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**The impact of Hedge Fund Activism on the stocks of the Athens
Exchange Market during 2008-2016**

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“I hereby declare that this particular thesis has been written by me, in order to obtain the Postgraduate Degree in Accounting and Finance, and has not been submitted to or approved by any other postgraduate or undergraduate program in Greece or abroad. This thesis presents my personal views on the subject. All the sources I have used for the preparation of this particular thesis are mentioned explicitly with references being made either to their authors, or the URL’s (if found on the internet).”

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TABLE OF CONTENTS

Abstract.....	9
1. Introduction.....	11
2. Literature Review	13
2.1. What is a Hedge Fund?.....	13
2.2. The Theory of Efficient Capital Markets	15
2.3. Characteristics of Hedge Fund Activism.....	16
2.4. Hedge Fund Activism and Agency’s Cost of Debt	16
2.5. Characteristics of Target Companies.....	18
2.6. The Impact of Hedge Fund Activism on R&D Expenditure	19
2.7. Hedge Fund Investment Horizon.....	20
2.8. Literature Review – Major Work on Hedge Fund Activism	21
2.9. Two Examples of Hedge Fund Activism Events.....	23
2.10. The Rapidly Changing Environment in Hedge Fund Activism	25
2.11. The “wolf pack” tactic.....	26
3. Methodology-Data on Hedge Fund Activism	28
3.1. Event Study Analysis: Event Window and Estimation Period.....	29
3.2. Estimation of Expected Returns	30
3.3. Market Adjusted Return Model.....	31
3.4. Estimation of the Average Abnormal Return (AAR).....	31
3.5. Estimation of the Cumulative Abnormal Return (CAR) & Cumulative Abnormal Return (CAAR)	32
3.6. Cross-Sectional Standard Deviation Test	33
3.7. Time-Series Standard Deviation Test.....	34

4. Results – Do hedge funds create value for shareholders?	36
4.1. Short-horizon Results of Stock Returns	36
4.1.1. Number of hedge fund activist events.....	36
4.1.2. Average abnormal returns for the full sample.....	36
4.1.3. Average cumulative abnormal return.....	40
4.2. Descriptive Statistics	41
4.3. Cross-Sectional Results	44
4.3.1. Univariate tests	44
4.3.2. Multivariate tests.....	46
4.3.3. Model with dummy variable	48
4.4. Probit Analysis of Hedge Fund Targeting.....	49
5. Conclusion	52
References.....	54

Abstract

This study traces the rise of hedge fund activism in Greece. Despite the blow of the 2008 financial crisis, hedge fund interventions still exist across the global economy. Shareholder activism by hedge funds has become a major trend in the United States within the last decade. Compared to other types of investors, hedge funds seem to be more activist than predicted, due to the unexpectedly significant role of several antecedent variables. The relatively lightly regulated environment of the hedge funds affects the weighting conventional activism-antecedent variables.

The purpose of this paper is a) to identify the typical targets of activism and b) to explore if hedge funds create value for the shareholders. Using a manually collected database of activism filings to the Athens Exchange Market, from 2008 to 2016, we found that hedge fund activism creates value both for the shareholders of the companies targeted and for the hedge fund investors. The abnormal return upon the announcement of the event is statistically significant and is evidence of how its effect on the operating and financial decisions of the company targeted, increases the shareholders' wealth.

Hedge fund activists tend to target “value” companies, which have low valuations in relation to their “fundamentals”. On the one hand, they are profitable, have sound operating cash flows and returns on assets, while on the other hand, they have low (sales) growth rates, leverage and dividend payout before the intervention.

1. Introduction

Hedge fund activism is a new form of activism and is expected to be the next form of activist investors in the capital markets, where mutual funds and pension funds play a significant role. Hedge funds activism has been discussed across the globe in the last decades, however, it is still a new and poorly understood concept. Hedge fund activism has forced significant changes in the operational, financial and governance structures of companies.

Shareholder activism is not an unprecedented phenomenon in the global capital markets. Previous studies have shown that when mutual or pension funds follow a more diversified activist program, they do not achieve remarkable benefits for the shareholders. However, hedge funds are undiversified and hold remarkable stakes in the corporations' portfolios. Moreover, they force companies to restrict sales, increase dividend payouts, and other actions which directly benefit the companies themselves and possibly other shareholders as well. Hedge fund activism may assist shareholders increase their value but it does not necessarily benefit the bondholders. Because in the different classes of stakeholders within a company, there are agency costs involved and thus management decisions may benefit one class of stakeholders to the expense of the others. This is a major problem in the redistribution of wealth from bondholders to shareholders.

The prevailing perception is that the major goal of hedge funds is to take an immediate payout from the company and then exit, before the long term costs are felt. People call hedge funds "short-term predators", in the sense that they attack a company with the sole intention of increasing the value of its shares. However, others claim that holding period for completed agreements is approximately one year, calculated from the date that a hedge fund files a Schedule 13D up to the date when the hedge fund no longer holds a significant portion of shares in a targeted company.

There are certain differences between hedge fund activism and other forms of activism. First of all, hedge fund managers have stronger financial motivation to make profit as they will collect a significant percentage of excess returns as performance fees, on top of their fixed management fees. Furthermore, hedge funds are not strictly regulated since they are not addressed to the public but only to

institutional customers and to a small number of wealthy investors. Moreover, hedge funds may target small companies where it is easier to acquire a significant percentage of ownership with a given amount of capital.

In this paper, we review the academic literature on hedge fund activism focusing on whether the positive returns to shareholders are a result of the agency cost reduction. An additional question is whether hedge funds help increase the value for shareholders or aim at gaining short-term benefits at the expense of the company and other stakeholders.

With these questions in mind, the thesis is organized as follows. Section 2 contains a brief outline of the major works reviewed in this paper. Section 3 presents the data sets for hedge fund activism and the methodology applied. Section 4 discusses the crucial question of whether hedge fund activism creates value for shareholders, through the examination of short-run stock returns. Moreover, the same section analyzes the specific characteristics of the companies targeted by activist hedge funds. The final section, Section 5, presents brief conclusions in relation to the results of our survey.

2. Literature Review

2.1. What is a Hedge Fund?

A hedge fund is an alternative form of investment, available to the most sophisticated, executive investors and rational arbitrageurs, such as individuals with significant assets. Similar to mutual and pension funds, hedge funds are pools of underlying securities and cannot be offered or sold to the general public.

Hedge funds can invest in a variety of securities/assets, often with complex portfolio-structures and risk-management techniques. However, there are fundamental differences between these two forms of investment. First and foremost, in contrast to mutual funds, hedge funds are not regulated by the SEC, although such regulations may be introduced quite soon. Furthermore, due to the lack of such regulation, hedge funds are able to invest in a wider range of products than mutual funds. They may follow the traditional activist agenda and invest in stocks, bonds, commodities, and real estate, but they are able to perform higher risk investments and employ techniques with greater flexibility than mutual funds. Another difference is that hedge funds use long-short strategies by taking long and short sell positions in their investments. The major technique used, called leverage, is a risky sophisticated strategy that may increase returns significantly but can also lead to losses. Finally, hedge funds are not as liquid as mutual funds and it is more difficult to sell your stocks because there is a “lock-up period” during which investors cannot diversify their portfolios while in the case of mutual funds, which offer greater liquidity, investors can immediately execute their investment preferences.

Generally, hedge funds are partnerships, entities managed by a general partner and the rest of the investors are limited partners who are passive and do not have an active role regarding the tactics and the objectives of hedge funds. Hedge funds managers are motivated to achieve high positive returns, as they will receive a significant 20% of excess returns in the form of performance fees, on top of their fixed annual fee of 2% on assets. Hedge funds managers invest a substantial amount of their own wealth into the funds, which constitutes a strong motive for high returns in contrast to mutual funds, where managers are not allowed to receive significant percentages of excess returns. Brav, Jiang, Partnoy, & Thomas (2008) reported that, because of the

regulation, hedge funds managers are not required to have diversified portfolios. They can hold substantial stakes in large companies and are required to “lock” their funds for a time period of two years. However, mutual funds must have diversified portfolios and their goal is to satisfy their clients by providing liquidity. Furthermore, hedge funds can invest in derivatives, such as futures and options, or trade on margin to hedge or leverage their stakes with a given capital. These strategies are not available in the mutual and pension funds, and thus hedge fund activist shareholders have the advantage of acquiring power over the management of the targeted companies.

Hedge funds are not subject to strict heightened fiduciary standards, such as those included in ERISA, which allows them to be more flexible to embed into the invested firms. Individuals with significant assets and large institutions invest in hedge funds to raise their capital through private offerings, not subject to extensive disclosure requirements and regulations. However, since hedge funds managers are bound by the U.S. regulation, it is not necessary to follow more specific regulation like “prudent man” investing standards.

