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The Role of Derivatives in Hedge Fund Activism*

By **GUO JIE (MICHAEL), GANG JIANHUA, HU NAN and VINAY UTHAM[1*]**

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Abstract

Using a hand-collected sample of hedge fund activist engagements from 1994 to 2014, this study analysed the role of derivatives in the hedge fund activism. Evidence shows 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 find 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, the probability of takeovers increases for hedge fund activists who did not use derivatives.

JEL Classification: G14; G34

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

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1. 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 to receive preferential tax status. Hedge funds typically "lock-up" investor capital for a long period of time to carry out their strategies and therefore cannot be redeemed freely. Mutual funds, on the contrary, are required to maintain high levels of liquidity and must meet daily withdrawal requests, if any. This is exactly where hedge funds have an edge over activist mutual funds on the aspect of undertaking activist engagements, especially when activist campaigns require the activists to hold large, illiquid blocks of assets for prolonged periods of time. This paper studies the financial derivatives which is a commonly used instrument by hedge fund managers and often believed to be highly effective while undertaking activist engagements.

Example: Bill Ackman vs. Herbalife: An example of derivatives used by activist hedge funds

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 as follows:

"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 the letter, Mr. Ackman recognised losses and covered $400 million worth of Herbalife stock by buying OTC put options. 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.

There are a number of reasons for the popularity of derivatives among hedge fund activists. First of all, the lack of regulation plays a key role. For instance, there were many cases in which hedge fund activists used "empty voting"[2] strategies (Anabtawi and Stout, 2010). Derivatives are very often used as constituents of activist strategies, because they are almost unregulated, leveraged, unstandardized and opaque. The lack of regulation was recorded by Helleiner and Pagliari (2010) , who found that in the cases of hedge funds, regulators focused on the "indirect regulation", that is, they emphasized on overseeing the involvement of bank lending while encouraged hedge

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

funds and their bank counterparties to self-regulate and disclose information to the markets.[3] Secondly, the lack of legal barriers that restrict hedge funds from over leveraging and excessive short selling, as evidenced by (Shadab 2009), also implicitly encourages activist hedge funds towards derivatives. Moreover, hedge funds are typically exempt from the Company Act which imposes heavy regulations upon financial institutions against risky betting. Specifically, under the Company Act, entities that are using short sales or derivatives must hedge their positions in a segregated account. Since this is not applicable to hedge funds, their positions of derivatives can be very aggressive, and, as a result, can be more effective while pursuing activist strategies. Shadab (2009) also found that the superior 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. The research by Chen (2011) provides further evidence that hedge funds using derivatives exhibit lower fund risks (e.g., market risk, and event risk) and are less likely to liquidate in a deteriorated market condition. Chen (2011) also finds that derivatives are more used by hedge funds that require higher minimum investment, charge higher fees, have shorter capital lockup periods[4], and employ effective auditing services. Overall, existing literature has indeed justified why hedge funds introduce derivatives as part of their trading strategies.

However, according to Partnoy (2015), activist hedge funds were found to have rarely used derivatives. They instead chose to buy "undervalued" stocks outright of the targeted firms. Furthermore, according to a study by Deloitte (2014), the additional costs arising from credit valuation adjustment (CVA)[5] charges were found to have been the highest for equity derivatives. This could be one of the reasons why most activist hedge funds prefer to directly buy the target stock instead of purchasing derivatives. After all, given that the use of derivatives places hedge funds in a unique position, there is a possibility that hedge fund activists benefit from using derivatives. This paper is keen to explore whether the use of derivatives enables hedge fund activists to create additional value.

In this study, we construct a set of hand-collected samples of engagements by hedge fund activists, and we use this dataset to measure market reactions when activists use derivatives to hoard targeted stocks and disclose their stakes in the targeted companies. Our research also tries to study the possibility of derivatives as an instrument to drive down the price volatility of the targeted stock. And, most importantly, the role of derivatives is examined with respect to the most profitable[6] and popular activist strategy: mergers.

Empirical results of our research provide valuable contributions towards understanding the role of derivatives in hedge fund activist engagements. Firstly, we find that the market reacts positively to targets of hedge fund activists around the period of disclosure irrespective of whether hedge fund activists used derivatives or not. However, the abnormal returns of targets of hedge fund activists who did not use

[3] 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.

