The Role of Derivatives in Hedge Fund Activism

Jianhua Gang
Email: jhgang@ruc.edu.cn
School of Finance, Renmin University, Beijing, China

Jie (Michael) Guo
Corrspondant Author: Email: jie.guo@durham.ac.uk
Durham Business School, Mill Hill Lane, Durham, DH1 3LB, UK

Nan Hu
Email: nan.hu@glasgow.ac.uk
Adam Smith Business School, Glasgow University, Glasgow, G12 8QQ, UK

Vinay Utham
Email: vinay.utham2@durham.ac.uk
Durham Business School, Mill Hill Lane, Durham, DH1 3LB, UK

Abstract

Using a hand-collected sample of hedge fund activist engagements from 1994 to 2014, we analysed the role of derivatives in hedge fund activism. We found that the abnormal returns of targets of hedge fund activists who did not use derivatives exceeded the abnormal returns of targets of hedge fund activists who employed derivatives around the activist engagement disclosure period. We also found that idiosyncratic volatility of targets of hedge fund activists who did not use derivatives was more reduced than those of targets of hedge fund activists who used derivatives. Finally, hedge fund activists who did not use derivatives increased the probability of takeovers.

JEL Classification: G14; G34.

Keywords: Hedge Funds, Investor Activism, Mergers & Acquisitions, Event Studies, Derivatives

I. Introduction

Activist hedge funds have been on the rise and their organisational structure position them to be efficient activists. Lack of regulation in the hedge fund industry also plays a major role in providing hedge funds with enough flexibility to undertake activist demands. For instance, hedge funds are not subject to the ERISA or "prudent man" regulations and are not required to maintain high levels of diversification for them to receive preferential tax status. Hedge funds typically "lock-up" investor capital for a prolonged period of time to carry out their strategies and ask investors to provide withdrawal requests in advance. Mutual funds, on the other hand, are required to maintain high levels of liquidity and will have to accept daily withdrawal requests, if any. This is where hedge funds have an edge over activists like mutual funds with respect to undertaking activist engagements, especially since activist campaigns may require the activist to hold large, illiquid blocks for prolonged periods of time.

This paper analyses and discusses an important tool used by hedge funds, which can prove to be an effective element while undertaking activist engagements: derivatives.

Bill Ackman vs. Herbalife: An Example of Derivatives Use by Activist Hedge Funds

In this section, we provide an example to highlight how hedge fund activists use derivatives. One of the most popular hedge fund activist engagements was William Ackman's Pershing Square Capital Management targeting Herbalife.

William Ackman's Pershing Square Capital Management bet $1 billion against Herbalife after accusing it of running a pyramid scheme. In 2013, Ackman swapped more than 40% of his shares for put options, as per Pershing Square's investor letter.

The letter stated the following:

"In order to mitigate the risk of further mark-to-market losses on Herbalife, in recent weeks we have restructured the position by reducing our short equity position by more than 40% and replacing it with long-term derivatives, principally over-the-counter put options. The restructuring of the position preserves our opportunity for profit – if the Company fails within a reasonable time frame we will make a similar amount of profit as if we had maintained the entire initial short position – while mitigating the risk of further substantial

mark-to-market losses – because our exposure on the put options is limited to the total premium paid. In restructuring the position, we have also reduced the amount of capital consumed by the investment from 16% to 12% of our funds."

According to this letter, Mr. Ackman recognised losses and covered $400 million worth of Herbalife stock after which, he bought puts. This led him to limit his losses from the stock going up further. Ackman and Pershing Square would have profited if the stock declined below the strike prices and would have only made a minor loss per share if the stock stayed at the same level or went up (La Roche, 2013).

William Ackman's use of put options in his battle against Herbalife is a classic example of how hedge fund activists utilised derivatives while undertaking activist engagements.

There are a number of reasons for hedge fund activists to employ derivatives. According to (Anabtawi and Stout, 2008), the business media reported numerous recent cases whereby hedge fund activists used "empty voting"[1] strategies, thereby leading to widespread interest in cases of empty voting. Furthermore, such strategies are "largely unregulated and often unseen." This lack of regulation could be one of the reasons why hedge fund activists utilise derivatives as part of their activist strategy.

Lack of regulation of the overall hedge fund industry can also play a key influence in hedge fund activists utilising derivatives. The lack of regulation was recorded by (Helleiner and Pagliari, 2010) , who found that in the case of hedge funds, regulators focused on "indirect regulation," that is, they emphasized on the role of banks in providing hedge funds with credit while encouraging the funds and their bank counterparties to self-regulate and disclose greater information to the markets.[2]

The lack of legal barriers that permit hedge funds to utilise leverage, short selling, and derivatives in order to achieve their objectives for investors, as evidenced by (Shadab, 2009), can also play a role in influencing activist hedge funds to utilise derivatives. Hedge funds are

[1] "empty voting" strategy involves the activist separating the right to vote shares from the beneficial ownership of these shares.

[2] Also see EICHENGREEN, B. 2003. Governing global financial markets: international responses to the hedge-fund problem. *Governance in a Global Economy: Political Authority in Transition*, 168-198.and ROBOTTI, P. 2006. Mapping the regulatory debate on hedge funds: a political analysis. FMG Discussion Paper, London, Financial Markets Group at the London School of Economics.

exempt from the Company Act, and as a result, are not subject to the restrictions imposed upon financial institutions by the Company Act regulations. Furthermore, under the Company Act, investment companies using short sales or derivatives as part of their strategy must hedge their positions with an offsetting trade or hold liquid securities of an equivalent value in a segregated account. Since this is not applicable to hedge funds, they can be more flexible while using derivatives, and as a result, can be more effective while pursuing activist strategies. (Shadab, 2009) also found that the beneficial performance of hedge funds was attributable to the legal regime under which hedge funds operated, thereby allowing them to pursue the aforementioned innovative investment strategies. This lack of legal barrier also contributes incentives for hedge fund managers to capture the gains from financial innovation.

(Chen, 2011) provides further evidence as to how the use of derivatives can actually contribute to a successful and an effective hedge fund activist strategy. According to (Chen, 2011), hedge funds using derivatives were found to have exhibited lower fund risks (e.g., market risk, and event risk). He further found evidence indicating that funds using derivatives were less likely to liquidate in a poor market state.

(Chen, 2011) also found that derivatives were more used by hedge funds that required higher minimum investment, charged higher fees, had a shorter capital lockup period, and employed an effective auditing service. Since (Greenwood and Schor, 2009) found that the average hedge fund activist holding period was only 18 months, it makes sense for hedge fund activists to utilise derivatives in order to expedite their activist strategy. Furthermore, (Chen, 2011) found that although using derivatives did not help prevent failure of the fund, it did mitigate the unfavourable influence of severe market conditions on fund operation, and further found that derivatives use in hedge funds was mainly associated with lower systematic risk. This is a major requirement for the success of the hedge fund activist strategy, and therefore, justifies why the market reaction is positive and statistically significant when hedge fund activists using derivatives disclose their stake.

By analysing a hand-collected sample of hedge fund activist engagements, we gauge the market reaction when hedge fund activists who use derivatives as a tool to accumulate target stock, disclose their stakes in the target firms. We also examine whether hedge fund activists employ derivatives as a method to drive down volatility of the target share prices. We further

analyse the role of derivatives with respect to the most profitable[3] and popular activist strategy: mergers.

