in other firms after some period.

noticed by prior fund-related studies. Among others, Greenwood and Schor (2009) reduce their sample size approximately half to the firms available in Compustat but find it arguably upward biased to small firms.

Over the course of activism, an activist fund keeps on following in the target firm and reports several amendments known as 13D/As. These amended files reveal the fund's consideration about the target contemporary performance and its strategic plans regarding future policies. In the majority of these cases, a fund demands merely a formal communication for investment purpose, however, sometimes, it recommends an entire change in the course of actions including displacement of CEO, board management, bargaining for appropriate deals in mergers and acquisitions (*M&As*), corporate and governance matters. In order not to miss any important information, we go through these amended files in particular and gather all theoretical information on relevant items. In case of a significant change to the previously submitted purpose of the transaction (e.g., if a fund initially purchases the stock for portfolio investment by having no intention of playing an active role at managerial level and later on alters it to participate in corporate activities as an aggressive/hostile investor) then this amended file would be considered as a separate case. However, earlier studies report that these follow up events do not affect the significance of the overall results (see, e.g., (Greenwood and Schor, 2009)). In this sample, 3500 amended files out of total 4260 (6 amendments per initial announcement) constitute about 80% of the total sample.

3.3.3 Matching firms sample

As discussed in the section 3.3.1 that when an activist crosses a threshold by acquiring 5% or more ownership stake in a publicly listed firm and reveals explicitly no interest to influence the control in firm, then it is mandatory for the acquirer to report Schedule 13G within 45 days at the end of calendar year in which the investor holds ownership. In case of holding 10% or more stake, the duration to file Schedule13G announcement restricts to 10 days at the end of calendar year. We experience that an activist also acquires firm for longer period with nonactive purpose by filing 13G to the SEC. This intuitively motivates to a comparative analysis and raises question to investigate whether firms actively targeted perform better than non–actively targeted firms. In other words, to evaluate the performance of firms reported in 13D Schedules, we use the firms reported in 13G Form. We gather all reported 13G disclosures for the similar set of hedge funds for which we collect 13D files over the period of January 2000 to December 2013. From these 13G Files, we gather all relevant information including firm name, percentage of holding to total ownership, and type of shares (common

versus preferred stock). Unlike 13D Schedule, 13G Form is distinctively exempted from several clauses to report.[19]

We collect initially 955 firms from 112 hedge funds reporting 13G Filings over the period of January 2000 to December 2013. At next stage, we search these firms in Thomson Reuters Datastream database to retrieve their DS Mnemonic Codes (identification codes) in order to collect data. For a small number of firms, which constitute approximately 6% of entire sample, however we do not find codes, thus these firms are dropped from our sample. For the rest of 898 firms, we extract data on daily and monthly stock prices and annual accounting figures from using Datastream. All matching firms are US based and listed at $NYSE/AMEX/NASDAQ$ exchanges.

3.3.4 Crisis definition

For the analyses of daily and monthly stock returns, we divide the data into two sub-groups, for the period before crisis, it starts from January 2000 to July 2007, and for the period during and after crisis, it begins from July 2007 and lasts until December 2013. For the annual accounting analyses, the observations for the crisis begin from 2007 and onward.[20]

For stock returns, the crisis is measured by means of a dummy variable which takes value one, if Schedule 13D is filed from July 2007 and ends at 2013. In similar fashion, for accounting analyses, crisis is equal to one, if Schedule 13D is reported in year 2007 and onward. Prior studies considering recent crisis impact have been using a similar definition (For detail, e.g., see, Becht et al. (2014); Ben-David et al. (2012); Maier et al. (2011)).

[19] In some cases, funds initially report 13D Schedule to the SEC, however later on they are observed to change the status to 13G depending on investment strategy.

[20] The crisis in sub-prime sector which started in early 2007 subsequently trickled down to the financial institutions including banks, holding companies, investment banks, and brokerage houses in the mid of 2007. A general concensus among academicians define the recent financial crisis period from July 2007 till December 2009. Maier et al. (2011) explain the definition of crisis by stating "at the end of June 2007, hedge funds of the investment bank Bear Stearns, which had invested overwhelmingly in the sub-prime mortgage market, were among the first to struggle". (see for details, 'Bear Stearns says battered hedge funds are worth little', New York Times, July 18, 2007., [1]http://www.nytimes.com/2007/07/18/business/18bond.html?_r=0.

3.4 Summary statistics

3.4.1 Activist funds and target firms

Table 3.2 delineates the distribution of target and nontarget firms according to 2–digit *SIC* industry codes. An overview clearly depicts that both event and non-event firms are largely drawn from manufacturing (41% & 36%) and services (22% & 19%) sectors respectively followed by sector related with financial services. Since the target and nontarget firms are drawn from similar hedge funds thus showing on one hand homogeneity in selecting firms, on the other hand evidently supporting the view that activists widely target firms from production sector for which activists suggested measures take time to be implemented. To simplify it, if an activist led campaign results in increase the allocation for firm's research and development, it certainly takes time to show the effect of such measures, thus activists target firms for longer period to stay and take actions which lead the firm to improve its value.

A large number of activist campaigns took place between 2005 and 2008 prior to the recent financial crisis as shown in table 3.3. The chronological distribution of the target and nontarget firms reveals that targeting firms for activism before crisis period is considered as profitable practice. Given the fund inflows to the hedge fund industry and highly positive absolute returns to investors from funds allowed the activists to serve as an ideal candidate for monitoring.[21] In 13G firms, we once again experience similar trend, which exhibits higher growth in acquiring firms (13G) during 2004 to 2008.

3.4.2 Characteristics of target firms

The discussion of this study essentially begins with the assumption that hedge funds likely target financially healthy and growth firms, however randomly. Activists lead a course of actions according to their pre-specified stated objectives and suggest measures which affect the market price to reflect its potential intrinsic value. The selection of a target is largely subject to a fund's intended period of holding stake in target, capital–lockup period together with fund and firm operational and financial characteristics. We investigate the fundamental questions of interest; what kind of firms do hedge funds target for activism? Whether the choice is centered around targets' distribution and leverage policy. To investigate these

[21] According to Eurekahedge, a research firm in hedge fund, the assets managed by the fund industry declined by $470 billion between June 2008 and April 2009.

concerns, we adopt two approaches following the prior activism–related literature (Boyson and Mooradian, 2011; Brav et al., 2008; Greenwood and Schor, 2009). In first approach, we compare characteristics of targets with matching sample firms based on size/book–to–market value/ 2–digit SIC industry. And in second approach, using multivariate logit regression model, we attempt to predict the likelihood of a firm targeted by activist for the purpose of activism.

We construct a sample of matching firms reporting Schedule 13G based on market capitalization, book-to-market value, and 2–digit SIC industry codes in the year in which firms are targeted. At first stage, all firms in both samples are sorted out using a criterion of 2–digit *SIC* code. For each target firm, we find at least one nontarget firm to compare with industry code. In case of unavailability of industry code to match with, we exclude it from the sample. At next phase, we choose matching firm whose market value of equity ranges between 70% to 130% of market value of target firm a month before being targeted. Following this filtering reduces the size of sample considerably. However, yet for each individual target the nontarget firms exceed. Finally, we compare the nontarget matching firms holding book-to-market value closest to the book-to-market value of target firms. The target firm and matching peer with missing observation of book-to-market value are removed from sample. Our matching procedure successfully provides one-on-one matching between target and nontarget.

