

Hedge Fund Activism and Shareholder Dispersion

By

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Hedge Fund Activism and Shareholder Dispersion

1. Introduction

Over the last 40 years, shareholder activism has been an important strategy that allows hedge fund managers to influence the management of their portfolio companies using relatively small equity positions. Often, the targets of activism have “sound operating cash flows and return on assets,” but have management, capital structure, corporate governance, or strategy problems that have depressed the company’s stock price.¹ In the midst of these obstacles, a profitable business can look like a rough investment without the management making significant changes. This is where the activists come in.

Activists start by buying an equity stake in the target company. Then, by making their demands public, activists amplify the potential voting power of their shares by encouraging other shareholders to send in proxy votes to support the activist proposal. While these sorts of “proxy fights” do sometimes happen at annual meetings, more often than not, the mere threat of a proxy vote can pressure a company into making the desired changes.² Because this strategy allows funds to boost returns through greater control, activism has become increasingly popular in recent years, with more than 2600 cases of activism recorded from 1994 - 2011. Despite this trend, much of the commentary on the outcomes of activism is anecdotal. Because of the difficulty in defining activist success and precisely determining the objectives of activists, “even the most basic questions about hedge fund activism remain unanswered: Which firms do activists target and how

¹ Alon Brav, Wei Jiang, Frank Partnoy, and Randall Thomas, “Hedge Fund Activism, Corporate Governance, and Firm Performance” (The Journal of Finance 2008), 1730.

² April Klein and Emanuel Zur, “Hedge Fund Activism” (New York University Stern School of Business October, 2006), 2.

do those targets respond?”³ This paper engages with the latter question and empirically examines which conditions tend to exist in cases where activists can successfully achieve their objectives. Because activism relies on support from other shareholders for proxy votes, this paper focuses on stock ownership factors that may drive a win or a loss in a given intervention. Two ownership factors were seen as potentially critical to success: the dispersion of stock ownership across major investors and the size of the activist’s equity position relative to other major investors. Specifically, this paper will argue that:

H1: With companies with more dispersed stock ownership among their top institutional investors, an activist hedge fund will be less likely to achieve its objectives

H2: With companies where an activist hedge fund has a larger relative ownership stake, the activist fund will be more likely to achieve its objectives

This paper is organized as follows: section 2 summarizes the current literature surrounding hedge fund activism. Section 3 outlines the role other shareholders play in the activist process. Section 4 explains the data, how it was collected, and the methodology. Section 5 shows the results and the associated regressions. Section 6 presents the conclusion of this paper.

2. Literature Surrounding Hedge Fund Activism

The emergence of hedge fund activism

While hedge fund activism has seen an acute rise in the last two decades, it has been noted by several scholars that shareholder activism itself dates back to the

³ Alon Brav, Wei Jiang, Frank Partnoy, and Randall Thomas, “Hedge Fund Activism, Corporate Governance, and Firm Performance” (The Journal of Finance 2008), 1730.

1980s.⁴ However, the early iterations of shareholder activism were defined by a collective action problem. For institutional shareholders at annual meetings, “the act of voting, and becoming informed enough to vote intelligently, requires an investment of time,” but payoffs of voting were low because one shareholder rarely could affect a proposal alone.⁵ Mutual funds could try to rally other investors using activism, but rallying investors is costly and would require substantial payoffs to make the strategy worth it. Hedge funds are willing to front the costs of activism because they can concentrate large holdings in the target company to achieve substantial payoffs from activism. However, mutual funds and other regulated asset managers must “satisfy the diversification requirements of the Investment Company Act,” which bans concentrated positions in one company.⁶ Without the ability to legally hold concentrated positions and the capacity to legally fund these positions with leverage, non-hedge fund investors rarely had the incentive to engage in activism.