Our results provide valuable contributions towards understanding the role of derivatives in hedge fund activist engagements.

First, we find that the market reacts positively towards targets of hedge fund activists around the period of disclosure irrespective of whether hedge fund activists used derivatives or not, that is, the abnormal returns were positive for both targets of hedge fund activists who used derivatives and targets of hedge fund activists who did not use derivatives. However, the abnormal returns of targets of hedge fund activists who did not use derivatives exceeded the abnormal returns of targets of hedge fund activists who used derivatives and the difference was statistically significant. This was further justified by multivariate analysis where the 11-day CARs were regressed against a set of explanatory variables. This result suggests that the market believed that hedge fund activists who purchased the target shares directly had a higher probability of successful activism than hedge fund activists who adopted a "wait-and-watch" approach by using derivatives.

Second, we found that both hedge fund activists who used derivatives and did not use derivatives aided in the reduction of idiosyncratic volatility of their targets post the announcement date. However, the idiosyncratic volatility was found to have reduced more for targets of hedge fund activists who did not use derivatives.

Finally, we found that hedge fund activists who did not employ derivatives increased the probability of takeovers of their targets, thereby justifying the positive market reaction towards these targets. (Greenwood and Schor, 2009) attributed positive abnormal returns experienced by the target around the activist engagement period to the ability of the activist to push for the sale of the target. Furthermore, we found that the hedge fund activists who did not use derivatives targeted smaller companies compared to the targets of hedge fund activists who used derivatives. This made it easier for the hedge fund activists to pursue the sale of the target without having to seek an increase in effective ownership stakes through the usage of derivatives (Hu and Black, 2007).

[3] See GREENWOOD, R. & SCHOR, M. 2009. Investor activism and takeovers. *Journal of Financial Economics,* 92**,** 362-375. And BECHT, M., FRANKS, J. R., GRANT, J. & WAGNER, H. F. 2015. The returns to hedge fund activism: An international study.

Our paper has numerous implications and contributions. This is the first paper that analyses the role of derivatives in hedge fund activism in a comprehensive manner. Earlier studies have considered the possibilities of derivatives influencing hedge fund activism, but have not comprehensively studied the role of derivatives, especially in the context of volatility.

Second, this paper studies the market reaction to the use of derivatives by hedge fund activists. The finding that the market rewards targets of hedge fund activists who do not use derivatives more than targets of hedge fund activists who use derivatives suggests that the market has more confidence in hedge fund activists who purchase shares directly and engage in activism rather than adopt a "wait-and-watch" approach by using derivatives. The market reaction towards hedge fund activists who use derivatives is an important contribution towards understanding the role of derivatives in shareholder activism.

Finally, our paper provides a testing ground for studying the value creation through the usage of derivatives. (Greenwood and Schor, 2009) found that the abnormal positive reactions experienced when an activist disclosed its stake was attributed to the ability of the activist to force the company to be acquired. (Becht et al., 2015) further supported the finding by concluding that takeovers are the most popular activist engagement. Our finding suggests that hedge fund activists who did not use derivatives increased the probability of takeover of their target companies, thereby indicating that derivatives are ineffective financial instruments while undertaking activist engagements. The market rewards those hedge fund activists who purchase shares directly and engage in activism and it is these activists that are more successful in pursuing the sale of their targets, in comparison to those hedge fund activists who adopt a "wait-and-watch" approach by using derivatives.

The rest of the paper is structured as follows: Section II outlines a comprehensive review of literature of hedge fund activism. Section III outlines the hypotheses used to analyse the objectives of the paper. Section IV outlines the data. Section V outlines the methodology used for empirical analysis. Section VI provides the results and discussion. Section VII concludes.

II. Review of Literature

Since the SEC adopted the Regulation MA-related "free communication" Rule 14a-12 in 1999 (Briggs, 2006), there was a boom in hedge fund activism in the United States. As a

result, a number of studies have examined the impact of activism on hedge fund firm performances.

(Brav et al., 2008) pioneered this area to analyse the impact of hedge fund activism using a large sample over the time period between 2001 and 2006. Their paper found that hedge fund activists proposed strategic, operational, and financial remedies with success or partial success in two-thirds of the cases.

(Clifford, 2008) found that certain features of hedge funds like longer lock-ups and withdrawal notification periods played a major role in assisting their activist efforts. The targets of hedge fund activists were found to have large excess returns in equity investments as well as improved operating performance because of activist outcomes. The paper also found that hedge fund activists generated significantly greater returns compared with their passive peers, thereby concluding that their returns could have mitigated their monitoring costs.

(Becht et al., 2010) studied 362 European activist interventions using a sample that included both public and private interventions. The public activist interventions were associated with positive abnormal returns around the time of activist stake disclosures. Private activism generated less returns compared to public activism and this was attributed to the finding that public activism was associated with a higher probability of takeovers.

(Mooradian and Boyson, 2010) studied the influence of intense hedge fund activism on target firms. Activists were classified as "intense" if the activist hedge fund acquired all or a portion of the target firm's stake in a setting other than open market and when one of the following conditions remained valid: either the activist hedge fund's filing with the SEC stated a specific activism agenda or the activist hedge fund obtained more than one type of the target firm's securities. They found that targets of intense hedge fund activists displayed strong improvements in operating performance for up to three years following the activism, whereas the remaining targets did not. It was also found that all hedge fund activists, both intense and non-intense, gained from the improved target stock performance during the activism period.

(Boyson and Mooradian, 2011) found that activist hedge funds improved both short-term stock performance and long-term operating performance of the target firms and concluded that activist hedge funds benefitted target firms' shareholders and the hedge funds themselves.

Studies also showed that hedge fund activists were also known to have created positive long term impact on their target firms. (He et al., 2016) studied the impact of hedge fund activism on corporate innovation and found that innovative firms were as likely to be targeted by hedge fund activists as non-innovative firms. They also found that activist hedge funds generated positive abnormal returns to shareholders of target innovative firms during the 5-year period post intervention, thereby concluding that activist hedge funds were not myopic investors and that they generated long-term benefits to shareholders of innovative firms by enhancing the innovation output of their targets. (Bebchuk et al., 2015) tested the empirical validity of the claim that interventions by hedge fund activists had a detrimental effect on long-term interests of companies and their shareholders by examining a long five-year window following activist interventions and found that the data did not support this claim. The findings of their study implied that policymakers and institutional investors should not accept the validity of assertions that activist interventions were costly to firms and their shareholders in the long term and such claims did not provide a valid basis for limiting the rights, powers, and involvement of shareholders.

To sum up, existing literature generally suggests the positive effects of activist efforts by hedge funds. But very few studies examined the mechanism through which activist hedge funds created value. For instance, (Greenwood and Schor, 2009) attributed the positive abnormal returns of target firms around the time an activist disclosed its stake to the ability of the activist to force the company to get acquired. This finding is supported by (Becht et al., 2015) who find that takeovers are the most profitable activist strategy. (Boyson et al., 2016) found that activism mergers are more likely when the activist hedge fund has a record of aggressive intervention, substantial prior merger experience, or has switched from passive to activist ownership. They further found that value creation through activism mergers to have arisen from monitoring target management and are not explained by bidder overpayment.