[4] See also (Greenwood and Schor, 2009).

[5] CVA can be described as the market value of counterparty credit risk.

[6] 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.

derivatives exceeded the abnormal returns of targets of hedge fund activists who used derivatives and the difference was statistically significant. 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 those who adopted a "wait-and-watch" approach by using derivatives. Secondly, 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, 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).

The contribution of this paper is threefold: First, 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 studied the role of derivatives within a context of volatility. Second, this paper studies the market reaction to the use of derivatives by hedge fund activists. Third, 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., (2017)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 rest of the paper is structured as follows: Section II reviews relevant literature. Section III states the hypotheses. Section IV describes our dataset. Section V outlines the methodology used for empirical analysis. Section VI provides empirical results and discussion. Section VII concludes the paper.

2. 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. Academic interests in this field are not confined in US market. 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 (2009) studied the influence of intense[7] hedge fund activism on target firms. They found that targets of intense hedge fund activists showed 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. Many 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 during a 5-year period post intervention, thereby concluding that activist hedge funds were not myopic investors and that they generated long-term benefits to shareholders by enhancing output of their targets. However, Bebchuk et al. (2017) 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 and found that the data did not support this claim.

To sum up, existing literature generally agrees on the meaningful efforts by hedge fund activists, 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 argument is supported by Becht et al.(2017) who find that takeovers are the most profitable activist strategy. Boyson et al. (2017) 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.

This paper studies the role of derivatives in the hedge fund activism. We examine the question whether the ability to use derivatives provides activist hedge funds with any additional advantage while undertaking activist efforts. Hu and Black (2007) found that hedge funds routinely used leverage and options to increase their effective ownership in target firms. They found that decoupling votes and shares using equity derivatives and other capital market developments was efficient. They also found that

[7] 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.

hedge funds 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 ownership"). Therefore, the study by (Hu and Black, 2007) suggests that it is possible that derivatives play an important role in achieving activist efforts. Our study not only aims to examine the role of derivatives to understand how the market responds when hedge fund activists adopt "empty voting" or "hidden ownership", but also analyse whether the derivatives enable hedge fund activists to increase the probability of sales of the target firms.

3. Hypotheses

The purpose of this paper is to answer two research questions: (1) Do hedge fund activists create more value for their targets by using derivatives? (2) Does the use of derivatives increase the probability of takeovers involving hedge fund activists? Accordingly, our proposed testable hypotheses are:

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

Testing H1 helps us to analyse why activist hedge funds rarely use derivatives (Partnoy 2015). We examine this by testing 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. And if not, then it would justify why only a few activist hedge funds resorted to derivatives.

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

Literature found that using derivatives resulted in a decrease in the volatility of the 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% as a result of derivatives. Bansal et al. (1989) concluded that the volatility reduced by 6.4% after options are listed. Therefore, tests of H2 reveal whether the hedge fund activists are able to reduce idiosyncratic volatility by using derivatives. If the use of derivatives is the reason for the reduction of idiosyncratic volatility, then the importance of derivatives in hedge fund activism is highlighted.

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

Greenwood and Schor (2009) showed 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 results were reinforced by Becht et al. (2017). Exercising derivatives would enable the activist to gain more shares, and thereby owning 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 takeovers.

4. Data

The sample of hedge fund activist engagements is constructed from the 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. Documents are required to be filed within 10 days post the purchase of the company's securities. The SC 13D filings outline the size of the purchase and investors' intentions. Since 2000, it has been a common practice for an activist to attach a letter to the target firm's management and board within their SC 13D filings (Greenwood and Schor, 2009). Each individual SC 13D filing contains 8 items. Items that are meaningful to this study include: "Item 4: Purpose of Transaction" announcing the intention of the activist; "Item 1: Security and Issuer" clarifying the type of security purchased, including derivative contracts if any adopted; "Item 3: Source and Amount of Funds or other consideration" summarizing the source and the amount of funds for each activist effort; "Item 5: Interest in the Securities of the Issuer" illustrating the voting rights of the activist, and other security related information; "Item 6: Contracts, Arrangements, Understandings, or Relationships with Respect to Securities of the Issuer" disclosing any underlying derivative contracts, or other arrangements made by the activist pertaining to the target firm.