Table 3.5 presents the summary statistics of target firms' characteristics and compares it with matching sample firms in one lagged year of fund activism. In order to mitigate the effect of outliers, we winsorize all variables at 1% level. We report means, medians, and standard deviations for both samples. To test the difference betweens median observations of target and non-target firms, we perform Wilcoxon signed rank test and report the p-values. All figures are annual and retrieved from Thomson Reuters Datastream. We compute the accounting measures for firm performance which may include the proxies for firm size, operating and financial performance, debt capacities, profitability, investment, and valuation.[22]

In comparison with matching firms, most of the characteristics of the target firms appear reasonable in year prior to fund activism. Using Wilcoxon signed rank test to examine the difference between medians yield statistically significant results for most of the characteristics. We begin by discussing the proxies for the size of firm measured as market value or capitalization (defined as the number of shares times per share price) and annual sales. We find that there is observable heterogeneity in difference in medians' observation. The targets

[22]Table 3.1 provides detailed description on definitions and computational process of these ratios.

appear larger than nontargets and this difference is positively significant at 1% level.

Activist funds largely emphasize on target's value for which we find strong evidence that undervalued stock is more likely prone to the fund activism. Regarding firm's valuation as indicated by book–to–market ratio (book value of equity/market value of equity) and Tobin's Q (long-term debt + the market value of equity/ long term debt + the book value of equity), the difference in medians are 0.80 and 0.03 percentage points respectively, which are significant at 1% and marginally at 10% level. We track this information to the stated objectives of funds and find that as an evidence 60% of firms are explicitly described as undervalued. Activist funds suggest suitably managerial actions which help target to improve its price and thus generate returns for its shareholders.

When we scale firm's operational performance expressed as sales growth (measured as annual percentage growth in sales) and return on assets (experssed as the ratio of EBITDA to lagged assets), the difference in medians is distinguishable from zero and targets outperform their peers by 8 percentage points and 3% respectively. Hedge funds likely target operationally well performing firms which contrasts with prior documented literature on non-hedge fund activism (see, for details, Gillan and Starks (2007)).

The targets debt capacity is assessed in terms of book leverage (defined as debt/(debt + book value of equity)) and market leverage (ratio of total debt to aggregate of total debt and market value of equity). Targets appear less leveraged as compared to their matching peers. Targets low level of leverage prior to fund activism provides a good start to analyze fund suggested actions and their subsequent impacts on firms' capital structure. Next variable cash (defined as cash percentage of total assets) is significantly lower than nontargets by 15 points which is significant at 1% level. The median observations for dividend yield (defined as (common dividend + preferred dividend) /(market value of common stock + market value of preferred stock)) and payout ratios for both targets and nontargets are zero. An interesting aspect to see how much targets reinvest in comparison with industry peers? To assess it, we check their two important components — capital expenditures (measured as percentage of total assets) and research and development ($R\&D$, measured as percentage of total assets). Targets capital expenditures are remarkably higher than nontargets. On the contrary, however, nontargets outperform targets in research and development.

In summarizing the characteristics of the target firms in one year before activism by a set of conventionally defined ratios, we may conclude that the activist funds likely target

medium size, undervalued, operationally and financially healthy firms.

3.4.3 Likelihood of fund–activism using logit regression

To assess the likelihood of fund–activism in the year before activism, we perform a logistic regression. Table 3.6 presents the logit model results. The dependent variable is a dummy variable which indicates the probability of a firm being targeted by a fund in year before activism and vector of independent variables include firm characteristics which are discussed in section 3.4.2. We compare each target with matching sample firm based on size/ book-to-market/ industry in the same year. After matching procedure, we substract each nontarget firm observation from target and regress fund dummy against vector of difference in firm characteristics. We control for industry and year fixed effects. In order to control for any outliers or extreme values, all variables are winsorized at 1%.

Table 3.6 exhibits the effects of covariates on likelihood of fund–activism. In column II, we report the marginal probabilities for each covariate. We find these results much in line with the results obtained in section 3.4.2. To discuss estimates in logit model, conventionally marginal probabilities are interpreted. For instance, firm's operating performance expressed as *ROA* is interpreted as a one standard deviation decrease in *ROA* is associated with 9.5% increase in the probability of being targeted, assuming other factors remain the same. In a similar way, analyzing valuation, debt capacity, and investment aspects conform with our predictable hypothesis that activists likely target small, financially well performing and undervalued stocks — which is also consistent with the documented literature on fund–activism.

3.5 Empirical analysis

3.5.1 Mechanics of fund decision policy

An activist's decision whether to retain its ownership stake in target firm is subject to a number of factors. We have extensively argued in our theoretical discussion that a firms' leverage largely determines this decision particularly in post–crisis period. Based on our arguments, we formulate these factors in a model which is closely related with (Greenwood and Schor, 2009) work.

$$Presence_{it} = \beta_0 + \beta_{1t}\Delta Leverage + \beta_{2t}ListedY + \beta_{3t}Capstructure + \beta_{4t}Characteristics + \varepsilon_{it} \quad (3.1)$$

Where *Presence* is a dummy which takes value 1 if fund holds its stake in target over the entire year of activism. $\Delta Leverage$ is a dummy variable which equals to 1, if firm leverage increases in the year following activism. *ListedY* is a dummy variable which takes value 1, if firm is still alive and traded on any US exchange. *Capstructure* includes various components of capital structure including leverage ratio, cost of equity, cost of debt, and weighted average cost of capital. *Characteristics* includes firm size, profitability, liquidity, growth, valuation, and payout policy. Each covariate in model is matched with a controling firm based on well-defined benchmark of size/book-to-market/industry.

To motivate the composition of our model, we argue for the variable $listed$, which allows to determine whether firm is still alive and listed on either exchange in the US. A link between fund presence and firm being listed explains the period the fund acquires the firm. In our sample, a large number of firms either delist or do not provide data to be accounted for in examining the fund decision.

3.5.2 Results

3.5.2.1 Leverage level and fund decision – Full sample analysis

In this section, we use a wide array of multivariate logit regression models to test the predictable hypotheses whether our central variable of interest– leverage explains any part of cross-sectional variation in our dependent variable which is fund decision of retaining stake in a target firm. The dependent variable is a dummy which adopts value 1, if fund stays in firm following the activism. The vector of explanatory variables include leverage, difference in leverage level between current year and year before activism, which is dummy and takes value 1 if net difference is positive, difference in leverage between year after activism and year before activism which is dummy variable and takes value 1 if net difference is positive, cost of capital, cost of debt, a dummy to indicate whether firm listed in the year following activism, and vector of firm characteristics which include accounting measures of performance including size, profitability, liquidity, valuation, and operational efficiency measures. Most of the independent variables are nondummies, thus we do not supress the

constant term. Each panel reports results obtained from different model specifications which we explain in subsequent analysis. We use vector of control specifications which includes firm size, industry, and year fixed effects for each regression. The number of observations in each regression significantly reduce for which we argue in following part of analysis. In addition, the standard errors are robust to heteroskedasticity and reported in parentheses for each regression.