There are still avenues, to be examined, to understand and conclude whether hedge fund activists are superior compared to other activists. For instance, does the type of security, which hedge fund activists acquire, have any influence on the impact of activist efforts? Does the ability of hedge fund activists to use leverage and complex financial instruments like derivatives provide them with greater probability of undertaking successful activist efforts?

This paper studies the role of derivatives in hedge fund activism. We examine whether the ability to use derivatives provide activist hedge funds with any additional advantage while

undertaking activist efforts. There is also the need to explore the market reaction to hedge fund activist efforts whereby the hedge funds resort to derivatives to build up their positions in the target firm.

(Hu and Black, 2007) found that hedge funds routinely used leverage and options to increase their effective ownership stakes in target firms. They found that decoupling votes and shares using equity derivatives and other capital market developments was efficient, and they also found that hedge funds were the most prominent users of decoupling. They also found that hedge funds were found to have held more votes than economic ownership (a situation known as "empty voting") while at other times they held undisclosed economic ownership without votes, but often with the *de facto* ability to acquire votes if needed (a situation known as "hidden (or morphable) ownership"). They also suggested that equity derivatives can also be used to hold both economic ownership and de facto voting ownership while avoiding the disclosure rules that address direct positions in shares.

The study by (Hu and Black, 2007) suggest that it is possible that derivatives can play an important role in achieving activist efforts. This paper aims to examine the role of derivatives to understand how the market responds when hedge fund activists utilise either "empty voting" or "hidden ownership." Since (Greenwood and Schor, 2009) suggest that takeovers are the most profitable activist strategy, and since derivatives enable hedge fund activists to increase their ownership, thereby increasing their voting power, this paper also aims to analyse whether derivatives enable hedge fund activists to increase the probability of sale of the target firms.

III. Hypotheses

The motivation of this empirical paper is to answer two research questions: (1) Do hedge fund activists, using derivatives, create more value for their targets? (2) Does the use of derivatives increase the probability of takeovers involving hedge fund activists?

The first testable hypothesis is constructed as follows:

H1: *Hedge Fund Activists Created Short-Term and Long-Term Value to Target Firms Using Derivatives*

We measure short-term value creation by using Cumulative Abnormal Returns (CARs) computed using the market model. Long-term value creation is measured using Buy-and-Hold Abnormal Returns (BHARs) computed using the market-adjusted model.

Testing H1 helps us to analyse why activist hedge funds rarely used derivatives (Partnoy, 2015). We examine this from the perspective of market reaction, that is, testing H1 would help us to understand the market reaction when hedge fund activists using derivatives announce their stakes in the target firms. Testing H1 would also help to analyse whether the market has high expectations on hedge fund activists exercising their derivatives to achieve a successful activist engagement.

If activist hedge funds create short-term value and/or long-term value to their targets by using derivatives to undertake activist engagements, then our finding should encourage more hedge fund activists to use derivatives. On the contrary, if activist hedge funds did not create any value by using derivatives, then it would justify why only few activist hedge funds used derivatives.

The second testable hypothesis is constructed as follows:

H2: *The Use of Derivatives had a Positive Influence on Hedge Fund Activist's Target Share Price Volatility*

Past studies found that use of derivatives resulted in a decrease in volatility of underlying stocks. (Skinner, 1989) found that the variance of the stock returns decreased by an average of 4.8% as a result of options on those stocks. (Conrad, 1989) found that variance on excess stock returns reduced from 2.29% to 1.79% for 200 days after their listing as a result of derivatives. (Bansal et al., 1989) concluded that the volatility reduced by 6.4% after options are listed.

Testing H2 examines whether the hedge fund activists were able to reduce idiosyncratic volatility by using derivatives. It also helps us to understand whether derivatives played a key role in reducing idiosyncratic volatility. If hedge fund activists using derivatives reduced idiosyncratic volatility and hedge fund activists who did not use derivatives did not reduce idiosyncratic volatility, then it would highlight the importance of derivatives in hedge fund activism.

H3: *Hedge Fund Activists Increased the Probability of Takeovers of Target Firms Using Derivatives.*

(Greenwood and Schor, 2009) suggested that the positive abnormal returns realized by activist targets are due to the ability of the activist to force the company to be acquired. And these findings were reinforced by (Becht et al., 2015). Exercising derivatives would enable the activist to gain more shares, and thereby gaining more voting power. As a result, there is a greater probability for takeovers involving activists. Testing H3 could help to understand whether the use of derivatives increases the success of the most popular and profitable hedge fund activist outcome: takeovers.

IV. Data

Derivatives Sample

The sample of hedge fund activist engagements was constructed from a hand-collected activist sample consisting of SC 13D filings. Every institutional manager, including an activist hedge fund, is to file a Schedule 13D filing with the Securities and Exchange Commission (S.E.C.), if they acquire more than 5% of a publicly listed firm. These documents are required to be filed within 10 days post the purchase of the company's securities. (Greenwood and Schor, 2009).

The SC 13D filings outline the size of the purchase and summarizes the investors' intentions. Since 2000, it has been common for an activist to attach a letter to the target firm's management or board within their SC 13D filing (Greenwood and Schor, 2009). Each SC 13D filing contains 8 items. While "Item 4: Purpose of Transaction" outlines the intention of the activist, the most important sections for our paper are "Item 1: Security and Issuer," which outlines the type of security purchased, including any derivative contracts, "Item 3: Source and Amount of Funds or other consideration," which outlines the source and the amount of funds for each activist effort, and "Item 5: Interest in the Securities of the Issuer," which outlines the voting rights of the activist, and other security related information. There is also an additional section titled "Item 6: Contracts, Arrangements, Understandings, or Relationships with Respect to Securities of the Issuer," which outlines any underlying derivative contracts, or other arrangements made by the activist pertaining to the target firm.

Our central activist database was constructed as follows: First, the list of activists was recorded from the Thomson Reuters Shareholder Activism Intelligence database. The SEC's

EDGAR database was then accessed and the initial Schedule 13D filings of each activist was documented and an excel database was constructed. Each Schedule 13D filing consists of eight items. All eight items were recorded, and based on "Item 4: Purpose of Transaction," the activist demands were classified and recorded. Each activist's website was then visited and the type of Activist was recorded. In the event that the type of activist was not clear, we utilised websites such as WhaleWisdom to identify the type of activist. This was done, especially in the case of Hedge Fund activists.

Our central activist sample consisted of 5,926 activist events by 872 activists spanning from 1994 to 2014. The activists are classified as follows: Hedge funds, Financial institutions, Private equity companies, Investment managers, Investment companies, Individual investors, Industrial owners, Pension funds, and Shareholder committees. Since our paper examines only hedge fund activists, we further filtered the activist database and our final activist sample resulted in 3,806 SC 13D filings, which were filed by 290 activist hedge funds. By examining Items 1, 3, 5, and 6 of each SC 13D filing of hedge fund activists, it was found that there were 275 activism events where hedge fund activists used derivatives[4]. The distribution of hedge fund activist engagements, where the hedge fund activist used derivatives, by year is outlined in Appendix A.