Compounding these incentives, hedge funds also maintain lockup periods for the funds they manage giving them the necessary time to undertake activist measures to influence a business’ management.⁷ Activism as a strategy can take significant time to work effectively because the fund must both pressure the target company to make changes and wait for these changes to fully realize in the target company’s earnings. Research by Alon Brav found that long term changes in factors like plant productivity and return on assets continue for as many as 3 years following the initial activist

⁴ Roberta Romano, “Less is More: Making Institutional Investor Activism A Valuable Mechanism of Corporate Governance” (Yale Faculty Scholarship Series 2001), 176.

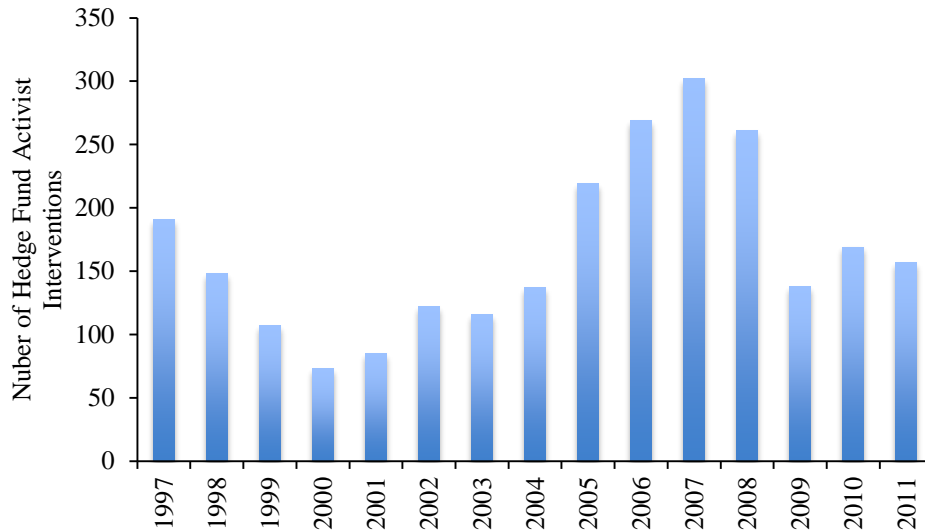
⁵ Bernard Black, “Shareholder Passivity Reexamined” (Michigan Law Review 1990), 527.

⁶ Marcel Kahan and Edward Rock, “Hedge Funds in Corporate Governance and Corporate Control” (University of Pennsylvania 2006), 1049.

⁷ Alon Brav, Wei Jiang, and Hyunseob Kim, “Chapter 7 Hedge Fund Activism” (2012), 2.

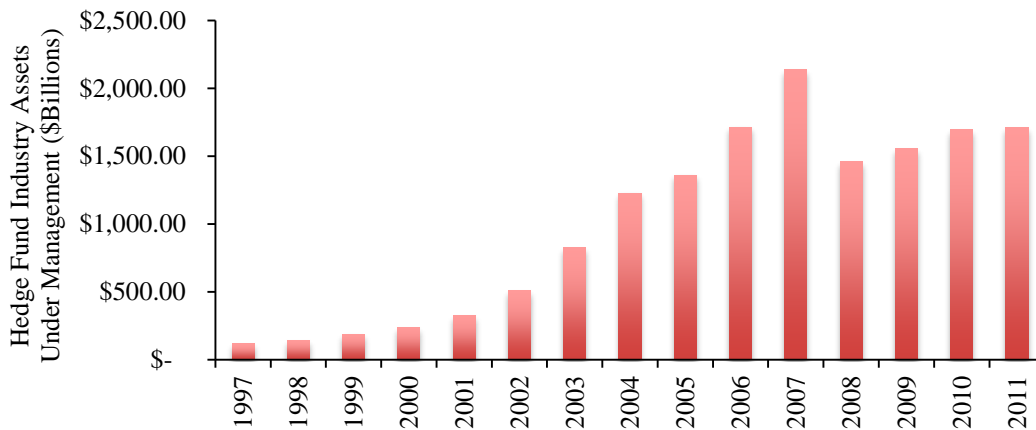
investment.⁸ Since mutual funds are legally required to be liquid for their investors, before the emergence of the hedge fund industry it would be difficult for an activist to maintain influence over a company for this extended period of time.