Hedge fund managers face fewer conflicts of interest than other institutional investors, such as pension and mutual funds, who have different business relations with the invested firms or other non-financial goals. Hedge fund managers have strong and independent motives to achieve positive returns, since their aim is to pursue opportunities on private capital markets. There are some categories of funds which have similar characteristics with hedge funds, but it is crucial to pinpoint the slight differences. More specifically, private equity investors target companies especially or going private transactions for acquiring high percentage ownership stakes than hedge funds activists. Venture capital investors mainly target private companies, because their goal is to force corporate governance actions within the firm, such as merging or selling the company or even initial public offering. Therefore, they invest earlier than private equity and hedge funds. It is however difficult to pinpoint this slight difference between hedge funds and private equity, as there is significant overlapping.

The popularity of these different investment vehicles has waxed over the years. During the financial crisis of 2007-2008, the Hedgefund.net reveals that hedge fund industry managed around \$3 trillion. According to the Preqin Global Hedge Fund

Report, this industry has now reached \$3.2 trillion. The number of operating hedge funds has increased exponentially from 2,000 in 2002 to 10,000 in 2015, with data from the Hedge Fund research indicating a decrease in 2016.

2.2. The Theory of Efficient Capital Markets

Market efficiency is a huge contribution in financial economics which refers to the degree to which stock prices and other securities reflect all available information (the random walk model). Fama et al. (1969) have developed the efficient market hypothesis theory and argued that stocks always trade at their fair value making it not possible for investors to outperform the market by selecting the suitable and profitable stocks and the only way investors may obtain higher returns is either by chance or by purchasing riskier investments. Investors who agree with this theory tend to buy index funds which track overall market performance and are proponents of passive portfolio management. Samuelson (1965) claimed that the stock market is “micro efficient” but not “macro efficient” since the theory of efficient capital markets is better suited for individual stocks than for the aggregate market.

The efficient market hypothesis commonly refers to the following three forms:

- *Weak-form efficiency*: Efficiency future prices cannot be predicted by analyzing historical prices. Excess returns cannot be obtained long term by using investment strategies based on historical stock prices or other data from the past. Hence prices must follow a random path.
- *Semi-strong-form efficiency*: Stock prices adjust to all new available public information very quickly and no one can earn excess returns based on this public information.
- *Strong-form efficiency*: Stock prices reflect private and public information so no one can obtain excess returns.

The market efficiency theory is opposed to the hedge fund activism since the goal of these funds is to obtain abnormal returns and their basic aim is to beat the market.

2.3. Characteristics of Hedge Fund Activism

One type of activism may have different purposes. For instance, an activist hedge fund may ask a company to pay excess dividend and at the same time nominate a fund representative into the board of directors. There are many cases where one or more funds might target the same company whereas other hedge funds take an activist position in more than 10 companies. The size of the firm and the stakes that the hedge fund obtains play a significant role in the investment strategies.

Aslan & Maraachlian (2009) divide hedge fund activism into two categories: The first is the “General” category, where the goal of the hedge fund is to keep in touch with the management of the target firm. In this situation, the fund has the option of communicating with the management without making any specific demands. This category contains general action plans such as asking the company to take action to improve shareholder value.

The second is the “Specific” category, which includes events where the funds have more specific proposals or plans. Moreover, the activist hedge fund sends a letter to the management of the company, asking them to make changes such as:

- a) Governance structure issues, for instance suggesting specific board members or demanding positions in the target company’s board of directors or asking for a decrease of the executive compensation and other related cost cuts.
- b) Capital structure in long-term activities, for instance share buy-back programs, changes in dividend payouts and equity issuance.
- c) Different short-term strategies such as asset liquidation, quick sale of the firm, suggestions to spin-off underperforming divisions and pushing for mergers and acquisitions.

2.4. Hedge Fund Activism and Agency’s Cost of Debt

Many case studies examine the relations between shareholder-bondholder and the conflicts for the agency’s cost of debt. It is undisputable that this cost derives from the excessive payouts to shareholders against bondholders. This matters, due to the high priority which has shareholders to subsequent issuance of debt, or some changes

in the asset investment strategies with exposure to risky projects that enhance shareholders' value (Jensen & Meckling, 1976). According to Myers (1977), another strategy is not to invest in projects with positive NPV if they benefit bondholders. The last method (Waga & Welch, 1993) is done through acquisitions which increase leverage and affect debt seniority. However, corporate ownership and control are two different issues and especially managers have the ability to control and suggest shifts in the financial, investment and operational options. The agency risk of managers derives from outside investors, since managers tend to engage in self-serving behavior and there is asymmetric information between outsiders and insiders (Jensen & Meckling, 1976; Holmstrom & Tirole, 1989). Insider information helps the firm make the right decision in order to increase profits and shareholder value. Furthermore, shareholders are not able to bypass the managers of the firm without cost. This bypass requires a successful proxy motion by shareholders (Fluck, 1999), whereas Shleifer & Vishny (1986) claim that this separation may be done via acquisition and Zwiebel (1996) via bankruptcy. These studies show that managers have the advantage of pursuing their own program, which jeopardizes the bondholders' benefits or the creditors' interests. A solution for resolving agency conflicts between managers and shareholders is needed.

Hedge funds are monitoring company managers because they have an interest in increasing the value of company assets by preventing waste of free cash flow and by taking actions in order to enhance company value (Barclay & Holderness, 1992; Bhojraj & Sangupta, 2003). The improvement of management decision making and the elimination of opportunistic behaviors, such as perquisite consumption and/or overcompensation, will benefit all company stakeholders. Activism might have a positive effect on increasing company value (which benefits all parties involved) and enhancing the shareholders-bondholders' position upon the targeting announcement.

2.5. Characteristics of Target Companies

Another crucial question for hedge fund activism is what kind of firms do activist hedge funds target. Evidence on this question can be summarized as follows. Hedge funds prefer to target “value” firms with specific “fundamentals”, such as low growth rates, leverage, and dividend payout ratios. Furthermore, hedge funds target companies that have sound operating cash flows and low valuation. They especially prefer small firms, since it is easier for them to accumulate significant ownership with a given amount/capital. However, other authors disagree with this definition of the typical target company being smaller, more profitable and with a higher book-to-market ratio. Brav et al. (2008) have found that return on assets is a significant parameter for hedge funds to target a firm (positive correlation). Khorana et al. (2013), argue that more than one third of the companies have experienced a share price over performance before being targeted by hedge funds and therefore the stock price continues to increase. However, Klein & Zur (2009) have found that companies with a lower bankruptcy risk are also a target for hedge funds, compared to a sample of non-targeted companies which have different “fundamentals”. These studies have tried to pinpoint that target firms are more profitable than others, but there is ongoing debate on whether only small firms are the major targets of hedge fund activism.

The proponents of hedge fund activism claim that these interventions derive from the conflicts between corporate managers and their dispersed stockholders. As a result, managers are motivated to invest in negative NPV projects in order to exploit the company’s free cash flow rather than dispersing cash to shareholders via dividends or share repurchases. Jensen (1986) states that in order to increase the shareholders’ value, it is necessary to reduce R&D expenditures and other long-term investments. Moreover, another way to decrease free cash flow problems is to increase leverage and push managers to take measures for the cost of debt. If these arguments are valid, one might expect the aforementioned characteristics of target firms, such as higher R&D expenditure, lower dividends, and higher capital expenditure, in contrast to another sample comprising of non-target companies. However, the majority of the studies have not found evidence for the free cash flow hypothesis. Boyson & Mooradian (2007) claim that activist hedge fund investors have less leverage, but other authors (Clifford, 2007; Klein & Zur, 2009) have found activist hedge fund investors to have equal or higher leverage to the rest of the sample. In addition, Klein

& Zur (2009) state that target firms have lower dividend payments, in contrast to Clifford (2007) who found similar dividends with the control sample.

Overall, although many characteristics of the companies targeted by hedge fund activism have been discussed and there is some evidence that target companies have a specific characteristic, called “Tobin’s Q”, which is often lower than in non-targeted companies, there is a “value” orientation. In any case, these characteristics do not prove high agency costs.

2.6. The Impact of Hedge Fund Activism on R&D Expenditure

A major change in the companies targeted by hedge fund activism includes reducing long-term investments and especially investments in research and development (Bebchuk, Brav, & Jiang, 2013). Harvard Law Professor Lucian Bebchuk has named this situation “investment-limiting” interventions. Several studies have focused on this issue, in order to pinpoint whether R&D investments have increased or decreased in the aftermath of hedge fund engagement. Most authors claim that there was a decrease in such expenditure. A recent study (Allaire & Dauphin, 2015) found that the “surviving” companies have reduced R&D expenditure by 50% or more. But the examination of another random sample of non-target firms, found that R&D expenditures have increased. If the results were limited to R&D investments only for those companies which were not taken over, the decline was even greater since the acquiring companies may proceed to greater cut-backs on the R&D expenditure of acquired companies.

However, there is one study (Brav et al., 2014) stating that the firms targeted by hedge funds will find some ways/patent applications in order to enhance their “innovation output”. This aspect, that less “innovation input” can produce higher “innovation output” under hedge fund guidance, is not correct. The goal of the hedge fund is to reduce or cut back long term investments in order to increase short term profits, but there is no evidence that the “innovation output” can be increased only through short term patents and without R&D expenditure. Moreover, one discovery/patent may lead to others and this could eventually lead to a research breakthrough, which would in turn lead to the development of new products as is usually the case with

pharmaceutical companies. A reduction in the R&D plans of a company, creates the incentives to undercut long term sustainability of the company.