As evidenced from Appendix A, there was a major drop in the use of derivatives in the years 2008, 2009, 2010. This suggests that the decision to use derivatives was heavily influenced by the 2007 financial crisis. An increase in the use of derivatives in years 2013 and 2014 suggests that derivatives are once again becoming popular among hedge fund activists post the financial crisis.

After accounting for stock price information from CRSP and accounting information from COMPUSTAT, the final sample of hedge fund activists using derivatives consisted of 175 activism events.

According to (Partnoy, 2015), activist hedge funds were found to have rarely used derivatives, instead choosing to buy stocks of targets firms they believe were undervalued. According to a study by (Deloitte, 2014), the additional costs arising from credit valuation adjustment (CVA[5]) charges were found to have been highest for equity derivatives. This could be one of the reasons why most activist hedge funds prefer to directly buy the target

[4] The derivatives mainly considered in this paper are options, futures, and forwards.
[5] CVA can be described as the market value of counterparty credit risk.

stock instead of purchasing derivatives. Yet another reason for our low sample could be because most hedge fund activists aim to be more pro-active in their activist engagements instead of adopting a "wait-and-watch" approach by purchasing derivatives.

Matching Sample

To analyse the short-term and long-term market reaction, a matching sample was also constructed from the sample of activist engagements by hedge fund activists who did not use derivatives. The matching sample was constructed based on year, targets' size, and targets' market-to-book ratio. More specifically, in each industry and calendar year, the targets were classified into quintiles based on their market values and in each quintile, the targets were sorted on their market-to-book value ratios. Targets of hedge fund activists who did not use derivatives close whose market-to-book ratios were close to those targets of hedge fund activists who used derivatives were selected as the matching sample. The matching sample contained 241 observations.

V. Methodology

5.1. Cumulative Abnormal Returns

To analyse the gains experienced around the time hedge fund activists using derivatives disclose their stakes in the target firms, the announcement period excess returns were measured by computing cumulative abnormal returns (CARs). According to (Moeller et al., 2004), the most traditional measure of announcement period excess returns is to compute abnormal percentage returns using standard event study methods. These abnormal returns were computed over a 11-day event window [-5, +5].

These announcement period excess returns were computed using the market model shown in equation (1):

$$AR_{it} = R_{it} - (\alpha + \beta r_{mt})\ t = 1, 2, T \qquad (1)$$

Where, AR_{it} is the abnormal return of target company i on day t; R_{it} is the return of the target company i on day t, and r_{mt} is the market return on day t (measured by CRSP value-weighted index return).

The excess returns of the target companies around the time when hedge fund activists disclose their stake is the sum of the abnormal returns over the 11-days (-5 to +5) surrounding the announcement day of the activist engagement as in equation (2):

$$CAR_i = \sum_{t=-1}^{t=+1} AR_{it} \qquad (2)$$

5.2. Buy and Hold Abnormal Returns

We compute and analyse the buy and hold abnormal returns (BHARs) to examine the long-run announcement period gains to both targets of hedge fund activists who use derivatives and the targets of hedge fund activists who do not use derivatives.

To compute BHARs, we follow the methodology of (Liang, 2008), outlined as follows:

$$BHAR_{iT} = \prod_{t=1}^{T}(1 + r_{it}) - \prod_{t=1}^{T}(1 + r_{mt}) \qquad (3)$$

Where: r_{it} is the monthly stock return and r_{mt} is, the market return

The mean BHAR over a period T is:

$$BHAR_T = \frac{1}{n}\sum_{i=1}^{n} BHAR_{iT} \qquad (4)$$

5.3. Single-factor Analysis

The cumulative abnormal returns for targets of hedge fund activists who used derivatives around the time when hedge fund activists disclosed their stakes in the target firms were analysed by computing the difference between the sample of targets of hedge fund activists who used derivatives and the matching sample and by using the t-test (two sided) to examine statistical significance of the difference.

5.4. Multiple-Factor Analysis

To examine the influence of derivatives on the cumulative abnormal returns, the 11-day CARs were regressed against a set of control variables using the following OLS regression:

$$CAR_i = \alpha + \beta_1 Derivative + \beta_2 Ln(MV) + \beta_3 \left(\frac{M}{B}\right) + \beta_4 Leverage + \beta_5 \left(\frac{CF}{E}\right) + \beta_6 (Cash) + \beta_7 \left(\frac{P}{E}\right) + f_t + \varepsilon \quad (5)$$

The dependent variable in equation (5) is the 11-day CARs computed using the market model. The key variable of interest is the *Derivative* dummy variable that takes the value of 1 for targets of hedge fund activists who used derivatives and 0 for targets of hedge fund activists who did not use derivatives. All other control variables are explained in Appendix B. Equation (5) also accounts for year-fixed effects.

To examine whether the use of derivatives increases the probability of takeovers involving hedge fund activists, Probit model is introduced as follows:

$$Acquired = \alpha + \beta_1 Derivative + \beta_2 Ln(MV) + \beta_3 \left(\frac{M}{B}\right) + \beta_4 Leverage + \beta_5 \left(\frac{CF}{E}\right) + \beta_6 (\text{Cash}) + \beta_7 \left(\frac{P}{E}\right) + \varepsilon \quad (6)$$

The dependent variable in equation (6) is the *Acquired* dummy variable that takes the value of 1 for targets that are acquired and 0 for targets that remain independent following the involvement of hedge fund activists. The key variable of interest is still the dummy variable, *Derivative* that takes the value of 1 if hedge fund activists used derivatives to pursue activist strategies and 0 otherwise. All other control variables are explained in Appendix B.

5.5. Idiosyncratic Volatility

The idiosyncratic price volatility of the targeted stocks by the hedge fund activists is examined to reveal the possible impact of the derivatives on the market reaction as well as on the volatility of stock prices around the time when the hedge fund activist disclosed stake in the target firm.

The methodology of (Bali and Cakici, 2008) was followed to compute idiosyncratic volatility. The following steps were followed:

Step 1: The return of each stock was assumed to be driven by a common factor and firm specific shock ε_i. Assuming a single factor return generating process, idiosyncratic volatility is measured relative to the traditional CAPM:

$$R_{i,t} - r_{f,t} = \beta_{i,t}(R_{m,t} - r_{f,t}) + \varepsilon_{i,t} \quad (7)$$

Where:

$R_{i,t}$ – return on stock I; $R_{m,t}$ – market return; $r_{f,t}$ - risk-free rate; $\varepsilon_{i,t}$ – idiosyncratic return

Step 2: The market model is estimated:

$$R_{i,t} = \alpha_{i,t} + \beta_{i,t}(R_{m,t}) + \varepsilon_{i,t} \quad (8)$$

Step 3: The idiosyncratic volatility of stock i is measured as the standard deviation of the residuals:

$$IVOL_{i,t} = \sqrt{var(\varepsilon_{i,t})} \quad (9)$$

VI. Results and Discussion

6.1. Summary Statistics

Table 1 outlines the summary statistics of characteristics of targets of hedge fund activists who use derivatives as well as the matching sample. The results of Table 1 suggest that hedge fund activists use derivatives while targeting large-sized companies, as evidenced from comparing the market value. This could be because hedge fund activists prefer "hidden (morphable) ownership," (Hu and Black, 2007). Large sized companies have many shareholders and it is therefore, much more difficult to pursue activism with regards to these companies. As a result, hedge fund activists could opt for holding undisclosed economic ownership without votes, but often with the *de facto* ability to acquire votes if needed through the use of derivatives. This situation is known as "hidden (morphable) ownership," (Hu and Black, 2007).