Our database of activist is built as follows: First, the list of activists is recorded from the Thomson Reuters Shareholder Activism Intelligence database. And the SEC EDGAR database is then accessed and the raw Schedule 13D filings of each activist are documented. All the eight items are recorded initially, and then classified based on "Item 4: Purpose of Transaction". Types of activist are identified and recorded according to their website information together with websites such as WhaleWisdom. As a result, our sample consists of 5,926 activist events by 872 activists in a period between 1994 and 2014. Activists are classified as: hedge funds, financial institutions, private equity companies, investment managers, investment companies, individual investors, industrial owners, pension funds, and shareholder committees. Because this study focuses on hedge fund activists, so a filtration is then followed. And our final activist sample pertaining to hedge fund activist records a total number of 3,806 SC 13D filings filed by 290 activist hedge funds. After screening Items 1, 3, 5, and 6 of each SC 13D filing of hedge fund activists, there are 275 activism events where hedge fund activists introduce derivatives[8]. The distribution of hedge fund activist engagements with derivatives is outlined in Appendix A. In Appendix A, there was a major drop in the use of derivatives in the years of 2008, 2009 and 2010. This suggests the use of derivatives was heavily influenced by the 2008 financial crisis. It also shows derivatives were once again popular post the financial crisis in 2013-2014. After merging and cross-matching with stock prices (CRSP) and accounting information (COMPUSTAT), our consolidated sample consists of 175 activism events. After all, the number of 175 is not many, and an important reason for this limited number of observations is 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. In order to analyse the short- and long-term market reactions, a matching procedure is then adopted. The matching sample is constructed based on the year, size and market-to-book ratio of the targets.[9] The matched sample contains 241 observations.

5. Methodology

5.1 CAR

To analyse the gain experienced around the time hedge fund activists using

[8] The derivatives here include options, futures, and forwards.

[9] Detailed procedures of how to match samples are available upon request.

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), this is done by using standard event study methods, and abnormal returns are computed over an 11-day event window [-5, +5]. These announcement period excess returns are computed using the market model as shown in equation (1):

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

where, AR_{it} stands for the abnormal return of a target company i on time t; R_{it} is the return of the target company i on t, and R_{mt} is the market return on time t (measured by the 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 shown in equation (2):

$$CAR_i = \sum_{t=-1}^{t=+1} AR_{it} \tag{2}$$

5.2 BHAR

We then calculate 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 by Liang (2008):

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

where R_{it} and R_{mt} stand for the monthly stock return and the market return, respectively. We further define the mean BHAR over a time period T as:

$$BHAR_T = \frac{1}{n}\sum_{i=1}^{n} BHAR_{iT} \tag{4}$$

5.3 Factor Models

To examine the influence of derivatives on the cumulative abnormal returns, the 11-day CARs are regressed against a set of control variables:

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

The CAR_i in equation (5) is the 11-day CARs computed using the market model. The key variable of interest is the dummy variable "Derivative", which 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 the other control variables are explained in Appendix B. Equation (5) also accounts for the year fixed effects.

In addition, in order to study whether the use of derivatives increases the probability of takeovers involving hedge fund activists, a Probit model is constructed as follows:

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

The dependent variable in equation (6), the "Acquired", is a 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.

5.4 The Idiosyncratic Volatility

The idiosyncratic price volatility of the target stocks by hedge fund activists is then examined. The purpose of doing this is 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 their stakes in the target firms. This study follows the three-step approach by Bali and Cakici (2008) to compute the idiosyncratic volatility:

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

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

In equation (7), $R_{i,t}$ is the return on a stock i; $R_{m,t}$ is the market return; $r_{f,t}$ is the risk-free rate; $\varepsilon_{i,t}$ is the idiosyncratic return.

Step 2: The market model is then estimated:

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

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

$$IVOL_{i,t} = \sqrt{var\left(\varepsilon_{i,t}\right)} \tag{9}$$

6. Results and Discussion

Table 1 outlines the summary statistics of targets of hedge fund activists who use derivatives as well as the matching sample. Results in Table 1 suggest that hedge fund activists use derivatives while targeting large companies, as evidenced by comparing market values. This is consistent to the fact that hedge fund activists prefer "hidden ownership". Large companies are typically held by many shareholders. As a result, they tend to be difficult targets for the activists to pursue activism. Hence, 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 ownership" (see Hu and Black, 2007).

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

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

Notes: 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 2. 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.