To sum up, several studies state that R&D expenditures significantly decrease under hedge fund guidance and only one study claims the opposite, i.e. that patent applications can improve the innovation horizon of the company.

2.7. Hedge Fund Investment Horizon

The investment horizon of a hedge fund is a controversial issue across the globe. The proponents of hedge fund activism claim that their goal is to pursuit long term shareholders' value, whereas opponents criticize them as "short term predators" whose aim is to obtain short term profits and then exit the firm (Kahan & Rock, 2006). It is however quite difficult to find evidence on this aspect, since there are no databases available and only a few studies have tried to contribute in this theory.

It is difficult to find all the available information, but the only evidence is when the ownership in the target firm fluctuates above or below the 5% disclosure threshold according to the filing date. These data are crucial in determining and accurately estimating the hedge fund's investment duration, after the initial filing date. According to Brav et al. (2008), the median duration from the initial 13D filing date to "exit" is 369 days (roughly one year), but a more recent study by the same authors (Brav, Jiang & Kim, 2010) estimates the median period to be shorter, at 266 days. Moreover, the 25th and 75th percentile figures for the entire sample are 169 days and 647 days respectively. If we divide the sample to hostile and non-hostile events by hedge funds, the median duration is shorter, at 319 days and 375 days respectively. However, there is no available information allowing the identification of the exit date for 47,6% of the companies in the sample and thus it is unclear whether this evidence is adequate to determine the investment horizon of hedge funds.

In conclusion, there is an unresolved problem with data collection. In particular, there are is no exit information available for many companies, which would allow us to draw more robust conclusions regarding this phenomenon. Due to this lack of data, there is a huge debate regarding the hedge funds' investment period in target firms

and there is no plausible assertion on this issue. Only the above study proves that over half of the sample definitely does not have a long-term investment horizon.

2.8. Literature Review – Major Work on Hedge Fund Activism

A lot of research has been done regarding hedge fund activism and the majority of the studies have found that the companies targeted by hedge funds generally achieve positive abnormal returns in the event window. It is important to note that this type of activism creates values for the shareholders as well as financial, operational, and governance structure improvements within the firms. The most important piece of research regarding hedge fund activism has been done in public companies in the United States. Another major study, conducted by Brav et al. (2008), examined a sample of 1059 hedge fund activism events within the period of 2001-2006 and focused on the characteristics of target companies, the objectives and the tactics of hedge fund activists, in conjunction with market reactions to activism and shifts in company performance after hedge fund interventions. Klein & Zur (2009), examined a sample of 151 events from 2003 to 2005 and analyzed the conflicts of interest in hedge fund activism. Boyson & Mooradian (2007), analyzed 418 hedge fund activism events in the period of 1994-2005. Moreover, Clifford (2007) has collected a sample of 1902 events from 1998 to 2005 and examined the reaction of share prices and changes in the operating sector of the firms. The last study, by Greenwood & Schor (2009), analyzed a sample of 784 events for 138 hedge funds from 1995 to 2005 and examined the impact of hedge fund activism on mergers and acquisitions. This study produced different results from previous studies as it found that positive abnormal returns, either short term or long term, are driven by targets that are acquired ex post, whereas the surviving firms do not show any improvement in their operating performance.

In the literature there are also papers focusing on hedge fund activism in different types of businesses. Bradley et al. (2010) examined hedge funds activism specifically in the area of closed-end funds. Due to the discount involved, these are the most suitable type of funds to accurately analyze the impact of activism on increasing value. These authors found that, within the period 1988-2003, activism has decreased closed-end funds discount to half of their original discount value on average.

Furthermore, in a recent study, Huang (2009) analyzed the consequences of hedge funds in leveraged buy-outs from 1990 to 2007 and found that potential buyers of the target firm benefit from a higher buyout premium due to hedge fund activism pressure. In addition, Jiang, Li, & Wang (2009), examined a sample of Chapter 11 companies in the period 1996-2007 and explained a wide range of strategies that hedge funds employ in order to gain power and control in the firm and acquire ownership without high costs. The pressure exercised by hedge funds provides them with the power to change the situation of these Chapter 11 companies, by strengthening the rights of the creditors and the incentives for the management of the company.

Several studies in the literature examine the most significant issue which is the returns to the investors of the activist hedge funds and to the shareholders of the target firms. Hedge funds achieve higher returns than the overall market and other types of equity-oriented hedge funds. Brav et al. (2008) found that hedge fund activism on average achieved monthly excess returns 1% higher than the overall market, from 2001 to 2006. Boyson & Mooradian (2007) examined the same issue and found that activism hedge funds achieve better returns than matched hedge funds by 3.3% annually. However, there is another study (Gantchev, 2009) claiming that due to the high cost of activism, the net return is lower as it is difficult to overcome the costs of launching activism.

Other studies focused on hedge fund activism in other parts of the world. Becht, Franks & Grant (2008) analyzed hedge fund activism events across Europe, from 2000 to 2008, and found positive abnormal returns upon announcement of the hedge fund intervention. Moreover, Mietzner & Schweizer (2008) analyzed the filings of acquisitions for at least 5% of the voting rights of public companies in Germany. Their goal was to compare the performance of the hedge fund to the performance of private equity funds as shareholder activists. The market reaction was positive for both groups of investors, as they own large stakes in target companies, after the acquisition announcement. Another study by Stokman (2008), examined 94 similar hedge fund activism events across Europe and North America in the period 2000-2007 and reported the same results with other similar studies in Europe.

The majority of these studies reached the same conclusions across the globe. Hedge fund activism is successful in achieving the goals of earning positive abnormal returns around the announcement date and creating value for the shareholders of the target firms. A study by Uchida & Xu (2008) examined 41 shareholder activist events in Japan, initiated by the US hedge fund “Steel Partners” and the Japanese activist fund “Murakami”. In a similar study, Becht et al. (2009), examined 41 companies targeted by a UK hedge fund and found that this activism event increased the shareholders’ wealth. All these cases referred to strong-form efficiency capital markets around the world. However in Greece, due to the economic crisis, it is even more difficult to find evidence in a weak-efficiency market where the economic environment is rapidly changing. However, there may be investment opportunities for hedge funds in emerging markets like Greece.

2.9. Two Examples of Hedge Fund Activism Events

The two different approaches described below, explain hostile and non-hostile hedge fund activism events.

The first case involves communication between the company management and the hedge fund, without hostile tactics. Brav et al. (2008) state the following example: On November 19, 2003, MLF Investments LLC filed a Schedule 13D stating that it owned 5.8% of Alloy Inc., a direct marketing and retail firm. This hedge fund (MLF) had purchased these shares at an average cost of \$5.17 per share. In Schedule 13D, the hedge fund and its affiliates (the “Reporting Persons”) noted that there was a big effort underway to help the management maximize the goal of achieving high profits and increasing the shareholder value of the company. So, the Reporting Persons claimed that a change must be made in the operational structure of the company, such as separating the two core sectors of the firm (retail and marketing). This plan might be more effective than the previous one and should lead to an increase in the valuation of the two businesses. Therefore, the Reporting Persons entered into discussions with the Alloy Inc. management and the Board of Directors, regarding these changes in order to improve the valuation of the company and, generally, to make suggestions for the future plans of the firm. During the (-20+20) event window around the announcement of the Schedule 13D filing date, the value of Alloy Inc. increased by

11%. The discussions between the hedge fund and the company began and one year later, Alloy Inc. appointed Matthew Feshbach, the founder and managing partner of the hedge fund, to the company's board. Therefore, on May 31st, 2005, Alloy adopted the strategy of diversifying the merchandise business and its shares closed at \$8.39. The hedge fund continued to assist the company by increasing its stakes and on September 2005 owned 16.1% of Alloy Inc. Two years later, the hedge fund decided to silently exit the company.

The second case shows a more hostile approach, as it includes major changes in corporate governance. On November 17th, 2005, Pirate Capital (hedge fund) filed a Schedule 13D with the SEC, notifying them of a 7.9% stake in James River Co. The hedge fund purchased its stake at an average cost of \$33.45. The hedge fund sent a letter to the company stating all the actions/measures that should be taken into consideration. The major concern is that the valuation of the firm is very different from the valuation of similar companies. This difference derives from the management's failure to meet the demands in the operational and financial strategy of the company. Indisputably, this was the responsibility of the CEO, Peter Socha, who did not have the experience required to achieve the goals of the firm. Moreover, the company did not have a CFO. For these reasons, the private capital demanded that a) the Board should hire an investment banking firm to come up with alternative strategies, such as the potential sale of the firm, and b) redeem the shareholders' rights plan, effective no later than March 15th, 2006. On March 10th, 2006, Morgan Stanley has played an important role in identifying potential bidders. The company's stock price increased more than 10% to \$39.77 on that date. After a short period, the hedge fund demanded representation in the company's Board of Directors. On August 22nd, 2006, the two sides entered a settlement agreement stipulating that three representatives of the fund were elected to the company's Board, and in turn, the hedge fund dropped the proposals it had made to the shareholders for the next annual shareholders meeting.