(Insert Table 1 here)

6.2. Gains to Targets of Hedge Fund Activists Using Derivatives

Cumulative Abnormal Returns

In this section, we examine the market reaction towards disclosure announcement by hedge fund activists who use derivatives and compare the gains with the matching sample. The

results of the difference between the 11-day CARs[6] of the two samples are displayed in Panel A of Table 2.

As evidenced from Table 2[7], although the market reacts positively when hedge fund activists, who use derivatives, disclose their stakes in their targets, the gains are larger in the case where the hedge fund activists did not employ derivatives. Furthermore, the difference between the 11-day cumulative abnormal returns of the two samples were found to be negative and statistically significant at the 1% level.

Hedge fund activists who employ derivatives are granted the rights to purchase the target's shares at a future date. The market, therefore, might treat these hedge fund activists as being hesitant towards undertaking the activist engagements, or might assume that these hedge fund activists do not have the necessary ownership to successfully pursue the activist engagement. On the other hand, the hedge fund activists who do not employ derivatives purchase the shares directly, and are therefore, capable of immediately negotiating with the target's management. The market might therefore, value their "confidence" more than the hedge fund activists who adopt a "wait-and-watch" approach by employing derivatives.

The results of the univariate analysis are further justified in the multivariate setting. The 11-day CARs are regressed against a set of control variables, and the results of the OLS regression are displayed in Panel B of Table 2. The key variable of interest is the *Derivative* dummy variable that takes the value of 1 for hedge fund activist engagements whereby the hedge fund uses derivatives.

As evidenced from Panel B of Table 2, the *Derivative* dummy variable is negative and statistically significant at the 1% level across all four specifications, thereby further justifying

[6]We considered the 3-day and the 5-day event windows for both the univariate and the multivariate analysis. The univariate analysis showed that the difference in CARs were insignificant for the 3-day and the 5-day windows. This was further justified by the multivariate analysis, that is, the *Derivative* dummy variable was negative but insignificant across all four specifications for both the 3-day and the 5-day event windows. *Leverage* and *Cash/Assets* were the only variables affecting the 3-day event CARs. Both were negatively related to the 3-day CARs. This finding suggested that firms that had high leverage and lower levels of cash experienced negative short-term market reaction. *Leverage* was once the again the variable affecting the 5-day CARs and it was negatively related to the 5-day CARs. This finding suggested that once again, higher the firm leverage, poorer the market-reaction. For brevity, the results are not reported in Table 2. As a robustness check, we also computed the 3-day, 5-day, and 11-day abnormal returns using the market-adjusted model and found the results to be similar. For brevity, these results are also not reported in tables.

[7] In the analysis of CARs, four observations are missing: three observations missing for derivative sample and one observation missing for non-derivative sample. This is because the stock price returns or the market returns are missing, which are needed to compute CARs

our finding that the targets of hedge fund activists who did not use derivatives outperformed the targets of hedge fund activists who used derivatives in the short-run.

(Insert Table 2 here)

Buy-and-Hold Abnormal Returns

This section examines the long-term gains to targets of hedge fund activist engagements. Table 3 provides the results where the 6-month BHARs, 12-month BHARs, and 24-month BHARs are compared between the derivative sample, where hedge fund activists used derivatives, and the matching sample, where the hedge fund activists did not use derivatives.

(Insert Table 3 here)

As observed from Table 3[8], there is no statistical difference between the two samples, thereby indicating that the use of derivatives has no impact on the long-term market reaction. Given that the individual BHARs are not significant, we can conclude that irrespective of whether they used derivatives or not, hedge fund activists did not create any long-term value to their target firms.

6.3. Hedge Fund Activists, Derivatives, and Volatility

In this section, we examine the idiosyncratic volatility of the target companies' stock prices before and after the hedge fund activist, who used derivatives, disclosed its stake. The results are displayed in Table 4[9]. It was found that both hedge fund activists that used derivatives and the hedge fund activists that did not use derivatives reduced the idiosyncratic volatility of their target firms' stocks. However, the reduction in idiosyncratic volatility was found to be greater for target firms where the hedge fund activist did not use derivatives.

(Insert Table 4 here)

Past studies found that use of derivatives resulted in a decrease in volatility of underlying stocks. (Skinner, 1989) found that the variance of the stock returns decreased by an average of 4.8% as a result of options on those stocks. (Conrad, 1989) found that variance on excess

[8] In the analysis of BHARs, more observations are missing. This could be because the target could have either been acquired or simply delisted within 6 months, 12 months, or 24 months.

[9] There are two observations missing in the pre-announcement period for the derivative sample. This is because there were stock price returns and market returns missing for these two observations.

stock returns reduced from 2.29% to 1.79% for 200 days after their listing as a result of derivatives. (Bansal et al., 1989) concluded that the volatility reduced by 6.4% after options are listed.

Our finding of a reduction in idiosyncratic volatility is consistent with the aforementioned findings and suggests that activist hedge funds utilised derivatives to drive down the volatility associated with the underlying stocks of the target firms. However, the finding that hedge fund activists who did not employ derivatives reduced the idiosyncratic volatility by a greater amount suggests that the use of derivatives had no unique impact on the idiosyncratic volatility.

6.4. Do hedge fund activists utilise derivatives to increase probability of sale of the target firm?

This section examines whether hedge fund activists used derivatives to increase the probability of sale of their targets. (Greenwood and Schor, 2009) had found that the positive abnormal returns experienced around the time the activist disclosed its stake in the target were attributed to the ability of activists to push for the sale of the target. These findings were further supported by (Becht et al., 2015), who found that takeovers were the more profitable and popular activist strategy. The findings of (Hu and Black, 2007) suggest that hedge funds routinely used leverage and options to increase their effective ownership stakes in target firms. Increased ownership implies increased voting power, the use of derivatives, therefore, could increase the probability of a successful activist campaign. Since takeovers are the most popular strategy with hedge fund activists, there is a possibility that hedge fund activists will use derivatives to increase their voting power in order to increase the probability of takeovers of the target.

Takeover Sample

To analyse whether hedge fund activists increased the probability of takeovers by using derivatives, our hedge fund activism database was merged with the Thomson One Banker Mergers and Acquisitions database to obtain the number of deals with hedge fund activist involvement where the hedge fund activist used derivatives. According to methodology of

(Greenwood and Schor, 2009), only those deals that occurred within 18 months after the hedge fund activist using derivatives disclosed its stake were considered for the analysis. It was found that there were 178 deals with hedge fund activist involvement and includes both targets where hedge fund activists used derivatives and targets where hedge fund activists did not use derivatives in acquiring target firm's stock. Table 5 outlines the distribution of these deals. Panel A of Table 5 outlines the distribution of deals by year and Panel B outlines the distribution of deals by industry. Panel C of Table 5 outlines a few deal characteristics.