We begin by discussing table 3.7 which presents results for fund decision making in first year after activism in two separate models. In model I, using cost of debt variable in our regression, we find that the leverage is significantly negative at 5% level. In economic terms, it makes reasonable sense and interpreted as one standard deviation decrease in leverage ratio is associated with 0.005 percentage points increase in the probability of being fund present in firm in first year after activism assuming other factors remain the same. This result is partly consistent with our assumption that funds do not exit from target given higher level of debts, rather it restructure them. The fund may sell its stake in second year of activism after restructuring debts. In model II, which replaces variable cost of debt with *WACC*, the estimates improve statistically significantly. Target firm's leverage in one year following activism is negatively significant at 1% level which is interpreted as one standard deviation decrease in leverage ratio is associated with 6% increase in the probability of fund being present in target in one year post-activism. The dummy, $\Delta Leverage1$ indicates that change in leverage increases (in existing year) in comparison with year before activism which is positively significant at 10%. A positive coefficient on the variable $\Delta Leverage1$ indicates that current year leverage exceeds the leverage in year prior to fund activism. This finding is in support of our view which states that firm leverage increased following fund activism. In recent period, a study by Bebchuk et al. (2014) investigating the long term impact of hedge funds on target firms report that 19% of the activist interventions are characterized as "investment-limiting" by which they mean increase in leverage, higher payout, or reduced investment at the end of fiscal year in which activism takes place and two subsequent years. They find significantly increase in leverage upto 5% from pre-activism to the post-activism years. To the rest of our model, we do not find any component in firm characteristic explaining any variation in fund decision. Given that both models exhibit substantially fewer number of observations is because of lack of adequate observations to compute weighted average cost of capital.

Table 3.8 reports the estimates after regressing fund presence in second year of activism against a set of dummies, and firm characteristics in three separate models. We include

additional dummies of $\Delta LeverageY2$ which explains change in leverage level in second year of activism compard to first year, $Firm\ Listed\ Y2$ dummy which indicates if target is contemporarily traded in stock exchange after two years of activism.

In model I, the coefficient on leverage is positively significant, however marginally at 10% which may be interpreted as fund decision to hold target's stock in second year of activism is positively associated with positive level of leverage. The variable $Firm\ Listed\ Y1$ is also marginally significant which shows that firm is traded in first year of activism. Regarding firm characteristics profitability, valuation, and growth are also significant. Model II represents results by replacing variable cost of equity with "wacc" i.e., weighted average cost of capital. In comparison with result for leverage in model I, we find entirely different output. The coefficient on leverage is no more positive when we account for weighted average cost of capital. This differential effect in both coefficients is partly explained in the components measuring cost of capital. In addition, we do not find any other dummy showing significance. In model III, we replace capital structure component with "cod" which is cost of debt and find that leverage is negatively related with fund presence in target firm following second year of activism. The results for leverage in model II and III are consistent which explain that in second year of fund activism, an activist is presumably restructuring debts in target firm by reducing the leverage. Another interesting finding is the change in leverage level in first and second year of activism which is positive (statistically insignficant) and in part supports the view that during the course of activism, firms experience increase in leverage level.

3.5.2.2 Firm leverage and fund decision making during crisis period

In this section, we analyze the impact of crisis on target firm's leverage and to explore the channels by which these borrowings are acquired and in addition to investigate the venues to which these additional borrowings are allocated. As we have been discussing in our previous analyses that the channels by which activists manange the capital for firm's investment are target's borrowings which are obtained from traditional money lending institutions. Given that, we are interested in to measure the impact of crisis on target's leverage and to examine whether change in leverage due to crisis affects the fund decision of presence in target firm.

Table 3.9 presents the results obtained from multivariate logit regression model to assess the marginal effect of crisis. We revisit the model specification used in section 3.5.2.1 and incorporate crisis dummy into it. Model I, II, and III use similar variables by replacing with component of capital structure systematically. We use "cod" i.e., cost of debt in model I,

"wacc" which represents weighted average cost of capital in model II, "coe" cost of equity in model III. All regressions control for firm size, industry and year fixed effects. All variables are winsorized at 1% level.

The results in table 3.9 are consistent with the results reported for entire sample period in table 3.7. In model I, the estimates for crisis, leverage, and $\Delta LeverageY1$ are statistically significant when using cost of debt as variable in regression. This may suggest that during crisis period, firm's leverage persistenly accounting for much of variation in fund decision making. The change in leverage level during crisis period in first year after activim is positive which is in line with the findings for full sample period. On the contrary, when we use weighted average cost of capital, we observe that coefficient on crisis dummy is no more statistically significant. The effects for leverage and change in leverage still pronounce significantly. Model III results appear in the similar way except for leverage effect. The variable for which estimate statistically remain invariably same is the change in leverage level which is positive and conforms with argument that during the course of activism, targets experience increase in leverage.

In comparison with results presented in table 3.9, the crisis effect fades away in second year of fund decision across all models. Table 3.10 assesses the effect of crisis on fund decision in second year of activism using additional specifications including change in leverage in year 2 and firm being listed in year 2 following fund activism. In model I, $\Delta LeverageY2$ and $Firm\ Listed\ Y2$ are positively marginally significant. These results are consistent with the theory that following activism firms increase their leverage in particular during crisis period. We find much similarity in estimates when we replace "cod" with "wacc" variable. The results drastically change when we incorporate cost of equity as a component of capital structure. The firm's leverage becomes positively significant at 1% implying that one standard deviation increase in firm's leverage is associated with 0.6% increase in fund decision to hold stake in firm. Given the scenario in which targeted firm is overdebted, an activist likely prefers to restructure debts in order to sell firm at premium. This finding is also supported by positively significant coefficient on $\Delta LeverageY2$ which describes leverage as increased in second year of activism compared to the first year.

Summarizing results from table 3.9 and 3.10, we may conclude that crisis effect is significant in first year of activism and in second year it marginally vanishes. Firm's leverage decisively determines fund decision of holding stake in first year of activism. The change in leverage level in current and following years remain significantly positive which supports

our view that target firms increase their leverage during the crisis period. Another equally important finding we observe that funds remain active in listed firms even after two years of activism which contrast with widely spread critique for which they are blamed (that activists behave myopically) to extract the short-run gains over the cost of long-term value destruction.

3.5.2.3 Firm leverage and fund decision making – using crisis interactive terms

In section 3.5.2.2, we analyzed results for the full sample period and later on crisis dummy is incorporated into the analysis. We find that crisis signficantly affects an activist decision making about stock retaining in the first year of activism, however in the second year it becomes insignificant. In this section, we attempt to decompose the crisis effect from the analysis of full sample period to assess which part of sample is deriving our significant results. For this purpose, we generate crisis interactive terms with all dummies, and firm characteristics. In what follows, we are mainly focused on our central variable of interest which is leverage or change in leverage level, thus our analysis would be centered around this specific variable (crisis-interactive term).[23]

In table 3.11, the dependent variable is dummy which takes value 1 if fund is present in firm in first year following activism, vector of independent variables include a vast array of dummies and their interactive terms with crisis dummy, firm characteristics with crisis interactive terms and control variables which include industry and year fixed effects. In model I, the crisis dummy is negatively insignificant. The coefficient on *Leverage* is positive, however insignificant. On the contrary, when we control for crisis effect, we find that leverage is positively significant at 5%. This result is crucial in the wake of recent financial crisis for which we argue that activist's target firms became highly leveraged during crisis period. A positive observation explains that fund does not sell the stock which is highly leveraged, rather retains it to restructure the debts. As an evidence, the change in leverage level is also positively significant. The coefficient on "coe" i.e., cost of capital is positively significant which means that cost of equity increased in the period before crisis, however significantly reduced during the crisis period which also supports our view that lower cost of capital encouraged funds to increase their borrowings for targets.