We then examine the market reaction towards disclosure announcements by hedge

fund activists who use derivatives and compare the corresponding gains with the matching sample. The results of the difference between the 11-day CARs[10] of the two samples are displayed in Panel A of Table 2. As evidenced by Table 2[11], although the market reacts positively when hedge fund activists, who use derivatives, disclose their stakes in the 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 was found to be negative and statistically significant at the 1% level. Hedge fund activists who employ derivatives are granted the right but not obligation to purchase shares of the target at a future date. The market, therefore, seems to treat these hedge fund activists as being hesitant towards undertaking activist engagements, or assume that these hedge fund activists do not have the necessary ownership to successfully pursue any activist engagement. On the other hand, the hedge fund activists, who do not employ derivatives but purchase the shares directly, are capable of immediately negotiating with the management. Therefore, the market values their capability more than the hedge fund activists who adopt a "wait-and-watch" strategy by using derivatives.

Results from the univariate analysis are further confirmed in the multivariate setting. The 11-day CARs are regressed against a set of control variables, and the results are listed in Panel B of Table 2. The key variable of interest is the dummy variable "Derivatives", which equals to 1 for hedge fund activist engagements if derivatives are involved. And as shown by Panel B in Table 2, the coefficient of the dummy variable is negative and statistically significant at 1% significance level across all the four specifications, thereby justifying the finding that targets of hedge fund activists who did not use derivatives outperformed the targets of hedge fund activists who used derivatives in the short-run.

[10] We considered the 3-day and the 5-day event windows for both 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.

[11] 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.

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

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

Notes: 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 1. 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.

Furthermore, our study also looks into long-term gains of targets in hedge fund activist engagements. Table 3 illustrates the comparative results of the 6-month, 12-month, and 24-month BHARs. As observed from Table 3[12], there is no statistical difference between the two samples across all the three time windows. And this indicates 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 implementation of derivatives by hedge fund activists does not create any long-term value to their target firms.

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

	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)			

Notes: This table presents long-term gains of targets of hedge fund activists who use derivatives. BHAR6 is the six-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.

The idiosyncratic volatility of the stock prices is then evaluated before and after the hedge fund activist, who used derivatives, disclosed its stake. The results are displayed in Table 4[13]. Both the hedge fund activists that used derivatives and those

[12] 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.

[13] 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.

that did not all reduced the idiosyncratic volatility of their target firms' stocks. However, the reduction in idiosyncratic volatility is greater for target firms where the hedge fund activist did not use derivatives. This finding of a reduction in idiosyncratic volatility is consistent with literature[14] 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.

Table 4. 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
Panel A. Idiosyncratic volatility of targets of hedge fund activists using derivatives								
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								
Volatility (%)	2.93	482	2.46	241	3.41	241	−0.95***	0.0001

Notes: 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.

For the question of whether hedge fund activists used derivatives are 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. (2017), 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. In our paper, in order 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. By adopting the 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. Table 5 lists the distribution of these deals. Panel A outlines the distribution of deals by time, Panel B outlines the distribution of deals by industry, and Panel C outlines a few deal characteristics.

[14] See (Skinner, 1989), (Conrad, 1989), and (Bansal et al., 1989).

Table 5. Distribution of Deals with Hedge Fund Activist Involvement

Panel A: Distribution of deals by year

Year	No. of deals	Per cent (%)	Year	No. of deals	Per cent (%)
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	Per cent (%)	Year	No. of deals	Per cent (%)
Consumer products & services	12	6.74	Materials	11	6.18
Energy & power	14	7.87	Media and 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

Notes: 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.

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 is consistent to Partnoy (2015) that activist hedge funds were found to have rarely used derivatives. 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.

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

Dependent variable	(1) *Acquired*	(2)	(3)	(4)
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

Notes: *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 1. 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.

7. Conclusion

This paper examined the role of derivatives in hedge fund activism. 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. Evidence showed 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. Results thereby indicate 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. 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. Furthermore, 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. Finally, this study 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. Therefore, hedge fund activists are better off by directly purchasing shares of the targets that they believe are undervalued.

The contribution of this paper is threefold. First, 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. Most importantly, our paper provides a testing ground for studying the value creation through the usage of derivatives. This study also finds 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.

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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**

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 d 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 g 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) divide 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-DV(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)