To sum up, these two hedge fund activism events had the same goal but employed different strategies to achieve it. In the first event, hedge fund activism aimed at changing business strategies or basic "fundamentals" of the company, cooperating with its managers. However, in the second event, the managerial opposition to hedge

fund activism might stem from its negative impact on the CEO's salary and company turnover, even if it ultimately led to an increase in the shareholders' value.

2.10. The Rapidly Changing Environment in Hedge Fund Activism

Which factors have caused the recent explosion in hedge fund activism? There are many reasons why hedge fund activism has increased dramatically, especially in the last decade. The hedge fund activism landscape is changing rapidly and there are many doubts about the reliability of previous empirical papers on the issue of the hedge funds. No one can ignore the recent success of many hedge funds across the globe and this type of activism may cause a "hedge fund bubble" since many funds pursue investment opportunities in a specific sample of firms that have overinvested.

Activist campaigns run by hedge funds range from modest interventions in corporate governance to hostile interventions, such as selling of the company or firing the CEO or spinning off company divisions. Hostile interventions have greater market impact, with positive stock returns.

Such campaigns have increased exponentially, with one recent study (Hoffman & Benoit, 2014) counting 1115 campaigns from 2010 to 2014. Only in the year 2014, 347 campaigns from activist hedge funds have been recorded (Bunge & Benoit, 2015). This is a stark contrast to earlier years when for example, during a 20-month period from 2005 to 2006, only 52 such campaigns were recorded. This contrast reveals a huge increase in recent years and increases the possibility of a hedge fund bubble.

A result of the success of hedge fund activism interventions is that many hedge funds now pursue fewer legitimate opportunities to acquire larger stakes in companies. Moreover, it seems that one of the reasons why hedge fund activism has increased is the discovery of a new activist tactic, called the "wolf pack" tactic which is presented in detail in the following section.

2.11. The “wolf pack” tactic

This new hedge fund activism tactic, called the “wolf pack”, is the formation of a network of activist investors who act in a parallel way, without legally forming a “group” under Section 13D of the Securities Exchange Act of 1934. Their purpose is to avoid federal securities legislation which would impose an earlier disclosure obligation.

Which are the reasons for forming a “group” for 13D purposes?

- The first reason is that all the members of this “group” will be sued by the target firm, since avoiding joining a “group” protect specific activist investors who have their own shares less than 5% of the target firm which usually don’t know that they are exist. These investors are basically invisible, unless they declare themselves, with goal to stay below the 5% ownership level. This is a tactic for hedge funds to avoid some significant securities laws with high costs; using this method allows them to overcome these limitations as they are not joining a “group”.
- The second and more important reason is that not joining a group delays the announcement at which the Schedule 13D must be filed. This tactic offers the individual hedge fund the opportunity to organize the activist campaign and rapidly purchase 5% of the target company’s stocks at a price which does not reflect the market reaction to such campaigns. Therefore, the hedge fund can purchase additional shares in the ten-day window provided by Section 13D(1) after the acquire crosses 5% before it must file its Schedule 13D. However, buying stocks in this event window can be more costly and may alert the arbitrageurs (Bebchuk et al., 2013a). Through this method, hedge funds eventually hold a stock position of 6-10% as at the time of the initial Schedule 13D filing.
- The third issue forming a “group” involves the target’s plan in relation to the filing of a Schedule 13D. The target’s tactic is to adopt a “poison pill” to prevent the “group” from acquiring more of the target’s shares (Lewkow & ten Sienthoff, 2005). Due to the opposition to poison pills by proxy advisors, several public companies nowadays don’t have a “standing” poison pill in place, and they prefer to have one only for a specific reason like the above. For instance, if the “wolf

pack” leader purchases 5.1% silently and after another 3.9% more quickly in the 10-day window before it files. The same time, 6-10 hedge funds allies (all of whom will deny forming a group) purchase another 12-15% in the same period. All this situation produce a grand total of 21-24% of all the shares of other funds plus the leader. If the leader and its allies were formed as a ‘group’ two consequences would follow. First, they must to file a Schedule 13D at much earlier point and this it may be more costly to acquire additional stocks post-filing. As a result of this the same group would maybe have wound up holding a much lower aggregate amount than the 24% stake. Second, the response of the target to the Schedule 13D’s filing will often be to adopt a poison pill that prevent further acquisition of shares by every member of the group. In particular, the poison pill can be use a 10% ceiling (Del.Ch.Lexis 64, 2014). But if no group is formed, the only constraint imposed by such a poison pill adopted on the Schedule 13D’s filing will be to prevent the leader and other individuals stockholders from crossing the 10%. To conclude, the “wolf pack” technique forces activists to overcome the poison pill and get a larger stock position before the bidder finds out that they exist.

Brav et al. (2008) argue it is crucial to understand that the best time to appreciate the share price and select the best trading strategy by the “wolf pack” formation is just before the filing of Schedule 13D in the 10-day period permitted by Section 13D.

3. Methodology-Data on Hedge Fund Activism

The Securities and Exchange Commission (SEC), and in our case the Athens Exchange Market, pursuant to law 3556/2007, stipulate that it is mandatory for any individual or entity owning 5% or more of a public firm's stocks, to file a beneficial ownership report.

Any change in the data reported, either an increase or a decrease of the number of stocks held, or letters sent to the management etc., must be reported by the individual or entity, to the Athens Exchange Market, through the beneficial ownership report. This specific report is a major source of information regarding hedge fund activism, as it includes information about the identity of the filer(s), the filing date, background information, the number of stocks purchased, the percentage of stocks held by the filer(s) and most importantly, the purpose of the investment.

Since there is no central database for hedge fund activism, the only available source of information regarding these events is the report submitted to the Athens Exchange Market, which requires all investors who are the beneficial owners of over 5% of any class of publicly traded shares of a firm and have the intention of disclosing their ownership, to change the corporate governance within 10 days from exceeding the 5% threshold.

In our research, we hand collected all available information on hedge fund activism events from the website of the Athens Exchange Market for the period of 2008-2016. Pursuant to law 3556/2007, this information does not include the purpose of the transaction, as mentioned above, but is limited to the identity, the filing date, the ownership and any changes. As there is no information available on the type of the filer(s), we had to manually collect the respective data. It is difficult to distinguish the remaining filers, because there are private equity funds, venture capital funds, hedge funds, and non-fund investment advisors. For this reason, we had to look through the web, visiting the respective websites, in order to form an opinion about their "investment identity". In several cases, using the information found online, we managed to classify the remaining entities into hedge funds and non-hedge funds. The next step was to gather all these filings and collect the adjusted closing prices for

each case and the closing prices of the Athens Exchange Market through the use of Datastream.

Therefore, we calculated the daily returns during the event window [-20,+20] and the estimation period [-120 +21], using as a benchmark the date on which the change of the percentage share ownership was announced. The daily returns were calculated as follows:

$$Ret_{it} = \frac{RI_t - RI_{t-1}}{RI_{t-1}}$$

Where:

Ret_{it} =daily return at t

PI_t = the closing price at t

PI_{t-1} =the closing price at $t-1$

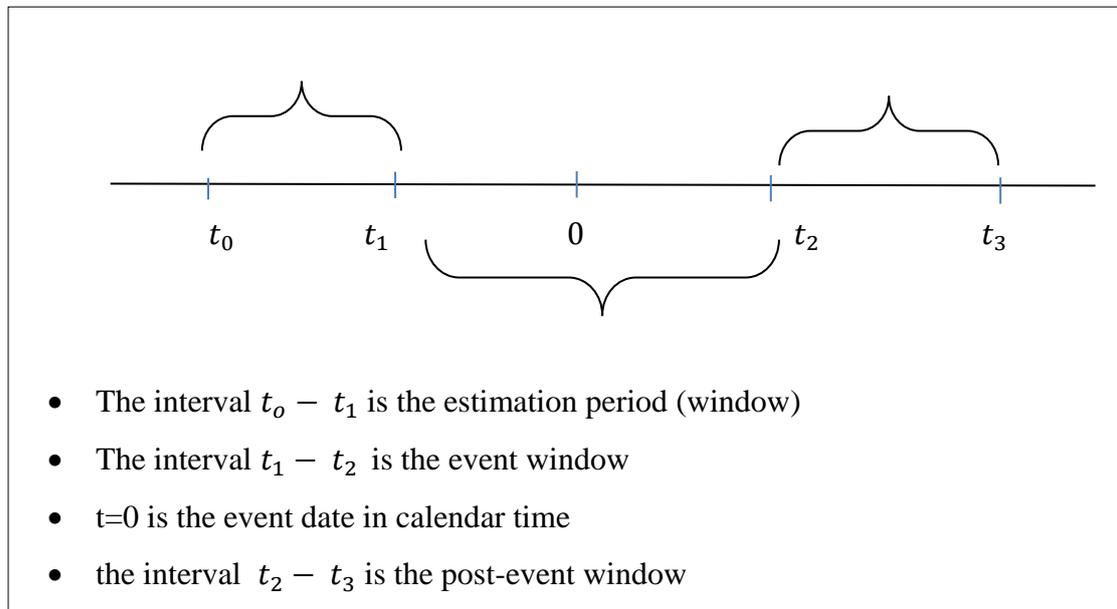
3.1. Event Study Analysis: Event Window and Estimation Period

An event study attempts to measure the valuation effects of a corporate event, such as a merger or acquisition or earnings announcement, by analyzing the response of the share price in the period around the announcement of the event (Fama et al., 1969). The methodology of event study analysis, has been implemented for two specific reasons: a) to test the null hypothesis that the market incorporates information efficiently and b) to examine the effect of specific events on the wealth of the companies' security holders, under the assumption of market efficiency, at least in respect of the information publicly available. This technique is mainly used in corporate finance (not economics).