In model II, we regress similar specifications by excluding variable "coe" cost of equity. An overview of the coefficients depicts almost similar results as estimated in model I. The

[23]Due to inadequate observations for the variables "cod" (cost of debt), and "wacc", the model does not produce output, thus we are unable to report the estimates.

effect of crisis on firm's leverage is positively significant, however the magnitude reduces. The differential effect in leverage variable with crisis interactive term could be attributed to the variable cost of equity. Cost of equity being an important component of capital structure explains partly variations in the leverage level. Once again, we find positively significant effect for the change in leverage level in the year after activism.[24]

Table 3.12 reports the results for multivariate logit regression model. The dependent variable is a dummy which takes value 1 if activist fund exists in target firm in second year of activism. We include some additional specifications to our baseline model as explanatory variables. All variables are added with crisis interactive terms to capture the crisis effect. In each respective model, we control for industry and firm fixed effects.

In model I, the coefficient on crisis dummy is negatively marginally significant. For the set of variables explaining leverage, we do not find any statistical significance. The estimates in model II appear similar to model I, in which we do not add variable cost of equity. The insignificant coefficient on leverage could be argued that activist fund readily has restructured the debts in target firm, thus leverage is no more a decisive factor in determining fund decision about selling the stock. This view is also evidenced by coefficient on variable $\Delta Leverage1$ which is negative implying that leverage level has reduced in target firm as compared to previous year.[25]

Summarizing these results, we may conclude that leverage plays an important role in fund decision about retaining target firm stock, and this effect pronounces in first year of activism when fund accumulates higher level of debt in target as compared to nontarget firm. Activist holding concentrated stake in overdebted firm finds it difficult to sell the stock at premium and thus extends its holding period, however meanwhile suggests measures to target's capital structure which may include restructuring debts. Once target firm successfully reduces these debts, activists sell the stock to likely potential buyer at higher premium.

[24] In an unreported regression model, when we regress fund dummy against crisis dummy, and other dummies with crisis-interactive terms, we find crisis effect negatively significant for leverage and interactive terms. The estimates on "Leverage * Crisis" explains largely cross-sectional variation in fund decision regarding firm holding in first year of activism. Moreover, these results persistently pronounce for all components of capital structure including cost of debt, equity, and weighted average cost of capital.

[25] In an auxiliary analysis, when we use model specifications for second year fund dummy with crisis, leverage and other dummies with crisis interactive terms, the coefficient on crisis yield negatively significant results for two different settings; first model using cost of debt as component of capital structure, second weighted average cost of capital. The estimates on variable "Leverage * Crisis", however appears insignificant and thus does not explain any variation in the fund decision making.

3.5.3 Impact of additional leverage on target firm distribution and investment policies

We hypothesize whether additionally borrowed money induced in target firms is utilized in enhancing firm's payout and investment aspects. To test this hypothesis, we analyze post-activism one year changes in firm's distribution measures as indicated by payout and dividend yield and investment measures as assessed by capital expenditures and research and development.

Table 3.13 presents the changes in firm's payout, dividend yield, capital expenditures, and research and development in one year following the activism. Using Wilcoxon signed rank test, we test the difference in medians for target firms in time-series setting. The coefficients on payout and dividend yield clearly indicate that firm has improved its distribution in one succeeding year following activism. Both estimates are statistically significant at 1% and 10% respectively. Regarding firm's investment side, we find that difference in median observation is positively significant which is in line with our assumption that firms experience increase in investment primarily financed by additional borrowings.

3.6 Concluding summary

The recent financial crisis (2007–08) has likely changed the paradigm of shareholder activism. Given the enormous amount of outflows of funds from the hedge fund industry following the crisis, activists are hindered to raise an adequate amount of liquidity and thus face restraints to finance their portfolios. To this problem, alternatively, funds have channelized firm's borrowings from traditional financial institutions for their investments. We examine this phenomenon and attempt to investigate some relevant concerns which may explore how additional borrowings might affect fund decision to sell its stake in target. Additionally, we are also interested in to examine the impact of crisis on firm's leverage. Moreover, we investigate those venues in which this additional leverage is likely allocated.

Using a uniquely hand-collected set of data consisting of 543 US listed firms targeted by 112 activist hedge funds over the period of January 2000 to December 2013, we analyze the target firms' performance in the year before activism, in particular leverage level before being targeted. The target firms exhibit relatively less leveraged in comparison with matching sample firms based on size/book-to-market/2–digit *SIC* industry codes in one year before the

fund-activism.

Using a wide array of multivariate logit regression model, we test the predictable hypotheses whether target firm's leverage explains the cross-sectional variation in fund's decision making to hold the stock. The decision of fund whether to stay in the firm is tested in the first and second year of activism for full sample period as well as after controlling for the crisis effect. Our findings are mixed and suggest partly consistency with the predictable theory. Target firm's leverage significantly explains the fund decision making in first and second year of activism in full sample analysis. When we account for the crisis effect, however, target's leverage effect appears significant during crisis period in first year of activism and does not yield any evidence for second year of activism. Based on these results, we draw the implication that the activist fund holds the stock in target given higher level of leverage, restructures it and sells it in second year at higher premium.

We also investigate those potential venues to which the firms higher leverage is used. We find that firms have experienced significantly substantial improvement in distribution and investment policy. One-year following the activism, the firms' payout and dividend yield have increased remarkably. In addition, the targets also experience significant increase in capital structure when we analyze the performance measures in time-series analysis.

These findings have considerable implications in the wake of recent financial crisis. In the post-crisis period, regulatory institutions are much concerned to regulate all such activities under taken by alternative asset classes which could possibly cause vulnerability to the global financial system. In recent periods, US regulatory authorities introduced Dodd-Frank (2010) Act to revamp and transparent the financial system in order to prevent another crisis.[26] Hedge funds being significant stakeholders are critically viewed in the wake of recent crisis as these funds rightly induced excessive leverage into the securities which later had disastrous aftermath on global financial system.

[26] [1]www.sec.com

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Table 3.1: Variable definitions

Variable	Description
Market value	Total number of outstanding shares times price per share.
Net sales	Firm's annual sales in dollars.
Tobin's Q	Aggregate of long term debt and the market value of equity divided by aggregate of long term debt and the book value of equity.
Book-to-market ratio	Firm book value of equity/market value of equity.
Growth in sales	Annual percentage growth in sales.
Cash flows	Percentage of assets.
Book leverage	Total debt divided by aggregate of total debt plus book value of total equity.
Market leverage	Total debt divided by total debt plus market value of equity.
Cash	Cash and cash equivalents, divided by total assets (%)
New equity	Amount of new equity issued during the year divided by the lagged assets (%)
Dividend yield	Common dividend plus preferred dividend divided by aggregate of market value of common stock and market value of preferred stock.
Payout	Total dividend divided by net income before extraordinary items.
Capital expenses	Percentage of total assets.
Research and development	Percentage of total assets.
Return on equity	Ratio of net income divide by total equity.
Profitability	Ratio of earnings before interest and taxes divided by net sales.

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Variable	Description
Liquidity	Cash and short term assets divided by current liabilities.
Growth Ratio	Retention rate which is equal to 1 minus dividend declared divided by net income
Return on equity	Net income divided by total equity.
WACC	Weighted average cost of capital, computed as: $$\frac{E}{V}R_e + \frac{D}{V}R_d(1-T_c)$$ R_e Cost of equity R_d Cost of debt E Total common shareholders equity D Total Debt V Total value is the aggregate of total equity and total debt.
Cost of equity	Dividend per share divided by current market value of stock multiplied by growth rate of dividends.
Cost of debt	Annual interest payment of total debt divided by market value.
Industry	Classified based on 2-digit SIC codes of the target

Data sources: All accounting and financial figures are extracted from the annual reports of target firms using Datastream.