Figure 1: Annual Number of Hedge Fund Activist 13D Filings



Source: Dataset from Alon Brav

Figure 2: Annual Growth in Hedge Fund Industry Assets Under Management



Source: Dataset from Barclay Hedge⁹

Consequently, hedge funds are uniquely suited for activist strategies relative to other types of investors. As hedge fund assets under management have grown over the

⁸ Alon Brav, Wei Jiang, and Hyunseob Kim, “Hedge Fund Activism Updated tables and figures” (2013), 14-16.

⁹ Barclay Hedge, “Hedge Fund Industry AUM” (2015).

last two decades, so too has the frequency of activist interventions. In figure 1 and 2, we can see that the growth in hedge fund activism closely follows the growth of the hedge fund industry more generally.

The process of hedge fund activism

When a hedge fund takes a 5% or more equity position in a company, the SEC requires that the fund file a 13D, which discloses the position as well as the purpose of transaction. Sometimes, the fund is only buying a company for investment purposes, but in activist cases, the fund is usually looking to: change corporate governance, gain representation on the board of directors, push for a buyback or dividend, change the capital structure, replace the CEO, or even sell the company.

Figure 3: Hedge Fund Activist Objectives in a Sample of 2624 Interventions

Panel A: Summary of Hedge Funds' Stated Objectives				
	Full Sample Statistics		Subsample Statistics	
	Number of Events	% of Sample	% initially Hostile	% Ex-post Hostile
General undervaluation	1562	59.5	NaN	NaN
Capital structure	332	12.7	20.5	45.5
Business strategy	468	17.8	26.3	62.6
Sale of target company	398	15.2	22.6	56.5
Governance	813	31	24.1	59

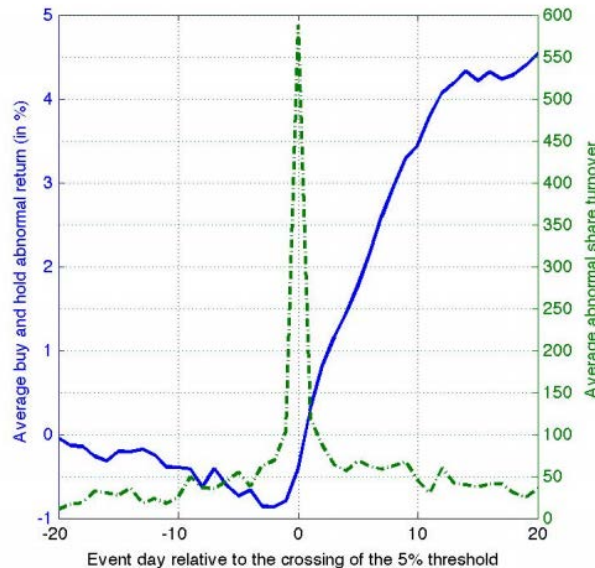
Source: Alon Brav, Wei Jiang, and Hyunseob Kim¹⁰

These 13Ds serve as a vehicle for activists to express their discontent and demands. Many activists use these filings to convey their initial demand for change, sometimes graphically. For example, in Chap Cap Partners' 13D for a stake in Vitesse Semiconductor, the fund demanded replacement of "Three Stooges" on the board of directors for their support of management that "dwelled far too long in the abyss of

¹⁰ These results are based on a sample (1994-2011) using the same data collection procedure and estimation methods as in Brav, Jiang, Partnoy, and Thomas (2008) and Brav, Jiang, and Kim (2010). For more information please see https://faculty.fuqua.duke.edu/~brav/HFactivism_SEPTEMBER_2013.pdf.

confident incompetence.”¹¹ Writing in these 13Ds can be direct or vague depending on the tactics of the activist involved and how much pressure the fund wants to put on the target company.