Event study Timeline:

In this timeline, the researchers have managed to find two test periods.

The timeline for a typical event study is presented below:



The estimation and event windows should not overlap, since the estimation of normal returns cannot be influenced by unusual price effects that the event window is supposed to capture. In particular, the date of filing is called the event window and several studies examine if a target firm earns abnormal returns in the few days before and after the date of the event. However, the estimation period takes into consideration the impact of historical prices and returns in order to calculate the expected return.

3.2. Estimation of Expected Returns

There are several ways to calculate expected returns. Sometimes, the calculation is based on the use of historical data, before the event window, so that the event cannot affect the estimation of expected returns. In order to calculate the abnormal returns, we should first estimate the expected return in the aforementioned way. The next step is to apply the Market Adjusted Return Model in order to estimate abnormal returns.

3.3. Market Adjusted Return Model

Using the Market Adjusted Return Model, we calculate abnormal returns by subtracting the observed return on the Market Index (Athens Exchange Market) from the observed returns of the companies for day t .

$$A_{jt} = R_{jt} - R_{mt}$$

Where:

A_{jt} = the abnormal return j at t

R_{jt} = the daily return j at t

R_{mt} = the daily return of the market Index at t

3.4. Estimation of the Average Abnormal Return (AAR)

The next step is to calculate the average abnormal return for each day, for 20 days prior to the event date, with the “AVERAGE” function of Microsoft Excel.

$$AAR_t = \left(\sum_{j=1}^N A_{jt} \right) / N$$

Where:

AAR_t = the Average Abnormal Return at t

$\sum_{j=1}^N A_{jt}$ = the sum of the abnormal return for all events at t

N = the number of events outstanding

3.5. Estimation of the Cumulative Abnormal Return (CAR) & Cumulative Abnormal Return (CAAR)

Moreover, we calculate and examine the Cumulative Abnormal Returns (CAR) for five different event windows, (-1,+1), (-2,+2), (-5,+5), (-10,+10), (-20,+20), with the following equation:

$$CAR_{T_1, T_2} = \sum_{t=T_1}^{T_2} A_{jt}$$

Where:

CAR_{T_1, T_2} = the cumulative abnormal return for firm j at t

A_{jt} = the daily abnormal return adjusted to the number of days in each event window (N).

The above analysis is done by using the “SUM” function of Microsoft Excel.

Therefore, we examine the five different event windows and calculate the cumulative average abnormal returns with the below formula:

$$CAAR_{T_1, T_2} = \frac{1}{N} * \left(\sum_{j=1}^N \sum_{t=T_1}^{T_2} A_{jt} \right)$$

3.6. Cross-Sectional Standard Deviation Test

The next step is to calculate the standard deviation for each abnormal return, as estimated above, using the “STDEV” function of Microsoft Excel. Moreover, we perform the t-test in order to check the statistical significance of the average abnormal returns for each day, using the Cross-Sectional Standard Deviation Test.

$$\sigma_{AAR_t}^2 = \left(\frac{1}{N-1}\right) * \sum_{i=1}^N (A_{it} - \frac{1}{N} \sum_{j=1}^N A_{jt})$$

And

$$t = \frac{AAR_t}{\left(\frac{\sigma_{AAR_t}}{\sqrt{N}}\right)}$$

Where:

AAR_t = the average abnormal return the day t

σ_{AAR_t} = the standard deviation of abnormal return the day t

\sqrt{N} = the square root of the number of events

Then,

$$\sigma_{CAAR} = \sqrt{\frac{1}{N-1} \sum_{i=1}^N (CAR_{j,T_1,T_2} - \frac{1}{N} \sum_{j=1}^N CAR_{j,T_1,T_2})}$$

And

$$t_{CAAR} = \frac{CAAR_{T_1,T_2}}{\sigma_{CAAR_{T_1,T_2}} / \sqrt{N}}$$

Where:

$CAAR_{T_1,T_2}$ = the average cumulative abnormal return to event window T_1,T_2

$\sigma_{CAAR_{T_1,T_2}}$ = the standard deviation of the above return

3.7. Time-Series Standard Deviation Test

The last step is to check the statistical significance of the results in relation to the Time-Series standard deviation test, also called the “crude dependence adjustment” test (Brown & Warner, 1980). Unlike the standardized abnormal test examined above, this test uses a single variance to estimate the returns. This test does not take into consideration unequal return between securities. However, there is a drawback with this method, since it avoids the potential problem of cross-sectional correlation of securities returns. First, we calculate the average abnormal returns for the whole sample, starting at 120 days before the event and up to 20 days after the announcement (event window: [-120+20]).

Second, we use the “STDEV” function of Microsoft Excel to calculate the average abnormal return for the whole sample, for the 100 days before the event/announcement date similar to the previous method (since the equations/formulas used have minor differences). For the significance test (t-test), we check the event window [-20+20] which is our benchmark.

The estimated variance of AAR_t is:

$$\sigma_{AAR}^2 = \frac{\sum_{t=E_1}^{E_2} (AAR_t - \overline{AAR})^2}{M - 2}$$

Where:

$$M = E_2 - E_1 + 1$$

$$E_2 - E_1 = 100$$

$$\overline{AAR} = \frac{\sum_{t=E_1}^{E_2} AAR_t}{M}$$

For the t-statistic test:

$$t = \frac{AAR_t}{\sigma_{AAR}}$$

Where:

AAR_t = the average abnormal return at t

σ_{AAR} = the standard deviation of the abnormal return

To check the significance test of the cumulative average abnormal return, we use the below formula. This method produces similar results with the previous method used for the calculation of abnormal returns.

$$t_{CAAR} = \frac{CAAR_{t,T_1,T_2}}{\sqrt{t} * \sigma_{AAR}}$$

Where:

\sqrt{t} = the square root of the days of each event window

(For example for the event window (-10 +10) then $t=21$)

4. Results – Do hedge funds create value for shareholders?

This section presents the results of hedge fund activism, which produce statistically significant cumulative abnormal returns. The estimation period for these returns begins at 120 days before up to 20 days after the event date. Returns are calculated with the Market Adjusted Model while t-statistics are calculated using the adjusted standard deviation and are listed in parentheses. The symbols *, **, and *** denote statistical significance at the 0.10, 0.05, and 0.01 levels, respectively.

4.1. Short-horizon Results of Stock Returns

4.1.1. Number of hedge fund activist events

Table 1 below presents the number of hedge fund activist events during the period 2008-2016.

Table 1: Number of hedge fund activist events per year.

Year	Number of Events
2008	1 event by 1 different hedge fund
2009	2 events by 2 different hedge funds
2010	7 events by 6 different hedge funds
2011	11 events by 7 different hedge funds
2012	5 events by 4 different hedge funds
2013	5 events by 4 different hedge funds
2014	13 events by 8 different hedge funds
2015	11 events by 7 different hedge funds
2016	6 events by 4 different hedge funds

4.1.2. Average abnormal returns for the full sample

In this section, we calculate the average abnormal returns for the 61 activist events (for the full sample) and we check if these returns are statistically significant. Table 2 shows the average abnormal returns (AAR) for the event window (-20,+20) with standard deviation and statistical significance. There are some returns which are

statistically significant, whereas others are statistically insignificant. For the purpose of this paper, we mainly focus on the statistically significant abnormal returns.