Table 3.2: Distribution of firms by industry

The table provides a comparative summary about the industry classification from which the firms are targeted. An activist files Schedule 13D upon crossing threshold of 5% or more ownership stake in a publicly listed firm with intent to influence the firm's internal governance. 13G is reported when fund is not intended to offer an active role in target firm's management. For 543 target firms, we have 898 nontarget firms targeted by similar 112 US hedge funds over the period of January 2000 to December 2013.

SIC 2 digit	Industry	13D firms		13G firms	
		N	%	N	%
01-09	Agriculture, Forestry, Fishing	0	0%	0	0%
10-14	Mining	41	8%	110	12%
15-17	Construction	5	1%	9	1%
20-39	Manufacturing	223	41%	327	36%
40-49	Transportation & Public Utilities	52	10%	72	8%
50-51	Wholesale Trade	12	2%	16	2%
52-59	Retail Trade	37	7%	34	4%
60-67	Finance, Insurance, Real Estate	52	10%	156	17%
70-89	Services	121	22%	174	19%
	Total	543	100%	898	100%

Table 3.3: Chronological distribution of target and matching firms

The following table represents the chronological distribution of firms drawn from Schedule 13D Files, and Schedule 13G Files from EDGAR search system in Securities and Exchange Commission of the US. These files are reported by a similar set of activist US hedge funds over the period of January 2000 to December 2013. A 13D Disclosure indicates intent of an activist to influence the internal governance of target firm whereas a 13G Disclosure shows a fund has no intention to play an active role. All firms are publicly traded at *NYSE/AMEX/NASDAQ* exchanges.

Year	No. of targets	% of sample	No. of matching	% of sample
2000	25	4.60%	12	1.34%
2001	31	5.71%	28	3.12%
2002	32	5.89%	35	3.90%
2003	35	6.45%	78	8.69%
2004	37	6.81%	106	11.80%
2005	63	11.60%	76	8.46%
2006	66	12.15%	148	16.48%
2007	76	14.00%	122	13.59%
2008	56	10.31%	83	9.24%
2009	24	4.42%	55	6.12%
2010	48	8.84%	87	9.69%
2011	32	5.89%	42	4.68%
2012	10	1.84%	9	1.00%
2013	8	1.47%	17	1.89%
Total	**543**	**100%**	**898**	**100%**

Table 3.4: Chronological distribution of hedge funds

The table represents the chronological distribution of the activist hedge funds over the period of January 2000 to December 2013.

Years	Number of Funds	Percentage of sample
2000	10	8.93%
2001	4	3.57%
2002	7	6.25%
2003	6	5.36%
2004	7	6.25%
2005	7	6.25%
2006	13	11.61%
2007	10	8.93%
2008	9	8.04%
2009	9	8.04%
2010	17	15.18%
2011	6	5.36%
2012	2	1.79%
2013	5	4.46%
Total	**112**	**100.00%**

Table 3.5: Firm characteristics in pre-activism year

The following table reports the average firms characteristics for 543 targets and compares them with the characteristics of a 898 matching sample non-targets by similar 112 U.S. hedge funds over the period of 2000-2013. I report mean, median, and standard deviation for both targets and non-target firms. The last two columns report the Wilcoxon signed rank test for the differences in medians between targets and the matched firms with their respective p-values. The targets are matched with non-targets on firm's size, book-to-market value, SIC 2-digit codes. The definitions of all variables are provided in table 3.1. The data to compute all these ratios is extracted from using Datastream.

Characteristics	Event firms: 13D			Non-event firms: 13G			Median comparison[1]	
	Mean	Median	Sd.	Mean	Median	Sd.	Difference	p-val
Market Value ($ mln.)	1038.66	203.69	2297.72	687.96	166.77	1734.88	36.92	0.000
Sales ($ mln.)	1428.27	311.26	5375.86	631.63	36.72	2168.69	274.54	0.000
Tobins'Q	-0.52	1.68	44.57	2.92	0.88	15.17	0.80	0.000
Book/Market	0.46	0.42	0.78	0.48	0.39	0.74	0.03	0.093
Sales Growth	1.36	1.06	2.34	1.19	0.98	2.66	0.08	0.004
Return on Assets	-0.03	0.03	0.24	-60.76	0.00	481.20	0.03	0.000
Book Leverage	0.42	0.33	1.05	2.92	0.88	15.17	-0.55	0.016
Market Leverage	0.27	0.19	0.29	0.17	0.00	0.27	0.19	0.06
Cash (% Assets)	0.75	0.02	2.59	0.34	0.17	0.35	-0.15	0.002
Dividend Yield	0.45	0.00	1.14	0.01	0.00	0.03	0.00	0.002
Payout	0.01	0.00	0.91	1.35	0.00	7.92	0.00	0.397
CapEx	5.81	3.35	8.86	54.14	1.29	204.04	2.07	0.420
R&D	0.07	0.00	0.14	1.19	0.98	2.66	-0.98	0.053
Return on Equity	-0.03	0.08	3.67	-52.79	0.00	219.74	0.08	0.040
Total Assets ($ mln.)	1940.54	376.00	5079.77	951.73	100.30	2825.04	275.70	0.001

[1] Wilcoxon signed rank test for differences in medians between the target and the matched firms.

Table 3.6: Logit regression – likelihood of fund activism

The table reports the effects of covariates on the probability of the firm being targeted by hedge fund in the year before activism. The dependent variable is a dummy which takes value 1 if firm had been a target in the previous year. All independent variables are lagged by one year. Column I reports the coefficients and column II reports marginal probabilities. All data is extracted from Datastream. I winsorize all variables at 1%. *, **, *** indicate the level of significance at 10%, 5%, and 1%.

Characterisitcs	Coefficients	Marginal Probabilities
Market Capitalization	-2.962**	-0.414*
	-1.439	0.232
Total Sales	-0.109	-0.015
	(0.151)	0.0206
Growth	-0.325	-0.045*
	(0.199)	0.027
Return on Assets	-0.679*	-0.095*
	(0.397)	0.057
Tobins Q	-0.540**	-0.075***
	(0.217)	0.023
Book to market value	0.169	0.024
	(0.108)	0.016
Book Leverage	0.575***	0.080***
	(0.221)	0.024
Cash	1.769*	0.247
	-1.064	0.154
Dividend Yield	-0.795	-0.111
	(0.727)	0.089
Research Development	-0.000	-1.51e-07
	(0.000)	0.000
Capital Expenditures	-6.026*	-0.842
	-3.157	0.531
Constant	1.182**	-
	(0.572)	-
# Observations	88	
Pseudo R-squared	0.211	

Table 3.7: Impact of leverage on fund decision of holding stock in target – first year following activism

The dependent variable is a dummy which takes value 1 if a fund holds the stake in a firm in the first year after activism. The set of independent variables include components of capital structure, firm characteristics and dummies. Δ Leverage1 is a dummy which is equal to 1 if difference in net leverage (leverage in current year minus leverage in previous year) is positive. *Firm Listed Y*1 – dummy which takes value 1 if firm is listed in the first year of activism. *Firm Listed Y*2 – dummy which takes value 1 if firm is listed in the second year of activism. "*cod*" is cost of debt, *wacc* is weighted average cost of capital, *coe* is cost of equity. Model I uses cod, Model II uses WACC. All variables are winsorized at 1%. Firm characteristics are defined in table 3.1. ***, **, * present 1%, 5%, 10% level of significance.