Figure 4: Abnormal Price Return and Trading Volume Following an Activist Intervention



Source: Brav, Jiang, and Kim¹²

There is also academic consensus on the capacity of activists to achieve success in their objectives. Different samples generate activist win rates between 60% and 75% depending on the objectives.^{13 14} However, regardless of the success or failure, it has also been documented that share price of the target company tends to abnormally appreciate 4-5% 20 days following the intervention as seen in figure 4.¹⁵ A similar increase occurs in trading volume during this period.

¹¹ Robert Chapman, “13D Filing Vitesse Semiconductor Corporation” (Securities Exchange Commission June 27, 2006), Exhibit B.

¹² These results are based on a sample (1994-2011) using the same data collection procedure and estimation methods as in Brav, Jiang, Partnoy, and Thomas (2008) and Brav, Jiang, and Kim (2010). For more information please see https://faculty.fuqua.duke.edu/~brav/HFactivism_SEPTEMBER_2013.pdf.

¹³ Klein and Zur, “Hedge Fund Activism”, 4.

¹⁴ Chris Cernich, Scott Fenn, Michael Anderson and Shirley Westcott, “Effectiveness of Hybrid Boards” (IRRC Institute 2009), 4.

¹⁵ Brav, Jiang, and Kim, “Hedge Fund Activism Updated tables and figures”, 9.

Activism is thus an important consideration in the short term for investors. Different objectives do also result in different return profiles, with the largest returns coming from an objective of selling the company.¹⁶ These short-term price appreciations can likely be explained by market speculation that the activist will be successful. In terms of long-term impacts, there is still debate in the literature surrounding whether activism produces better results for target companies in the long run.¹⁷

The targets of hedge fund activists

The earliest studies on activism documented that the main criterion of an activism target is poor performance. While this argument is superficially intuitive, recent literature shows that most targets actually tend to be profitable companies.¹⁸ Most activists consider themselves to be value investors and so they “target profitable and healthy firms, with above-average cash holdings” that have low valuations relative to their respective fundamentals.¹⁹ These value investments allow for the most room for returns by making changes to the target business.

Despite higher ability to achieve profits relative to their peers, it has been noted that target “dividend payouts are significantly lower relative to peers.”²⁰ One explanation for this is that target companies might tend to face the free cash flow agency problem.

Michael Jensen explains,

Managers have incentives to cause their firms to grow beyond the optimal size. Growth increases managers' power by increasing the resources under

¹⁶ Marco Becht, Julian Franks, Colin Mayer, Stefano Rossi, “Returns to Shareholder Activism: Evidence from a Clinical Study of the Hermes UK Focus Fund” (Oxford University Press 2008), 3097.

¹⁷ Martin Lipton, “Empiricism and Experience; Activism and Short-Termism; the Real World of Business” (Harvard Law School Forum on Corporate Governance and Financial Regulation 2013).

¹⁸ Stuart Gillan and Laura Starks, “The Evolution of Shareholder Activism in the United States” (Journal of Applied Corporate Finance 2007), 59.

¹⁹ Klein and Zur, “Hedge Fund Activism”, 2.

²⁰ Brav, Jiang, and Kim, “Chapter 7 Hedge Fund Activism”, 2.

their control. It is also associated with increases in managers' compensation, because changes in compensation are positively related to the growth in sales.²¹

So, managers tend to have a financial and political incentive to invest free cash flows to grow the firm, even when these investments return below the cost of capital and are not in the best interest of shareholders. Activism can be seen as a strategy to address this agency problem by pressuring management to put shareholders first or risk their jobs. Cases where this agency problem is more pronounced are thus frequently cases where activists get involved.²² Beyond this, poor managers, directors, and strategy problems also explain why an activist might see an opportunity with a target company.

3. Company Ownership and Activism

Various ownership characteristics of target firms have long been explored in literature on activism. In particular, it has been noted that activist targets tend to have much higher institutional ownership. The explanation for this is that high institutional ownership means shares are more liquid and thus it's easier for an activist to amass a large stake in the target company.²³ While the ownership characteristics of activist targets have been explored, there is little empirical research on the relationship between target ownership and activist outcomes.