Table 2: Average abnormal returns (AAR)

Time	AARt	σ AARt	t-statistic (Cross sectional)	t-statistic (Time-Series)
-20	0.42%	0.03862	0.85	1.07
-19	-0.12%	0.03118	-0.30	-0.30
-18	0.63%	0.02777	1.77*	1.60*
-17	0.09%	0.02264	0.30	0.22
-16	-0.97%	0.03397	-2.22**	-2.46***
-15	-0.23%	0.02558	-0.69	-0.57
-14	0.25%	0.02396	0.83	0.65
-13	-0.05%	0.02802	-0.15	-0.14
-12	0.26%	0.02728	0.74	0.66
-11	0.03%	0.03309	0.08	0.09
-10	-0.30%	0.03093	-0.77	-0.77
-9	0.47%	0.02554	1.44	1.20
-8	0.09%	0.02156	0.31	0.22
-7	0.00%	0.03564	0.00	0.00
-6	0.73%	0.03622	1.57	1.85*
-5	-0.28%	0.03515	-0.62	-0.71
-4	-0.74%	0.03100	-1.88*	-1.89*
-3	-0.72%	0.03592	-1.56	-1.83*
-2	0.02%	0.02385	0.06	0.05
-1	0.20%	0.03312	0.47	0.50
0	0.05%	0.03341	0.12	0.13
1	0.49%	0.02922	1.32	1.25
2	0.75%	0.04056	1.44	1.90*
3	0.20%	0.03114	0.50	0.51
4	0.46%	0.02846	1.26	1.16
5	0.42%	0.03190	1.04	1.08
6	-0.18%	0.03155	-0.46	-0.47
7	0.20%	0.03297	0.48	0.51
8	0.24%	0.03745	0.50	0.60
9	0.27%	0.02430	0.86	0.68
10	0.49%	0.02664	1.44	1.25
11	-0.40%	0.03074	-1.02	-1.02
12	0.33%	0.02730	0.95	0.84
13	0.04%	0.02640	0.11	0.10
14	0.05%	0.02896	0.14	0.13
15	-0.20%	0.02537	-0.61	-0.50
16	-0.21%	0.03910	-0.43	-0.55
17	0.34%	0.02444	1.10	0.88
18	0.25%	0.02644	0.75	0.64
19	0.33%	0.02652	0.96	0.83
20	0.39%	0.02973	1.02	0.98

The symbols *, **, and *** denote statistical significance at the 0.10, 0.05 and 0.01 levels respectively.

First of all, we see that the average abnormal return is 0.63% on day -18 (18th day before the event date), which is 95% statistically significant with the t-statistic cross sectional test and 90% statistically significant with the time series t-statistic test. Furthermore, day 16 has an abnormal return of -0.97% which is 95% and 99% statistically significant in the respective tests. Also, on day -9 the abnormal return is 0.47% and is 90% statistically significant. The last case in the event window (-20,+0) is the 4th day before the filing date, with an average abnormal return of -0.74% which is 95% statistically significant.

In the event window (0,+20) we have two cases where the average abnormal returns are statistically significant, on the 2nd day after the event date with 95% statistical significance with t-statistic cross section test and 90% with the time series (0.75%) and also on the 10th day after the filing date with an abnormal return of 0.49% and 90% statistical significance.

Several studies have found that the firms targeted by hedge funds, on average, gain abnormal returns within the event window; there are however differences in the distribution of these returns (Brav et al., 2008). A high percentage of firms earned negative abnormal returns. Many activists invest in multiple companies concurrently, with the goal of gaining larger performance fees if their target companies gain substantial returns. Companies cannot diversify their investments as they can only invest in themselves. So, the probability of negative returns may lead a Board of Directors to reject a strategy favored by a group of hedge funds.

Figure 1 shows the cumulative abnormal returns of target stocks subjected to hedge fund activism within the event window (-20,+20).

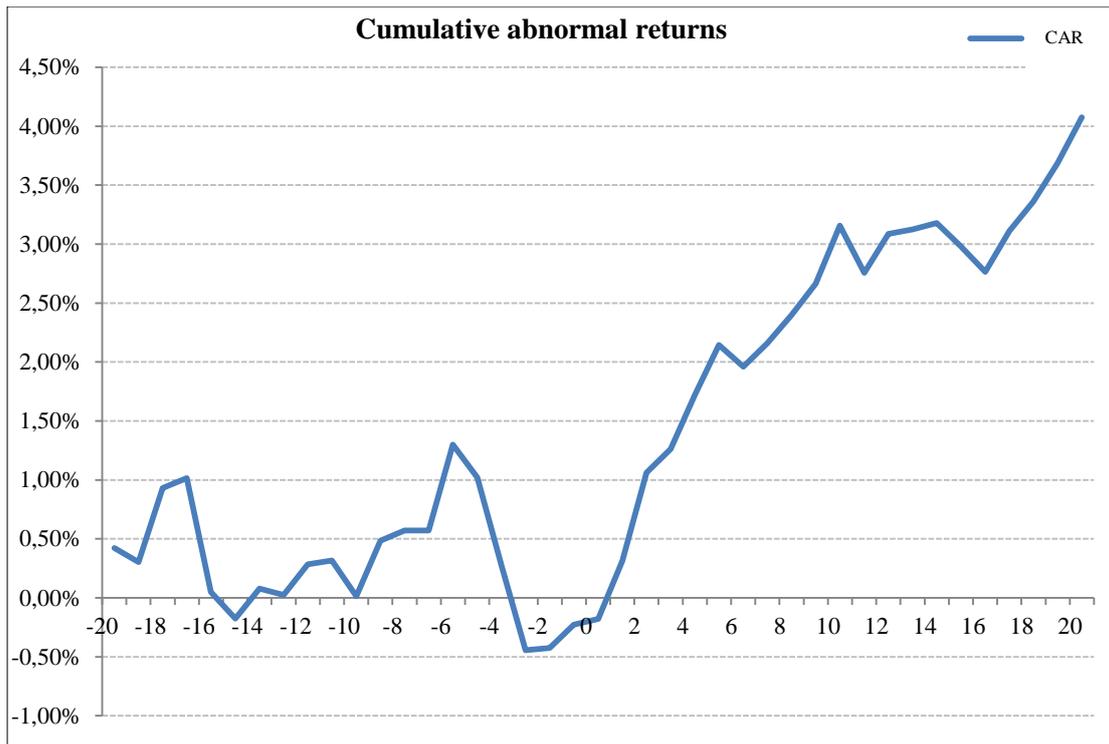


Figure 1: Cumulative abnormal returns of target stocks.

This figure plots the excess returns 20 days prior up to 20 days after the announcement date. There is a run-up of about 3% in between day 10 and day 2 prior to the filing. These returns continue to increase and there is an overall 4% in 20 days with minor fluctuations. Several hedge funds prefer to make public announcements before the official announcement date, whereas other hedge funds launch aggressive activism only after the filing date. In these cases, the filing date could not be an accurate proxy for the event date when activism becomes first publicly known.

There are two different explanations for the abnormal stock turnover in the days before the event date. The first is the “wolf pack tactic” through which some hedge funds, who do not cooperate formally, buy stocks of the target company. The second explanation is called “tipping”; in this case, the filing hedge fund reveals its intention to a specific number of selected investors, before the public filing, in exchange for favors and reciprocation.

4.1.3. Average cumulative abnormal return

Table 3 presents the cumulative average abnormal returns in eight different event windows, including statistical significance and standard deviation results. In the event window (-1,+1) there is a CAAR of 0.74% which is not statistically significant both in the cross-sectional and the time-series standard deviation tests. In the event window (-2,+2) there is a positive cumulative abnormal return of 1.50% which is 90% statistically significant with the cross-sectional standard deviation test and 95% statistically significant with the time-series standard deviation test. However, in the event window (-5,+5) there is a CAAR of 0.85% which is not statistically significant in both t-statistic tests. The other two event windows (-10,+10) and (-20,+20) have positive abnormal returns of 2.84% and 4.08% respectively, with 90% statistical significance.

Table 3: Cumulative abnormal return in different event windows.

Event Period	CAAR	σ	t-statistic (Cross Sectional)	t-statistic (Time-Series)
(-1,+1)	0.74%	0.063	0.92	1.09
(-2,+2)	1.50%	0.079	1.48	1.71*
(-5,+5)	0.85%	0.096	0.69	0.65
(-10,+10)	2.84%	0.136	1.62	1.58
(-20,+20)	4.08%	0.217	1.46	1.62
(+2,+6)	1.64%	0.059	2.17**	1.87*
(+1,+7)	2.34%	0.066	2.77***	2.25**
(+2,+7)	1.85%	0.061	2.37**	1.92*

The symbols *, **, and *** denote statistical significance at the 0.10, 0.05 and 0.01 levels respectively.

The last three announcement windows (+2,+6), (+1,+7), and (+2,+7) show a higher statistical significance of 95% and 99%. It is crucial to identify specific event windows in which the cumulative abnormal returns have a higher statistical significance. In our survey, the most suitable announcement window is the (+1,+7) which shows a 99% statistically significant CAAR of 2.34%.

4.2. Descriptive Statistics

In this section, we present the major characteristics of the firms targeted by hedge funds in Greece between 2008 and 2016, identified with the use of specific variables/parameters. The parameters examined for each characteristic include the min (MIN), max (MAX), standard deviation (STDEV), median, and average.

The results for the standard deviation and the MIN/MAX are controversial since the numbers are extremely high. This may be due to the economic crisis of 2008-2016 and to the fluctuations noted in 2013-2015. The Greek economy suffered many unpredictable and extreme events, including recession, high unemployment, and generally high volatility in the macro and micro “fundamentals”. This is the reason for these “strange” results in the above variables, which have more of a qualitative than quantitative meaning.