Fund presence in first year activism	***Model I***		***Model II***	
	Coefficients	Marg. Prob.	Coefficients	Marg. Prob.
Leverage	-1.862**	-0.0051	-1.518***	-0.063
	(-2.77)	(-0.49)	(-3.47)	(-1.85)
Δ*Leverage*1	3.370	0.010	2.296*	0.093
	(1.23)	(0.68)	(2.37)	(1.18)
*Firm Listed Y*1	-0.731	-0.002	10.90	0.987
	(-0.18)	(-0.19)	(1.48)	(17.41)
Profit	19.45*	0.0529	25.61	1.070
	(2.01)	(0.44)	(1.72)	(3.20)
Growth	4.519	0.012	0.176	0.007
	(1.36)	(0.49)	(0.16)	(0.15)
codt/ WACC	40.01	0.109	17.81	0.744
	(1.91)	(0.42)	(1.27)	(1.10)
Liquidity	0.261	0.001	0.233	0.010
	(0.18)	(0.19)	(0.65)	(0.54)
Q	1.430	0.004	-0.099	-0.004
	(1.46)	(0.51)	(-0.18)	(-0.20)
BM	2.735*	0.007	0.688	0.029
	(2.08)	(0.48)	(0.84)	(0.73)
ROA	-10.37	-0.028	-9.452	-0.395
	(-0.67)	(-0.33)	(-0.76)	(-0.93)
Cash	2.761	0.008	0.292	0.012
	(1.69)	(0.56)	(0.59)	(0.46)
MV	-0.370	-0.001	0.073	0.0031
	(-0.43)	(-0.36)	(0.21)	(0.23)
Constant	-1.828		-1.833	
	-0.14		(-0.43)	
Pseudo R2	0.509	-	-	
# Observations	40		59	59

Table 3.8: Impact of leverage on fund decision of holding stock in target – second year after activism

The dependent variable is a dummy which takes value 1 if a fund holds the stake in a firm in the second year after activism. The set of independent variables include components of capital structure, firm characteristics and dummies. Δ Leverage1 is a dummy which is equal to 1 if difference in net leverage (leverage in current year minus leverage in previous year) is positive. *Firm Listed Y*1 – dummy which takes value 1 if firm is listed in the first year of activism. *Firm Listed Y*2 – dummy which takes value 1 if firm is listed in the second year of activism. "*cod*" is cost of debt, *wacc* is weighted average cost of capital, *coe* is cost of equity. Model I uses cod, Model II uses wacc. All variables are winsorized at 1%. Firm characteristics are defined in table 3.1. ***, **, * present 1%, 5%, 10% level of significance.

Fund presence 2nd year activism	***Model I***		***Model II***		***Model III***	
	Coeff.	Marg. Prob.	Coeff.	Marg. Prob.	Coeff.	Marg. Prob.
Leverage	0.041*	0.010	-0.980*	-0.006	-0.785*	-0.169
	(2.23)	(2.11)	(-2.19)	(-0.43)	(-2.25)	(-2.16)
Δ *Leverage*1	0.187	0.046	2,129	0.012	0.915	0.189
	(0.33)	(0.34)	(1.10)	(0.52)	(0.83)	(0.88)
ΔLeverage2					1.024	0.213
					(0.85)	(0.87)
*Firm Listed Y*1	1.364*	0.328	0.967	0.007	12.78	0.985
	(2.48)	(2.68)	(0.85)	(0.40)	(1.91)	(35.54)
*Firm Listed Y*2					-11.77	-0.955
					(-1.79)	(-10.54)
Profit	-0.011**	-0.003	-3.009	-0.017	-1,824	-0.393
	(-3.10)	(-3.31)	(-1.14)	(-0.47)	(-0.92)	(-0.91)
Growth	1.042*	0.257	1.085	0.006	0.934	0.201
	(2.42)	(2.69)	(1.34)	(0.35)	(1.33)	(1.30)
coe/wacc/cod	13.31**	3.288	2.013*	1.166	11.10	2.393
	(2.75)	(2.70)	(2.00)	(0.47)	(0.99)	(0.99)
Liquidity	-0.038	-0.009	0.629	0.004	0.383	0.082
	(-1.19)	(-1.23)	(1.46)	(0.45)	(0.77)	(0.75)
Q	-0.485*	-0.120	0.126	0.001	0.165	0.036
	(-2.07)	(-2.11)	(0.29)	(0.22)	(0.52)	(0.52)
BM	-0.680	-0.168	-1.610*	-0.009	-0.661	-0.142
	(-1.57)	(-1.62)	(-2.31)	(-0.39)	(-1.20)	(-1.26)
ROA	-0.725	-0.179	0.776	0.005	1,895	0.409
	(-0.70)	(-0.69)	(0.06)	(0.07)	(0.20)	(0.20)
Cash	0.110	0.027	1.018*	0.006	0.425	0.092
	(1.84)	(1.82)	(2.27)	(0.44)	(0.96)	(0.93)
MV	-0.001	-0.000	-0.630	-0.004	-0.373	-0.080
	(-0.01)	(-0.01)	(-1.29)	(-0.33)	(-1.06)	(-1.08)
Constant	Y	Y	Y	Y	Y	Y
Pseudo R2	0.263	-	0.508	-	0.271	-
# Observations	130	130	51	51	52	52

Table 3.9: Firm leverage and fund decision making in first year of activism with crisis effect

The dependent variable is a dummy which takes value 1 if fund holds the stake in firm in the first year after activism. Crisis is a dummy which equals to 1 if firm is targeted during July 2007 to December 2013. The set of independent variables include components of capital structure, firm characteristics and dummies. Δ Leverage1 is a dummy which is equal to 1 if difference in net leverage (leverage in current year minus leverage in previous year) is positive. *Firm Listed Y*1 – dummy which takes value 1 if firm is listed in the first year of activism. *Firm Listed Y*2 – dummy which takes value 1 if firm is listed in the second year of activism. "*cod*" is cost of debt, *wacc* is weighted average cost of capital, *coe* is cost of equity. Model I uses cod, Model II uses wacc. All variables are winsorized at 1%. Firm characteristics are defined in table 3.1. ***, **, * present 1%, 5%, 10% level of significance.