(Insert Table 5 here)

The results of the Probit model are shown in Table 6. As evidenced from Table 6, the key dummy variable *Derivative* is negative and significant, thereby implying that hedge fund activists who did not use derivatives increased the probability of takeover of the target firms. This could be because activist hedge funds were found to have rarely used derivatives (Partnoy, 2015). It could also be because of the difference in target size. It was found that hedge fund activists who did not use derivatives targeted firms of smaller size. The ease of pushing for a sale of target of smaller size could have also contributed to this result. The inverse relationship between target size and probability of takeovers, as evidenced from Table 6, supports this theory. Given that the target size was small and given that such targets were more prone to takeovers, there was no reason for hedge fund activists to use derivatives to pursue takeovers. Finally, this result also justifies why targets of hedge fund activists who did not use derivatives outperformed targets who used derivatives around the time the hedge fund activist announced its stake. (Greenwood and Schor, 2009) attributed the abnormal returns around the time of activist disclosure to the ability of hedge fund activist to push for the sale of the target. Since hedge fund activists who did not use derivatives increased the probability of takeovers, the market reaction was more positive for the targets of these hedge fund activists.

(Insert Table 6 here)

VII. Conclusion

This paper examined the role of derivatives in hedge fund activism. More specifically, this paper examined whether hedge fund activists utilise derivatives to maximize their activist strategies, thereby creating value.

We analysed the cumulative abnormal returns around the time when hedge fund activists using derivatives disclosed their stakes in the target firm and compared them with the cumulative abnormal returns of targets of hedge fund activists who did not employ derivatives and found that the 11-day CARs of targets of hedge fund activists who did not use derivatives exceeded the 11-day CARs of targets of hedge fund activists who used derivatives thereby indicating that the market reacted positively when hedge fund activists did not employ derivatives. This suggested that the market had higher confidence in hedge fund activists who did not use derivatives, since these activists increased their target ownership by directly purchasing shares compared to a "wait-and-watch" approach adopted by hedge fund activists who employed derivatives.

We also analysed the buy-and-hold abnormal returns and found that irrespective of whether they used derivatives or not, hedge fund activists did not create any long-term value to their targets.

Next, we examined whether hedge fund activists, by using derivatives, reduced the idiosyncratic volatility of the target share price and found that both hedge fund activists who used derivatives and those who did not use derivatives reduced idiosyncratic volatility of the target firms. Previous studies had found that stock price volatility was reduced due to the use of derivatives. Our finding that hedge fund activists who did use derivatives reduced the idiosyncratic volatility by a larger amount than hedge fund activists who used derivatives, however, suggested that hedge fund activists did not use derivatives with the intention of reducing targets' stock price volatility.

We also examined whether hedge fund activists increased the probability of takeover by using derivatives and found that hedge fund activists who did not use derivatives increased the probability of takeovers by 29.52%. This finding helped to justify why hedge fund activists rarely used derivatives (Partnoy, 2015).

Overall, our paper concluded that the use of derivatives did not create any additional value for targets of hedge fund activists. On the contrary, it further justified why hedge fund activists rarely used derivatives. Since takeovers were found to be the most profitable and most popular activist strategy, and since hedge fund activists who did not use derivatives increased the probability of takeovers, it was concluded that derivatives do not play any major role in aiding the hedge fund activists who pursue the sale of their target firms. Hedge

fund activists are better off by directly purchasing shares of the targets that they believe are undervalued.

The contributions of our paper towards the existing academic literature are threefold. This is the first paper that examines the role of derivatives in hedge fund activism in a comprehensive manner.

Second, this paper studies the market reaction to the use of derivatives by hedge fund activists. Our finding suggests that the market rewards the hedge fund activists who did not use derivatives, thereby indicating that the market is more confident in hedge fund activists who purchase the target shares directly compared to hedge fund activists who adopt a "wait-and-watch" approach by employing derivatives.

Finally, our paper provides a testing ground for studying the value creation through the usage of derivatives. The findings of (Greenwood and Schor, 2009) and (Becht et al., 2015) suggest that takeovers are the most popular activist engagement. Our finding indicates that hedge fund activists who did not use derivatives increase the probability of takeover of their target companies, thereby indicating that derivatives are not effective financial instruments while undertaking hedge fund activist engagements. There was neither short-term value creation nor long-term value creation by hedge fund activists using derivatives.

Our paper mainly focused on options, futures, and forwards as the derivative instruments used by activist hedge funds. Future research could explore the use of other derivative instruments, such as credit default swaps, by activist hedge funds and its impact on situations related to firm bankruptcy. (Subrahmanyam, 2014) examined the effect of credit default swaps on credit risk and found that the credit risk of reference firms increased significantly upon the inception of CDS trading. This was also evident in the bankruptcy talks between Caesars Entertainment Corp. and activist hedge fund Elliott Management Corp (Keller, 2014). Future research could examine whether hedge fund activists use such instruments and their impact when they target financially distressed firms.

References

ANABTAWI, I. & STOUT, L. 2008. Fiduciary duties for activist shareholders. *Stanford Law Review*, 1255-1308.

BALI, T. G. & CAKICI, N. 2008. Idiosyncratic volatility and the cross section of expected returns. *Journal of Financial and Quantitative Analysis,* 43, 29-58.

BANSAL, V. K., PRUITT, S. W. & WEI, K. 1989. An empirical reexamination of the impact of CBOE option initiation on the volatility and trading volume of the underlying equities: 1973–1986. *Financial Review,* 24, 19-29.

BEBCHUK, L. A., BRAV, A. & JIANG, W. 2015. The long-term effects of hedge fund activism. National Bureau of Economic Research.

BECHT, M., FRANKS, J., MAYER, C. & ROSSI, S. 2010. Returns to shareholder activism: Evidence from a clinical study of the Hermes UK Focus Fund. *Review of Financial Studies,* 23, 3093-3129.

BECHT, M., FRANKS, J. R., GRANT, J. & WAGNER, H. F. 2015. The returns to hedge fund activism: An international study.

BOYSON, N. M., GANTCHEV, N. & SHIVDASANI, A. 2016. Activism mergers.

BOYSON, N. M. & MOORADIAN, R. M. 2011. Corporate governance and hedge fund activism. *Review of Derivatives Research,* 14, 169-204.

BRAV, A., JIANG, W., PARTNOY, F. & THOMAS, R. 2008. Hedge fund activism, corporate governance, and firm performance. *The Journal of Finance,* 63, 1729-1775.

BRIGGS, T. W. 2006. Corporate governance and the new hedge fund activism: An empirical analysis. *J. Corp. L.,* 32, 681.

CHEN, Y. 2011. Derivatives use and risk taking: Evidence from the hedge fund industry. *Journal of Financial and Quantitative Analysis,* 46, 1073-1106.

CLIFFORD, C. P. 2008. Value creation or destruction? Hedge funds as shareholder activists. *Journal of Corporate Finance,* 14, 323-336.

CONRAD, J. 1989. The price effect of option introduction. *The Journal of Finance,* 44, 487-498.

DELOITTE. 2014. *OTC Derivatives: The new cost of trading* [Online]. Available: https://www2.deloitte.com/content/dam/Deloitte/uk/Documents/financial-services/deloitte-uk-fs-otc-derivatives-april-14.pdf [Accessed 06 December 2016].

EICHENGREEN, B. 2003. Governing global financial markets: international responses to the hedge-fund problem. *Governance in a Global Economy: Political Authority in Transition*, 168-198.