The role of stockowner dispersion in influencing outcomes as reported by activists

²¹ Michael Jensen, "Agency Costs of Free Cash Flow, Corporate Finance, and Takeovers" (The American Economic Review 1986), 323.

²² April Klein and Emanuel Zur, "Hedge Fund Activism" (Stern School of Business, New York University, October, 2006), 5.

²³ Brav, Jiang, and Kim, "Chapter 7 Hedge Fund Activism", 2.

Intuitively, because activist interventions require support from other major shareholders, it makes sense that characteristics about target company ownership could influence the outcome of an activist intervention. A close examination of Carl Icahn's 2006 intervention in Time Warner sheds more light on how ownership characteristics play into an activist's calculations. In Icahn's original demands, he sought to split Time Warner into 4 different companies and replace their entire board of directors in a proxy fight. While these demands sound extreme, Icahn has a reputation in the activism world for succeeding with big demands, like splitting Motorola into two companies and getting major board representation at Yahoo.²⁴ However, with Time Warner, ultimately Icahn was only able to get two independent directors added to the board with none of the specific changes he wanted. In an interview about the intervention, Icahn explained "he had miscalculated in his campaign against Time Warner" because "it became clear that Time Warner's diverse shareholder base would not support his plan to replace the entire board in a proxy fight with 14 new directors."²⁵ Because of a relatively diverse base of major shareholders, it seemed that Icahn had difficulty getting all of them to agree to his specific board nominations and changes. In Icahn's own words, "I don't think shareholders were ready to give me the keys."²⁶

We see the issue of a diverse versus concentrated shareholder base raised by Icahn again in his 2011 intervention in Navistar. In this case, Icahn was able to obtain several board seats after writing an open letter that scolded the company for not

²⁴ Ameet Sachdev, "Carl Icahn trying to ease into driver's seat at Navistar" (Chicago Tribune October 21, 2011).

²⁵ Richard Siklos and Andrew Ross Sorkin, "Time Warner and Icahn Reach a Settlement" (New York Times Business February 18, 2006).

²⁶ Siklos and Sorkin, "Time Warner and Icahn Reach a Settlement".

considering the needs of “four shareholders” who “hold almost 60% of the stock.”²⁷ In this case, share ownership was much less diverse than with Time Warner, and in Icahn’s view this was an important reason his fund was able to achieve its goals in the intervention. With these cases, we can see that there is anecdotal evidence that the dispersion versus concentration of top shareholders of a target seems to influence the outcome of activist interventions.

Mapping the relationship between dispersion and success of activism

While these two cases offer interesting anecdotes, we can formalize this theory of shareholder dispersion influencing activism success by looking outside the domain of business scholarship. In political science, scholars have debated the merits of dispersed versus centralized polities for centuries. James Madison famously asked in Federalist 10 “whether small or extensive Republics are most favorable to the election of proper guardians of the public weal; and it is clearly decided in favor of the latter . . .”²⁸ Madison’s conclusion was that a government where the voting power was diverse and dispersed among more people would be critical to check the tyranny of the majority. This thought in turn influenced the development of the American Republic, where each state is given two senators regardless of size, consequently dispersing voting power to a greater degree.

For the purposes of this paper, our first hypothesis tests if dispersion can similarly influence the development of corporate responses to hedge fund activism. Following political frameworks developed by Bruce Bueno de Mesquita, we can imagine the top shareholders of a company as a kind of political coalition, whose large share count gives

²⁷ Carl Icahn, “Carl C. Icahn Issues Open Letter to Board of Directors of Navistar International Corporation” (PR Newswire September 9, 2012).

²⁸ James Madison, “The Federalist Papers: No. 10” (Yale Law School 1787).

them disproportionate power over management relative to small stockholders.²⁹ Ownership that is concentrated among only a few of these top shareholders could drive policies that favor the desires of those few shareholders. But if many top shareholders have large stakes in a company, it can be imagined that it is more difficult for any individual shareholder to exercise influence on the company. Going off this analysis, if there are many shareholders with large stakes apart from just the activist, this paper hypothesizes it might be more difficult for an activist to get a specific desired board nomination, or a specific desired spinoff, etcetera. Similarly, if stock ownership is more concentrated, then an activist might have an easier time achieving their objectives. This theory also supports the idea that if the activist has a more concentrated position in a target company, they might be able to better influence the company and achieve their objectives.