Fund presence 1st year activism	***Model I***		***Model II***			***Model III***
	Coef.	Marg. Prob.	Coef.	Marg. Prob.	Coef.	Marg. Prob.
Crisis	-3.149*	-0.535	-2.922	-0.486	-3.269*	-0.481
	(-2.24)	(-2.34)	(-1.77)	(-1.80)	(-2.16)	(-1.97)
Leverage	-1.02**	-0.148	-0.907**	-0.129	-0.021	-0.003
	(-2.68)	(-3.07)	(-2.86)	(-3.51)	(-1.07)	(-1.06)
Δ*Leverage*1	1.750*	0.225	1.651*	0.212	1.458***	0.178
	(2.11)	(2.41)	(2.04)	(2.26)	(3.61)	(4.20)
*Firm Listed Y*1	-0.596	-0.0791	-0.481	-0.064	1.020**	0.154
	(-0.74)	(-0.83)	(-0.60)	(-0.66)	(2.60)	(2.18)
cod/wacc/coe	-0.008	-0.00114	0.900	0.128	0.986	0.122
	(-0.03)	(-0.03)	(0.84)	(0.76)	(1.45)	(1.44)
Liquidity	0.418	0.061	0.499	0.071	0.223*	0.027
	(1.50)	(1.55)	(1.38)	(1.44)	(2.08)	(2.31)
Profit	12.77*	1.859	16.66*	2.372	0.033	0.004
	(2.08)	(2.50)	(2.50)	(3.02)	(1.90)	(1.98)
Growth	-0.140	-0.020	-0.612	-0.087	-0.582*	-0.072
	(-0.19)	(-0.19)	(-0.75)	(-0.77)	(-2.47)	(-2.64)
Market Cap	-2.841	-0.414	-2.925	-0.416	1.937	0.240
	(-1.15)	(-1.10)	(-1.17)	(-1.16)	(1.60)	(1.59)
Q	-0.083	-0.012	0.028	0.004	-0.154*	-0.019
	(-0.31)	(-0.31)	(0.10)	(0.10)	(-2.06)	(-2.12)
BM	0.532	0.077	0.365	0.052	-0.106	-0.013
	(1.32)	(1.46)	(0.93)	(1.03)	(-1.00)	(-1.00)
ROA	-8.966	-1.305	-14.36*	-2.044	-1.581	-0.196
	(-1.92)	(-1.80)	(-2.06)	(-1.66)	(-1.71)	(-1.65)
Constant	1.150		1.850		-1.168	
	(0.46)		(0.73)		(-0.83)	
Pseudo R2	0.275		0.292		0.181	
# Observations	123	123	116	116	313	313

Table 3.10: Firm leverage and fund decision making in second year of activism with crisis effect

The dependent variable is a dummy which takes value 1 if fund holds the stake in firm in the second year after activism. Crisis is a dummy which equals to 1 if firm is targeted during July 2007 to December 2013. The set of independent variables include components of capital structure, firm characteristics and dummies. Δ Leverage1 is a dummy which is equal to 1 if difference in net leverage (leverage in current year minus leverage in previous year) is positive. *Firm Listed Y*1 – dummy which takes value 1 if firm is listed in the first year of activism. *Firm Listed Y*2 – dummy which takes value 1 if firm is listed in the second year of activism. "*cod*" is cost of debt, *wacc* is weighted average cost of capital, *coe* is cost of equity. Model I uses cod, Model II uses wacc. All variables are winsorized at 1%. Firm characteristics are defined in table 3.1. ***, **, * present 1%, 5%, 10% level of significance.

Fund presence 2nd year activism	***Model I***		***Model II***		***Model III***	
	Coef.	Marg. Prob.	Coef.	Marg. Prob.	Coef.	Marg. Prob.
Crisis	2.036	0.460	1,798	0.420	0.547	0.125
	(1.72)	(2.06)	(1.48)	(1.65)	(0.82)	(0.82)
Leverage	-0.590	-0.134	-0.439	-0.105	0.029***	0.006
	(-1.92)	(-1.40)	(-1.67)	(-1.69)	(3.48)	(3.48)
Δ*Leverage*1	-0.992	-0.214	-1.101	-0.253	-0.087	-0.020
	(-1.06)	(-1.18)	(-1.13)	(-1.20)	(-0.25)	(-0.25)
Δ*Leverage*2	1.653*	0.378*	1.697*	0.397	0.734*	0.169
	(2.03)	(2.14)	(2.08)	(2.29)	(2.05)	(2.03)
*Firm Listed Y*2	1.370*	0.271	1.683*	0.350	1.376***	0.277
	(2.27)	(1.49)	(2.43)	(3.06)	(3.82)	(4.48)
cod/wacc/coe	1.934	0.438	-4.013	-0.963	0.101	0.023
	(1.01)	(1.75)	(-1.49)	(-1.50)	(0.19)	(0.19)
Liquidity	0.030	0.007	-0.077	-0.019	0.023	0.005
	(0.15)	(0.15)	(-0.31)	(-0.31)	(0.69)	(0.69)
Profit	7.933*	1.798	8.888*	2.133	-0.008	-0.002
	(2.00)	(2.08)	(2.07)	(2.12)	(-0.54)	(-0.54)
Growth	0.803	0.182	0.667	0.160	0.182	0.041
	(0.48)	(0.45)	(0.50)	(0.50)	(1.13)	(1.13)
Q	0.059	0.014	0.010	0.003	-0.099	-0.023
	(0.17)	(0.17)	(0.02)	(0.02)	(-1.39)	(-1.40)
BM	-1.207**	-0.274	-1.507*	-0.362	0.038	0.009
	(-3.06)	(-2.42)	(-2.38)	(-2.45)	(1.40)	(1.40)
ROA	-17.80*	-4.034	-17.39*	-4.173	-0.194	-0.044
	(-2.40)	(-2.91)	(-2.15)	(-2.23)	(-0.27)	(-0.27)
MV	28.72***	6.509	25.78***	6.188	-0.651	-0.147
	(3.90)	(4.38)	(7.77)	(8.63)	(-0.46)	(-0.46)
Constant	0.736		1.628		-1.963	
	(0.24)		(0.48)		(-1.60)	
Pseudo R2	0.390		0.418		0.166	
# Observation	130	130	123	123	306	306

Table 3.11: Impact of crisis on leverage and fund decision making in first year of fund activism

The dependent variable is a dummy which takes value 1 if fund holds the stake in firm in the first year after activism. Crisis is a dummy which equals to 1 if firm is targeted during July 2007 to December 2013. The set of independent variables include components of capital structure, firm characteristics and dummies. Δ Leverage1 is a dummy which is equal to 1 if difference in net leverage (leverage in current year minus leverage in previous year) is positive. *Firm Listed Y*1 – dummy which takes value 1 if firm is listed in the first year of activism. *Firm Listed Y*2 – dummy which takes value 1 if firm is listed in the second year of activism. Explanatory variable "*coe*" is cost of equity. For Model II, we drop "coe". All variables are winsorized at 1%. Firm characteristics are defined in table 3.1. ***, **, * present 1%, 5%, 10% level of significance.

Fund presence 1st activism year	***Model I***		***Model II***	
	Coefficients	Marg. Prob.	Coefficients	Marg. Prob.
Crisis	-3.197	-0.090	-3.950	-0.316
	(-0.98)	(-0.53)	(-1.23)	(-0.72)
Leverage	0.013	0.000	0.042	0.002
	-0.41	-0.42	-1.52	-1.35
Leverage * Crisis	0.180**	0.003	0.137*	0.006
	(-2.60)	(-2.32)	(-2.42)	(-3.16)
Δ *Leverage*1	1.516*	0.026	1.277*	0.059
	-2.48	-1.5	-2.25	-1.54
Δ *Leverage*1 *Crisis	0.196	0.003	0.162	0.007
	-0.24	-0.25	-0.22	-0.23
*Listed Y*1	1.280*	0.0315	1.150*	0.074
	-2.43	-1.2	-2.34	-1.35
*Listed Y*1* Crisis	-1.382	-0.028	-0.714	-0.036
	(-1.46)	(-0.96)	(-0.78)	(-0.73)
coe	2.227*	0.037		