The above parameters are used to identify the characteristics of target companies, as presented in table 4. All the characteristics-variables are drawn by the Thomson Reuters DataStream recorded at the year-end before targeting. These characteristics are:

- ROA (Return on Assets): defined as $\text{Operating Income}/\text{Total Assets}$.
- LN(MV): the logarithm of market capitalization in million dollars.
- FREE CASH FLOW PER SHARE: cash flow defined as net income depreciation.
- DIVYLD: dividend yield, defined as $\text{common dividend}/\text{market value of common stocks}$.
- ROE (Return on Equity): $\text{net income before Extraordinary Items and Preferred Dividends}/\text{Common Equity}$.
- LEV (Total Debt/Total Assets): is the book leverage ratio defined as $\text{debt}/(\text{debt}+\text{book value of equity})$.
- GROWTH: the growth rate of sales in the previous year.
- BOOK TO MARKET: the $\text{common equity}/\text{market capitalization}$.
- LN(LTD): the logarithm of long term debt.
- DIV PAYOUT P/S: dividend payout per share.
- TOBINS Q: defined as $(\text{market value of equity} + \text{value of preferred shares} + \text{book value of debt})/\text{book value of total assets}$.

Table 4: Characteristics of target companies in the year before being targeted.

	MIN	MAX	STDEV	Median	Average
ROA	-9.67	42.52	9.00	4.10	5.94
LN(MV)	2.36	8.95	1.48	6.18	6.35
FREE CASH FLOW PER SHARE	-1.85	12.74	3.27	0.12	1.31
DIVYIELD	0.00	22.85	4.68	0.14	2.60
ROE	-37.54	98.14	26.53	7.72	9.16
LEVERAGE	0.00	86.63	25.40	41.34	41.17
LN(LTD)	0.00	15.17	5.08	12.37	10.53
GROWTH	-51.57	149.92	28.21	-0.23	3.09
DIV PAY OUT P/S	0.00	92.28	24.65	1.95	20.65
BOOK/MARKET VALUE	0.12	20.00	4.11	0.93	2.35
TOBIN'S Q	0.67	2.58	0.44	0.98	1.11

Table 5 below, shows the autocorrelations of the above variables during the period 2008-2016 which help us identify the factors/characteristics of hedge fund activism in the target firms. The results below show that there are some strong correlations between the variables.

Table 5: Correlation matrix.

	ROA	LN(MV)	FREE CASH FLOW PER SHARE	DIVYIELD	ROE	LEVERAGE	LN (LTD)	GROWTH	DIV PAY OUT P/S	BOOK TO MARKET	TOBIN'S Q
ROA	1										
LN(MV)	0.252	1									
FREE CASH FLOW PER SHARE	-0.160	0.267	1								
DIVYIELD	0.750	0.094	-0.132	1							
ROE	0.494	0.116	0.036	0.319	1						
LEVERAGE	-0.513	0.243	0.338	-0.361	-0.285	1					
LN(LTD)	-0.139	0.323	0.176	-0.092	0.178	0.672	1				
GROWTH	0.130	0.001	-0.033	-0.123	0.210	-0.073	0.005	1			
DIV PAY OUT P/S	0.386	0.029	-0.206	0.322	0.223	-0.606	-0.474	-0.082	1		
BOOK TO MARKET	-0.301	-0.385	0.275	-0.159	0.045	0.260	0.078	-0.254	-0.312	1	
TOBIN'S Q	0.596	0.089	-0.068	0.356	0.256	-0.480	-0.447	0.299	0.378	-0.267	1

For instance, there is a strong correlation of 0.672 between the LN(LTD) and LEVERAGE variables. Moreover, the ROA variable is autocorrelated with the DIVYIELD, ROE, LEVERAGE, TOBIN'S Q and especially with the DIVYIELD variable. Moreover, there is a negative autocorrelation of -0.606 between the LEVERAGE and DIV PAY OUT P/S variables.

4.3. Cross-Sectional Results

4.3.1. Univariate tests

In this section we focus on the univariate analysis of abnormal returns for target firms in the most statistically significant event window (+1,+6). The dependent variable in our model is the CAAR in the event window (+1,+6), as follows:

$$CARR = a + b * Char + e$$

Where:

a = the constant

b = the coefficient

$Char$ = each characteristic-variable

e = residuals

Table 6: Univariate Regression Results.

	Dependent Variable: Cumulative Average Abnormal Return (+1,+6)				
	Intercept a	t-stat	Slope b	(t-stat)	R²
ROA	0.0222	(0.81)	0.00019	(0.19)	0.000707204
FREE CASH FLOW PER SHARE	0.0295	(-4.05***)	-0.00063	(-3.25***)	0.152314751
DIVYIELD	0.0250	(-1.29)	-0.00065	(-0.35)	0.002157013
ROE	0.0228	(1.64*)	0.00098	(-0.45)	0.003495518
LEVERAGE	0.0264	(0.92)	0.000000	(-0.18)	0.000597179
GROWTH	0.0249	(-2.42***)	-0.00074	(-0.71)	0.009252868
DIV PAY OUT P/S	0.0283	(-2.04**)	-0.00023	(-0.67)	0.007557506
BOOK/MARKET VALUE	0.0248	(0.30)	-0.00060	(-0.12)	0.001440627
LN(MV)	0.0457	(2.05**)	-0.00353	(-0.61)	0.006325932
LN(LTD)	0.0184	(0.93)	0.000467	(0.27)	0.001291592
TOBIN'S Q	0.0264	(1.13)	-0.0028	(-0.14)	0.000343242

The symbols *, **, and *** denote statistical significance at the 0.10, 0.05 and 0.01 levels respectively.

Table 6 provides significant results about the characteristics of hedge fund activism. The regressions for each variable indicate that there are certain major factors for the target firms and this evidence is consistent with the literature. The most significant factor is the “FREE CASH FLOW PER SHARE” (t-stat= -4.05) with 99% statistical significance, intercept of 0.0295 and slope -0.00063. Furthermore, another statistically significant factor is “GROWTH” with (t-stat= -2.42) and 99% statistical significance, with a slope of -0.00074. This small decrease in the slope indicates that hedge funds tend to target “value” firms and not firms with high growth rates.

The “DIV PAYOUT P/S” variable has an intercept of 0.028 which is 95% statistically significant, whereas the slope is not statistically significant. The next variable, “ROE”, is statistically significant at 90%, with an intercept of 0.022 and a slope of 0.00098 which are not statistically significant. The “LN(MV)” variable is an equally important factor with 95% statistical significance (t-stat=2.05). The remaining variables, namely “LN(LTD)”, “ROA”, “BOOK/MARKET VALUE”, “TOBINS’Q”, “LEVERAGE” and “DIVYIELD” are not statistically significant.

These are the specific characteristics of the target firms in which hedge funds earn positive abnormal returns. However, these regression models have some drawbacks, such as the low R-adjusted for all the variables examined, and consequently the

results may not accurately measure these specific factors for target companies. Another drawback is that in most cases the intercepts are not statistically significant, with the exception of the “FREE CASH FLOW PER SHARE” variable. This is the reason why we believe that multivariate results provide stronger and more qualitative evidence on these characteristics.

4.3.2. Multivariate tests

In this section, our aim was to regress the cumulative average abnormal return in relation to all the variables simultaneously. For this reason, in the regression we used the CAAR in the event window (+1,+6) as the dependent variable, for all 61 hedge fund activism events since it is the most statistically significant window for the cumulative abnormal returns. So the multivariate tests were conducted without taking into account the “LEVERAGE” variable due to the problem of multicollinearity, and only the “LN(LTD)” variable was used. The results of this regression are reflected in table 7 below.

Table 7: Multivariate regression results.

Variable	Coefficient	t-stat	
ROA	0.0008	(0.56)	No. of obs 61
FREE CASH FLOW PER SHARE	-0.0005	(-3.64***)	R-Squared
DIVYIELD	-0.0029	(-1.23)	0.336784
ROE	0.0003	(1.45*)	
GROWTH	-0.0007	(-2.32**)	Akaike Info Criterion
DIV PAY OUT	-0.0008	(-2.24**)	-2.777443
BOOK/MARKET VALUE	0.0009	(0.38)	
LN(MV)	0.0161	(2.36**)	
LN(LTD)	-0.0018	(-0.94)	
TOBIN'S Q	0.0001	(0.84)	

The symbols *, **, and *** denote statistical significance at the 0.10, 0.05 and 0.01 levels respectively.

The model is shown as follows:

$$\begin{aligned}
 CAAR = & \gamma_0 * \frac{BOOK}{MARKET} VALUE + \gamma_1 * DIVPAYOUT + \gamma_2 * DIVYIELD + \\
 & \gamma_3 * FREE CASH FLOW PER SHARE + \gamma_4 * GROWTH + \gamma_5 * LN(LTD) + \gamma_6 \\
 & * LN(MV) \\
 & + \gamma_7 * ROA + \gamma_8 * ROE + \varepsilon_t
 \end{aligned}$$

The results from this regression are equally important. First of all, the most crucial variable for hedge funds to target a firm is the “FREE CASH FLOW PER SHARE”, which is 99% statistically significant with (t-stat=-3.64). Next is the “GROWTH” variable, which is 95% statistically significant with (t-stat=-2.32). Moreover, another major characteristic of target firms is the “DIV PAY OUT” variable which is 95% statistically significant with (t-stat=-2.24). The “LN(MV)” variable is also 95% statistically significant with (t-stat=2.36). The last variable is “ROE” which is 90% statistically significant with (t-stat=1.45). All these variables represent some of the factors that hedge funds seek in order to obtain abnormal returns from target companies. These results are consistent with evidence provided by other researchers, such as Greenwood & Schor (2009) who also found some of these parameters to be statistically significant in hedge fund activism.