GREENWOOD, R. & SCHOR, M. 2009. Investor activism and takeovers. *Journal of Financial Economics,* 92, 362-375.

HE, Z. L., QIU, J. & TANG, T. 2016. Hedge fund activism and corporate innovation.

HELLEINER, E. & PAGLIARI, S. 2010. The end of self-regulation. *Hedge funds and derivatives in global governance,[w:] Global finance in crisis. The politics of international regulatory change, ed. E. Helleiner, S. Pagliari, H. Zimmermann, Abingdon & Oxon, Routledge*.

HU, H. T. & BLACK, B. 2007. Hedge funds, insiders, and the decoupling of economic and voting ownership: Empty voting and hidden (morphable) ownership. *Journal of Corporate Finance,* 13, 343-367.

KELLER, L. J. 2014. *Elliott Said to Buy Caesars Swaps Amid Bankruptcy Talks* [Online]. Bloomberg. [Accessed 04 December 2016].

LA ROCHE, J. 2013. *Bill Ackman Has Altered 40% Of His $1 Billion Bet Against Herbalife* [Online]. Business Insider. Available: http://www.businessinsider.com/bill-ackman-repositions-herbalife-short-2013-10?IR=T [Accessed 04 December 2016].

LIANG, P. 2008. Empirical Study on the Performance of Initial Public Offerings in China. *Journal of Service Science and Management,* 1, 135.

MOELLER, S. B., SCHLINGEMANN, F. P. & STULZ, R. M. 2004. Firm size and the gains from acquisitions. *Journal of financial economics,* 73, 201-228.

MOORADIAN, R. M. & BOYSON, N. M. 2010. Intense Hedge Fund Activists.

PARTNOY, F. 2015. *The Surprising Market Response to Activist Hedge Funds* [Online]. Wall Street Journal. Available: http://www.wsj.com/articles/the-surprising-market-response-to-activist-hedge-funds-1429743683 [Accessed 06 December 2016].

ROBOTTI, P. 2006. Mapping the regulatory debate on hedge funds: a political analysis. FMG Discussion Paper, London, Financial Markets Group at the London School of Economics.

SHADAB, H. B. 2009. The law and economics of hedge funds: Financial innovation and investor protection. *Berkeley Bus. LJ,* 6**,** 240.

SKINNER, D. J. 1989. Options markets and stock return volatility. *Journal of Financial Economics,* 23**,** 61-78.

SUBRAHMANYAM, M. G., TANG, D.Y., AND WANG, S.Q., 2014. Does the Tail Wag the Dog? The Effect of Credit Default Swaps on Credit Risk. *Review of Financial Studies,* 27**,** 2927-2960.

Table 1. Summary Statistics of Targets of Hedge Fund Activists Using Derivatives

This table presents summary statistics for the full sample of hedge fund activist engagements, portioned by the engagements where hedge fund activists used derivatives and matching engagements. All variables are defined in Appendix B. Continuous variables are winsorized at the 2% and 98% levels. P-Values are shown in parentheses. T-test is used to test the difference in means. Statistical significance at the 1%, 5% and 10% levels are denoted as ***, ** and * respectively.

	Firm Characteristics							
	Combined Sample		Derivative Sample		Matching Sample		Difference (Derivative – Matching)	
	Mean	N	Mean	N	Mean	N	Mean	P-Value
MV ($mil)	2187.6	416	2954.98	175	1630.33	241	1324.65***	0.0000
Ln(MV)	13.43	410	13.59	174	13.31	236	0.28	0.1150
M/B	2.186	416	2.197	175	2.177	241	0.020	0.9310
Leverage	0.3624	411	0.3785	173	0.3508	238	0.0277	0.3260
Cash Flows/Equity	0.00003	407	0.00004	173	0.00002	234	0.00002	0.3940
Cash	225.95	413	293.96	174	176.49	239	117.47***	0.0054
Cash/Assets	0.1092	413	0.1021	174	0.1144	239	-0.0123	0.2916
P/E	18.07	401	22.16	170	15.07	231	7.09	0.1211

Table 2. Gains to Targets of Hedge Fund Activists Using Derivatives

This table presents short-term gains of targets of hedge fund activists who use derivatives. Panel A shows univariate analysis. CAR [-5, 5] is the 11-day market model cumulative abnormal returns around the announcement. CARs are winsorized at the 1% and 99% levels. P-Values are shown in parentheses. T-test is used to test the significance of the mean. Statistical significance at the 1%, 5% and 10% levels are denoted as ***, ** and * respectively. Panel B shows multivariate analysis. Targets' announcement abnormal returns (CAR [-5, 5]) are regressed (OLS) against a set of explanatory variables (Activist dummy and target firm characteristics). All variables are defined in Appendix A. In all models, industry fixed effects are controlled for. For brevity, their coefficients are not reported in the table. The number of observations used in different specifications may vary because of the missing value of one or more variable. All continuous variables are winsorized at the 2% and 98% levels. P-Values shown in parentheses are adjusted for heteroskedasticity. Statistical significance at the 1%, 5% and 10% levels are denoted as ***, ** and * respectively.

Panel A: Univariate Analysis

	Full Sample		Derivative Sample		Matching Sample		Difference (Derivative – Matching)	
	Mean	**N**	**Mean**	**N**	**Mean**	**N**	**Mean**	**P-Value**
CAR [-5, 5] (%)	3.92***	412	1.86**	172	5.40***	240	-3.54***	0.0029
	(0.0000)		(0.0331)		(0.0000)			

Panel B: Multivariate Analysis

	(1)	(2)	(3)	(4)
Dependent Variable	**CAR [-5, +5]**			
Derivative	-0.0340***	-0.0368***	-0.0342***	-0.0395***
	(0.006)	(0.003)	(0.005)	(0.002)
Ln(MV)		-0.0020		0.0037
		(0.721)		(0.540)
M/B		-0.0065**		-0.0007**
		(0.019)		(0.011)
Leverage		0.0164		0.0077
		(0.442)		(0.733)
CF/E			-88.64*	-93.06*
			(0.067)	(-0.056)
Cash			0.00002	0.00001
			(0.200)	(0.506)
P/E			-0.00001	0.00001
			(0.933)	(0.941)
Constant	-0.0998	-0.1641***	-0.1028	-0.1988***
	(0.235)	(0.001)	(0.162)	(0.000)
N	411	400	382	373
R^2	0.0741	0.0999	0.1086	0.1353

Table 3. Long-Term Gains to Targets of Hedge Fund Activists Using Derivatives

This table presents long-term gains of targets of hedge fund activists who use derivatives. BHAR6 is the 6-month market-adjusted model buy-and-hold abnormal returns around the announcement. BHAR12 is the 12-month market-adjusted model buy-and-hold abnormal returns around the announcement. BHAR24 is the 24-month market-adjusted model buy-and-hold abnormal returns around the announcement. Variables are winsorized at the 2% and 98% levels. P-Values are shown in parentheses. T-test is used to test the significance of the mean. Statistical significance at the 1%, 5% and 10% levels are denoted as ***, ** and * respectively.