4. Research Methodology

In order to test the hypotheses, we needed to build a list of activist interventions that included: 1. the activist, 2. the target company, 3. the date of the intervention, 4. the objective of the activist, 5. whether or not the activist was successful in achieving this objective, and 6. the various historical data about top stock holders and ownership of the target at the time of the intervention. We constructed the activist intervention dataset from a near comprehensive list of 2687 activist hedge fund 13D filings from 1994 – 2011 obtained from professor Alon Brav at Duke University. This starting dataset would give us the necessary information on the activist, target, and date requisites.

²⁹ Bruce Bueno de Mesquita, Alastair Smith, Randolph M. Siverson, James D. Morrow, “The Logic of Political Survival” (MIT University Press 2003), 77.

Ultimately, to resolve difficulties in defining objectives and successes, the final list analyzed consisted of 92 interventions in S&P 500 companies from 1997 - 2011 with discrete win or loss objectives.

Selecting the list of interventions to analyze

Our first challenge of analyzing this data was determining the objective of the fund in the intervention. To tackle this, we first tested if the 13D filings would give us sufficient information to discern objectives. We discovered that in purpose of transaction section of each 13D, there often are detailed accounts of a particular activist's goals in a given intervention. We noted from a perusal of 100 13Ds that cases where board representation was sought and achieved tended to involve the mention of "nominations" or "nominees" to the board in this purpose of transaction section. So, we created a web-crawler in python to crawl through these 13Ds in SEC Edgar seeking out filings that mentioned "nominations" or "nominees" to the board. This crawler run indicated that 20.9% of the sample seemed to involve demanded changes to the board of directors. However, we checked several cases by hand by reading press releases and interviews of activists, and determined that looking at 13Ds alone would be insufficient to fully account for objectives and successes of a given intervention. Many funds, like Atlantic Investment Management and GAMCO, tend to be relatively vague in their stated purposes to the SEC. Also, in many cases, understanding success required more digging as they are not always reported in the 13D.

To understand this insufficiency by example, we can look back to 2004 when two activists, Atlantic Investment Management and Relational Investors, targeted SPX Corporation. Relational made their demand for board representation explicit naming two

individuals they wanted on the board, later threatening a proxy fight.³⁰ Atlantic, however, is known for acting less confrontational with demands. In their 13D for SPX Corporation, Atlantic described the position as for “investment purposes,” but in later interviews with Biz Journal, they made clear a desire for SPX to add independent directors to the board, as opposed to Relational Investor’s nominees.³¹ Atlantic explained that they were not specific in naming their own nominees and engaging a proxy fight because when one does this, “you make it harder to pick up the phone and talk to management about anything.”³² Ultimately, independent directors were added to the board like Atlantic wanted and Relational withdrew their board challenge for their own nominees.³³ In this case, we see that this intervention classifies as a win for Atlantic and a loss for Relational. However, if we had only examined the 13D filings, we would have excluded Atlantic entirely from the board change intervention list and likely would have seen the board change that did occur as evidence that Relational achieved their objectives. This showcases the value of press releases and interviews in empowering a greater level of accuracy in data collection for both objectives and successes.

Following this discovery, we decided to use a hand collection method of scanning 13D filings, press releases, interviews, and data compiled by the Conference Board Organization to achieve greater accuracy. However, this approach also has limitations, as there are many cases where activist demands are not thoroughly covered by the press and research community. To deal with this problem, we decided to focus solely on S&P 500

³⁰ Ralph Whitworth, “Schedule 13D SPX Corporation” (Securities Exchange Commission November 4, 2004).

³¹ John Downey, “SPX is on the right track, says investor” (Charlotte Business Journal November 24, 2004).