But there are also variables which do not seem to play an important role for hedge funds to target companies. These are the not statistically significant variables “ROA”, “DIVYIELD”, “BOOK/MARKET VALUE”, “LN(LTD)”, and “TOBINS’Q”. However, the lack of statistical significance is in contrast with the evidence provided by Brav et al. (2008) who reported that “ROA” and “BOOK/MARKET VALUE” variables are statistically significant for the US hedge funds to identify suitable target firms.

4.3.3. Model with dummy variable

In this analysis we tried to apply changes in the multivariate tests, in an effort to produce more robust results. It was crucial not to include highly correlated variables, such as “ROA”, “ROE”, and “DIVYIELD”. For the same reason, we replaced the “LN(LTD)” variable with the “LEVERAGE” variable. The new independent variable used in this analysis is the “Dummy of previous presence” which was equal to 1 if the hedge fund had previous presence in the target firm and 0 if there was no previous presence. The dependent variable used was the CAAR (+1,+6).

The results of this regression analysis are presented in table 8 below.

Table 8: Dummy regression.

	Coefficient	t-statistic	
C	-0.0691	-1.54	
Dummy (of previous presence)	0.0177	1.05	Adjusted R squared
FREE CASH FLOW PER SHARE	-0.0006	-3.07***	0.223256
LEVERAGE	0.0005	0.91	Akaike Info Criterion
GROWTH	-0.0005	-1.27	-2.745539
DIV PAY OUT P/S	-0.0007	-1.99**	
BOOK/MARKET VALUE	0.0020	0.84	
LN(MV)	0.0137	2.13**	
TOBIN'S Q	0.0120	0.48	

The symbols *, **, and *** denote statistical significance at the 0.10, 0.05 and 0.01 levels respectively.

The model is shown as follows:

$$CAAR = c + \alpha_1 * Dummy + \alpha_2 * FREE\ CASH\ FLOW\ PER\ SHARE + \alpha_3 * LEV + \alpha_4 * GROWTH + \alpha_5 * DIVPAYOUT + \alpha_6 * \frac{BOOK}{MARKET} VALUE + \alpha_7 * LN(MV) + \varepsilon_t$$

Based on this regression, we see that the “Dummy variable of previous presence” is not statistically significant for obtaining cumulative abnormal returns, with (t-stat=0.845). Hence, the previous presence of a hedge fund in the target company is

not a significant factor. Furthermore, another two characteristics which are not statistically significant are the “TOBIN’S Q” and “GROWTH” variables with (t-stat=0.48) and (t-stat=-1.27*) respectively. The last two variables which do not affect the decisions of hedge funds for target firms are the “LEVERAGE” and the “BOOK/MARKET VALUE” variables which are not statistically significant with (t-stat=0.91) and (t-stat=0.84) respectively.

Overall, in all the above regressions, the factor with the strongest statistical significance (99%) is “FREE CASH FLOW PER SHARE” with (t-stat=-3.07). Moreover, the “DIV PAYOUT P/S” variable is 95% statistically significant with (t-stat=-1.99). The last variable, “LN(MV)”, is crucial because it reflects the firm’s value, and is 95% statistically significant with (t-stat=2.13).

In conclusion, this model with the dummy variable has a low R-squared, indicating that there may be additional characteristics which influence the cumulative abnormal returns of hedge fund activism in the Greek market.

4.4. Probit Analysis of Hedge Fund Targeting

What are the characteristics of the firms targeted by activist hedge funds? This analysis employs Probit regressions to predict the targeting of hedge funds. This regression examines all the events from 2008 to 2016 in conjunction with the most significant factors described above. The dependent variable employed is the “dummy variable of previous presence” which was equal to 1 if the hedge fund had previous presence in the target firm and 0 if there was no previous presence, while the independent variables used were identical to the previous analysis.

Table 9: Probit analysis.

	Coefficient	z-statistic
FREE CASH FLOW PER SHARE	-0.0530	-3.31***
DIVYIELD	-0.0471	-2.06**
GROWTH	-0.0050	-1.13
DIV PAY OUT P/S	0.0323	1.69*
BOOK/MARKET VALUE	0.0182	0.87
LN(LTD)	-0.0049	-0.93
LN(MV)	-0.1461	-1.76*
ROA	-0.0209	-1.06
ROE	-0.0163	-1.36
TOBIN'S Q	0.0264	1.13

The symbols *, **, and *** denote statistical significance at the 0.10, 0.05 and 0.01 levels respectively.

The model is shown as follows:

$$\begin{aligned}
 & \text{DUMMY OF PREVIOUS PRESENCE} \\
 & = \alpha_1 * \frac{\text{BOOK}}{\text{MARKET}} \text{ VALUE} + \alpha_2 * \text{DIV PAYOUT PS} + \alpha_3 * \text{GROWTH} \\
 & + \alpha_4 * \text{LN(LTD)} + \alpha_5 * \text{LN(MV)} + \alpha_6 * \text{ROA} + \alpha_7 * \text{ROE} + \varepsilon_t
 \end{aligned}$$

This regression analysis showed that the variables of “GROWTH”, “BOOK/MARKET VALUE”, “LN(LTD)”, “ROA”, “ROE”, and “TOBIN’S Q” were not statistically significant, with low t-statistic results, whereas the coefficients are notably.

The new factor included in this regression, which is 95% statistically significant is the “DIVYIELD” variable with (t-stat=-2.06) and coefficient=-0.047. This variable, and especially its coefficient, indicates that hedge funds target firms with low dividend yield, a factor which might not be in the best interest of shareholders.

The characteristic of “FREE CASH FLOW PER SHARE” is of paramount importance in the Greek market, since it is statistically significant in all regressions

performed. In this regression, it was found to be 99% statistically significant with (t-stat=-3.31).

Another major characteristic of target firms is the “LN(MV)” which is 90% statistically significant. The coefficient of -0.146 indicates that hedge funds prefer to target small but “value” firms, even though they are profitable and enjoy handsome cash flows.

These characteristics make it easier for hedge funds to quickly acquire a significant stake. The reason why hedge funds do not target large companies is that there are high costs involved in acquiring a significant stake in large-cap firms and thus, they avoid targeting this type of companies.

5. Conclusion

The aim of this paper was to examine hedge fund activism in Greece, using a sample of activist events during the time period of 2008 through 2016. Hedge fund activism is a new phenomenon, which has grown exponentially in the last decade and is now widespread across the world.

In this paper we analyzed the tactics, the choices and the objectives of activist hedge funds and examined the relationship between various factors and the performance of target firms. We also examined how value is created in the target firm, to the benefit of shareholders and hedge fund investors operating in the Greek market. We found that the increased value depends on the positive cumulative abnormal returns noted around the announcement of the hedge fund's intervention.

The most statistically significant window is the (+1,+6) with a positive abnormal return of 2.34%. This finding shows that hedge fund activism is successful in achieving the goal of creating value for the target firm's shareholders. The market reaction to these events is positive and the company's performance improves due to major shifts in the CEO pay/turnover or payout policy. Generally, the influence of hedge funds' interventions on capital structure decisions, corporate governance, and other operational aspects, certainly leads to improvements within the target firm.

In the Greek market, the firms targeted by hedge fund activism have specific characteristics. Hedge funds focus on the firm's return on assets and return on equity and prefer to target companies with sound operating cash flows and high market value. These are the basic characteristics that activist hedge funds seek in identifying target companies in Greece. Based on the available data that we collected from the Athens Exchange Market, these companies have low growth rates, return on assets and dividend payout ratios, as well as significant return on equity.

The results of hedge fund activism are not only short-term; there are also longer term benefits for as long as three years after the announcement of the hedge fund's intervention. In the Greek market, hedge fund activists remain in the target companies for at least one year from the announcement date, in contrast with other studies showing that hedge funds remain in the target firms for a longer period of 4-5 years. Financial analysts call the Greek market a "hit-and-run-market" due to the

short term investment opportunities that hedge funds might obtain value for shareholders; this is also the reason why hedge funds are called “short term predators” instead of rational investors. This statement is indisputably supported by the statistically significant cumulative average abnormal returns noted for the target companies of the Athens Exchange Market, from 2008 through 2016. However, the majority of US studies indicate that the investment horizon of hedge funds is not as short as critics of hedge fund activism claim. In other countries, there are mixed results reported, probably because there are no reliable data available.

Finally, some predict that hedge fund activism will not have equal abnormal returns in the next decades, as the returns will decline or even disappear because too many activists will eventually focus on fewer attractive targets. There is also the major risk of a “hedge fund bubble” because a huge number of activist hedge funds will be targeting a diminishing number of firms which have overinvested. The most efficient solution to this problem is for regulators to impose greater transparency requirements before problems in the stock market arise. No one denies that hedge fund activism may still be a staple of corporate governance, but with a lower profitability equilibrium.

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