	Full Sample		Derivative Sample		Matching Sample		Difference (Derivative – Matching)	
	Mean	**N**	**Mean**	**N**	**Mean**	**N**	**Mean**	**P-Value**
BHAR6 (%)	1.45	324	-0.82	150	3.41	174	-4.23	0.2119
	(0.3911)		(0.7292)		(0.1546)			
BHAR12 (%)	-0.77	303	-2.49	138	0.66	165	-3.15	0.5495
	(0.7672)		(0.4783)		(0.8629)			
BHAR24 (%)	2.95	219	1.44	96	4.14	123	-2.70	0.7500
	(0.4817)		(0.8263)		(0.4509)			

Table 4. Idiosyncratic Volatility of Targets of Hedge Fund Activists Using Derivatives

To examine whether targets of hedge fund activists have improved when hedge fund activists used derivatives, the idiosyncratic volatility of targets is computed before and after the hedge fund activist discloses its stake. The methodology of Bali and Cakici (2008) is followed for computing idiosyncratic volatility. Panel A shows idiosyncratic volatility of targets of hedge fund activists using derivatives post announcement. Panel B shows idiosyncratic volatility of targets of hedge fund activists not using derivatives post announcement.

	Panel A. Idiosyncratic Volatility of Targets of Hedge Fund Activists Using Derivatives							
	Full Sample		Post-Announcement		Pre-Announcement		Difference (Post – Pre)	
	Mean	N	Mean	N	Mean	N	Mean	P-Value
Volatility (%)	2.78	348	2.52	173	3.04	175	-0.52**	0.0359

	Panel B. Idiosyncratic Volatility of Targets of Hedge Fund Activists Not Using Derivatives							
	Full Sample		Post-Announcement		Pre-Announcement		Difference (Post – Pre)	
	Mean	N	Mean	N	Mean	N	Mean	P-Value
Volatility (%)	2.93	482	2.46	241	3.41	241	-0.95***	0.0001

Table 5. Distribution of Deals with Hedge Fund Activist Involvement

This table presents deals with hedge fund activist involvement during 1994-2015, which includes both targets where the activist hedge fund used derivatives and targets where hedge fund activists did not use derivatives as part of acquiring targets' stock. Panel A outlines the distribution of deals by year. Panel B outlines the distribution of deals by Target Industry.

Panel A: Distribution of Deals by Year

Year	No. of Deals	Percent (%)	Year	No. of Deals	Percent (%)
1995	1	0.56	2006	11	6.18
1996	2	1.12	2007	22	12.36
1997	8	4.49	2008	12	6.74
1998	6	3.37	2009	7	3.93
1999	8	4.49	2010	10	5.62
2000	3	1.69	2011	13	7.30
2001	2	1.12	2012	12	6.74
2002	4	2.25	2013	17	9.55
2003	2	1.12	2014	23	12.92
2004	3	1.69	2015	7	3.93
2005	5	2.81			
			Total	**178**	**100.00**

Panel B: Distribution of Deals by Industry

Industry	No. of Deals	Percent (%)	Year	No. of Deals	Percent (%)
Consumer Products & Services	12	6.74	Materials	11	6.18
Energy & Power	14	7.87	Media & Entertainment	9	5.06
Financials	13	7.30	Real Estate	8	4.49
Healthcare	20	11.24	Retail	21	11.80
High Technology	32	17.98	Consumer Staples	8	4.49
Industrials	17	9.55	Telecommunications	13	7.30
			Total	**178**	**100.00**

Panel C: Deal Characteristics of Hedge Fund Activism Mergers Using Derivatives

	Mean	N
Deal Value ($ mil.)	1944.61	178
Completed (%)	64.61	178

Table 6. Probability of Takeovers of Targets of Hedge Fund Activists Using Derivatives

Acquired binary variable is regressed against a set of explanatory variables using a probit model. The *Acquired* binary variable takes the value of 1 for targets of hedge fund activists using derivatives, which get acquired and 0 for targets of hedge fund activists using derivatives, which do not get acquired. All variables are defined in Appendix A. All continuous variables are winsorized at the 2% and 98% levels. P-Values shown in parentheses are adjusted for heteroskedasticity. Statistical significance at the 1%, 5% and 10% levels are denoted as ***, ** and * respectively.

	(1)	**(2)**	**(3)**	**(4)**
Dependent Variable	***Acquired***			
Derivative	-0.1537	-0.1770	-0.3407**	**-0.2952***
	(0.220)	(0.266)	(0.047)	**(0.096)**
Ln(MV)		-0.0589		-0.1384**
		(0.212)		(0.025)
M/B		-0.00002		0.00002
		(0.504)		(0.510)
Leverage		-0.5462*		-0.3671
		(0.053)		(0.252)
CF/E			1.330***	1.491***
			(0.000)	(0.000)
Cash			0.00003	0.0003
			(0.853)	(0.253)
P/E			0.0002	0.0004
			(0.887)	(0.728)
Constant	0.2469***	1.3769**	0.2439**	2.0489***
	(0.003)	(0.025)	(0.034)	(0.008)
N	416	277	262	254
Pseudo R^2	0.0027	0.0229	0.1066	0.1335

Appendix A: Distribution of Hedge Fund Activist Engagements Involving Derivatives by Year

Panel A: Distribution of Deals by Year					
Year	**No. of Deals**	**Percent (%)**	**Year**	**No. of Deals**	**Percent (%)**
1994	1	0.36	2005	19	6.91
1995	1	0.36	2006	20	7.27
1996	4	1.45	2007	29	10.55
1997	20	7.27	2008	14	5.09
1998	7	2.55	2009	6	2.18
1999	7	2.55	2010	12	4.36
2000	7	2.55	2011	24	8.73
2001	6	2.18	2012	13	4.73
2002	12	4.36	2013	27	9.82
2003	11	4.00	2014	29	10.55
2004	11	4.00			
			Total	**275**	**100.00**

Appendix B. Definition of Variables

Variable	Definition
Panel A: Gains to Targets	
CAR [-5, 5]	Cumulative abnormal returns around the announcement over 11-days [-5, 5] surrounding the day of activist engagement announcement, computed using market model.
Volatility	Idiosyncratic volatility of targets of both hedge fund activists who use derivatives and who do not use derivatives before and after the activist engagement announcement.
Panel B: Key Explanatory Variable	
Derivative	Dummy variable equals one for targets of hedge fund activists who employ derivatives
Acquired	Dummy variable equals one for targets of hedge fund activists, who employ derivatives, that get acquired
Panel C: Firm Characteristics	
MV	Market value of the firm 4 weeks before the announcement (CRSP item PRC×SHROUT)
Ln(MV)	Natural logarithm of MV.
M/B	Market value of equity 4 weeks before the announcement (CRSP item PRC×SHROUT) divided by book value of equity at the fiscal year end before the announcement (Compustat item CEQ)
Leverage	Total debt over total capital at the fiscal year end before the announcement (Compustat item (DLTT+DLC)/(DLTT+DLC+SEQ))
CF/E	Cash flows at the fiscal year end before the announcement (Compustat item IB+DP-DVP-DVC) divided by market value of equity 4 weeks before the announcement (CRSP item PRC×SHROUT)
Cash	Cash of the target firms (Compustat Item CH)
Cash/Assets	Cash of the target firms (Compustat Item CH) divided by total assets (Compustat item AT)
P/E	Stock Price (CRSP Item PRC) divided by earnings per share (Compustat Item NI/Compustat Item CSHO)