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Fund presence 1st activism year	***Model I***		***Model II***	
	Coefficients	Marg. Prob.	Cofficients	Marg. Prob.
	-2.12	-1.35		
coe * Crisis	-3.871*	-0.064		
	(-2.25)	(-1.44)		
Liquidity	0.218	0.003	0.196	0.009
	-1.33	-1.09	-1.58	-1.32
Liquidity* Crisis	-0.053	-0.001	-0.051	-0.002
	(-0.34)	(-0.33)	(-0.55)	(-0.54)
profit	0.037	0.001	0.030	0.001
	-1.7	-1.2	-1.5	-1.21
Crisis* Profit	-1.163***	-0.019	-0.721**	-0.034
	(-4.23)	(-2.59)	(-2.64)	(-4.72)
Growth	-0.287	-0.005	-0.203	-0.009
	(-0.72)	(-0.67)	(-0.61)	(-0.60)
Growth* Crisis	-1.839*	-0.030	-1.852**	-0.087
	(-2.47)	(-1.60)	(-2.67)	(-1.64)
Q	-0.181	-0.003	-0.051	-0.002
	(-1.38)	(-1.13)	(-0.38)	(-0.38)
Q* Crisis	0.005	0.000	-0.11	-0.005
	-0.03	-0.03	(-0.65)	(-0.65)
BM	-0.049	-0.001	-0.047	-0.002
	(-0.64)	(-0.61)	(-0.73)	(-0.69)
BM* Crisis	-0.04	-0.001	-0.041	-0.002
	(-0.27)	(-0.26)	(-0.31)	(-0.30)
ROA	-1.577	-0.026	-0.147	-0.007
	(-0.90)	(-0.77)	(-0.09)	(-0.09)

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Fund presence 1st activism year	***Model I***		***Model II***	
	Coefficients	Marg. Prob.	Cofficients	Marg. Prob.
ROA* Crisis	1.490	0.025	-0.372	-0.017
	-0.68	-0.67	(-0.18)	(-0.18)
MV	0.044	0.001	0.0121	0.001
	-0.29	-0.28	-0.08	-0.08
MV* Crisis	0.188	0.0031	0.198	0.009
	-0.86	-0.82	-0.95	-0.86
Constant	-0.231		-0.193	
	(-0.11)		(-0.11)	
# Observation	313	313	327	327

Table 3.12: Impact of crisis on leverage and fund decision making in second year of fund activism

The dependent variable is a dummy which takes value 1 if fund holds the stake in firm in the second year after activism. Crisis is a dummy which equals to 1 if firm is targeted during 2007 to 2013. The set of independent variables include a vector of dummies, well-defined firm characteristics, and cost of equity. For Model II, we exclude "coe". All variables are winsorized at 1%. Firm characteristics are defined in table 3.1. ***, **, * present 1%, 5%, 10% level of significance.

Fund presence 2nd activism year	***Model I***		***Model II***	
	Coefficients	Marg. Prob.	Coefficients	Marg. Prob.
Crisis	-6.533*	-0.898	-5.855*	-0.861
	(-2.20)	(-7.11)	(-2.34)	(-6.11)
Leverage	-0.010	-0.002	-0.004	-0.001
	(-0.36)	(-0.36)	(-0.17)	(-0.17)
Leverage * Crisis	0.042	0.0101	0.038	0.009
	-1.48	-1.54	-1.73	-1.82
$\Delta Leverage1$	-0.346	-0.082	-0.363	-0.085
	(-0.76)	(-0.76)	(-0.85)	(-0.85)
$\Delta Leverage1$ *Crisis	1.452	0.348	1,710	0.403
	-1.5	-1.63	-1.84	-2.08
*Listed Y*1	1.894**	0.366	1.700**	0.334
	-2.9	-3.66	-2.67	-3.34
*Listed Y*1* Crisis	0.761	0.183	0.682	0.163
	-0.44	-0.45	-0.55	-0.55
*Listed Y*2	0.306	0.072	0.301	0.07
	-0.57	-0.58	-0.57	-0.58
*Listed Y*2* Crisis	-0.729	-0.168	-1.031	-0.231
	(-0.66)	(-0.69)	(-1.01)	(-1.07)

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Fund presence 2nd activism year	***Model I***		***Model II***	
	Coefficients	Marg. Prob.	Cofficients	Marg. Prob.
Δ *Leverage*2	0.339	0.081	0.25	0.059
	-0.72	-0.71	-0.55	-0.55
Δ *Leverage*2 * Crisis	0.098	0.024	-0.359	-0.082
	-0.1	-0.1	(-0.39)	(-0.41)
coe	1,368	0.326		
	-1.27	-1.27		
coe * Crisis	-4.374*	-1.042		
	(-2.08)	(-2.05)		
Liquidity	-0.032	-0.007	-0.015	-0.003
	(-1.08)	(-1.08)	(-0.46)	(-0.46)
Liquidity* Crisis	0.076**	0.018	0.053*	0.012
	-2.65	-2.53	-2.12	-2.09
profit	0.0357	0.009	0.0402	0.009
	-1.4	-1.38	-1.54	-1.51
Crisis* Profit	-0.182	-0.043	-0.129	-0.031
	(-0.90)	(-0.85)	(-0.69)	(-0.66)
Growth	0.576	0.137	0.401	0.095
	-1.74	-1.72	-1.87	-1.85
Growth* Crisis	-1.233*	-0.294	-1.056*	-0.249
	(-2.23)	(-2.16)	(-2.18)	(-2.12)
Q	0.069	0.0164	0.203	0.048
	-0.45	-0.45	-1.45	-1.43
Q* Crisis	-0.359	-0.086	-0.514**	-0.121
	(-1.96)	(-1.87)	(-3.03)	(-2.84)
BM	0.062	0.014	0.035	0.008

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Fund presence 2nd activism year	***Model I***		***Model II***	
	Coefficients	Marg. Prob.	Cofficients	Marg. Prob.
	-1.8	-1.79	-1.1	-1.1
BM* Crisis	-0.038	-0.009	0.052	0.012
	(-0.30)	(-0.30)	-0.47	-0.47
ROA	-0.347	-0.083	0.572	0.135
	(-0.26)	(-0.26)	-0.49	-0.49
ROA* Crisis	-0.855	-0.204	-1.680	-0.397
	(-0.46)	(-0.46)	(-0.99)	(-1.02)
MV	-0.13	-0.031	-0.167	-0.039
	(-1.08)	(-1.07)	(-1.49)	(-1.47)
MV* Crisis	0.537**	0.128	0.541**	0.128
	-2.81	-2.74	-3.14	-3.07
Constant	-0.226		-0.0984	
	(-0.14)		(-0.07)	
# Observations	305	305	322	322

Table 3.13: Changes in firm distribution and investment in one year post-activism period

The table reports the changes in firm payout, dividend yield, capital expenditures, and research and development in one year after activism in time-series setting. The changes in characteristics are for 543 firms targeted by 112 hedge funds over the period of 2000 to 2013. We report mean, median, and standard deviation for pre and post one year following activism. The last two columns report the Wilcoxon signed rank test for the differences in medians and report p-values. Table 3.1 provides detail definition of each variable. The data to compute all these ratios is extracted from using Thomson Reuters Datastream.

Characteristics	Pre-activism			Post-activism			Median comparison[1]	
	Mean	Median	Sd.	Mean	Median	Sd.	Difference	p-val
Payout	0.05	0.00	0.31	0.06	0.00	0.48	0.00	0.0063
Dividend Yield	0.01	0.00	0.02	0.01	0.00	0.11	0.00	0.0760
CapEx	0.09	0.025	0.66	0.04	0.030	0.07	0.05	0.0000
R&D	0.09	0.00	0.24	0.08	0.03	0.22	0.03	0.5249

[1] Wilcoxon signed rank test for differences in medians between the target and the matched firms.