³² Downey, “SPX is on the right track, says investor”.

³³ John Downey, “Dissident SPX shareholders hopeful but concerned” (Charlotte Business Journal April 18, 2005).

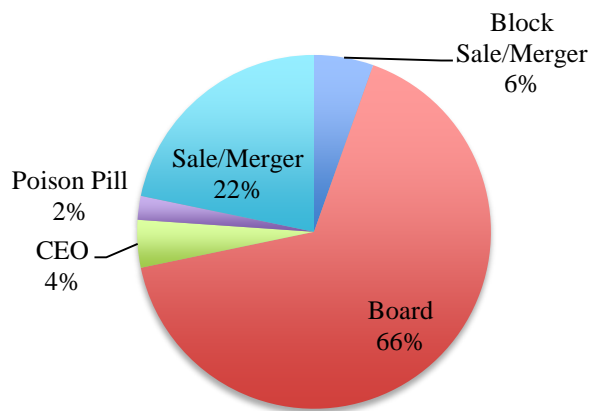
companies in constructing the intervention list. We populated the list of S&P 500 companies for the years 1997 – 2011 using Compustat. We used this list to construct a list of 170 interventions in S&P 500 companies for the time period. We omitted the 1994 – 1997 period from the list because of limitations on pulling historical ownership data for this period. We proceeded to research each intervention in this list and we documented the goals of the intervention.

Determining objectives and whether the intervention was a win or a loss

While selecting S&P 500 companies made it possible to research the specific demands and outcomes in each intervention, we still needed a precise definition of what success means in an intervention. When looking at 2005, we noticed that after Jana Partners demanded a \$1.5B buyback, Massey Energy only passed a \$500M buyback. We wondered if this was this to be considered a win or a loss. We faced similar questions in other cases and decided to trim the sample further, focusing only on interventions where the outcome could be discretely defined as a win or loss. We determined that the objectives with clear success definitions were demands for: board representation, CEO replacement, company sale, major spinoffs, mergers, blocking M&A activity, and dropping a poison pill. We excluded all cases where the goal was non-discrete, including goals of: investment purposes, general strategy change, buybacks, capital structure changes, and dividends. We only counted an activist intervention as a win if the activist was able to achieve the specific goals outlined in their demands for the company. For instance, if the activist wanted an individual nominated to the board, and this individual made it to the board, this would be considered a win. Partial successes were also considered wins if the activist was able to get at least one of their nominees to the board

of directors. However, if only independent directors made it to the board and none of the individuals the activist wanted made it to the board, we considered this a loss because other shareholders were prioritized above the activist. This ultimately yielded a final sample of 92 interventions to work with. Of this sample, 79% were wins for the activist and 21% were loses. In addition, Figure 5 shows that the most common objective was a demand for seats on the board of directors.

Figure 5: Pie Chart of Goals of Activists in the Sample



Collecting stockholder data

Once this final list was complete, we used Bloomberg to collect data on historical stockholder ownership at the time of the intervention. From Bloomberg, we recorded the top 30 institutional owners at the date of the 13D filing as well as their share count. We also recorded the size of the activist's position relative to the other top 30 holders.

5. Results

Calculating stockholder dispersion

To calculate shareholders dispersion, we decided to use a Gini Coefficient as a measure of how concentrated or dispersed share ownership was among the top 30

institutional investors. We began by calculating the mean absolute difference of stock count of the top 30 institutional holders of each company.

$$\text{mean absolute difference} = \frac{1}{n} \sum_{i=1}^n |x_i - \bar{x}|$$

n = the number of institutional stockholders (30)

x_i = the number of shares owned by institutional shareholder i

\bar{x} = arithmetic average of the number of shares owned by the top 30 institutional shareholders

The result of this mean absolute difference is a measure of stock ownership dispersion for each company, however because the total number of shares varies between companies, we use the relative mean average deviation to adjust for scale.

$$\text{relative mean absolute difference} = \frac{\text{mean absolute difference}}{\bar{x}}$$

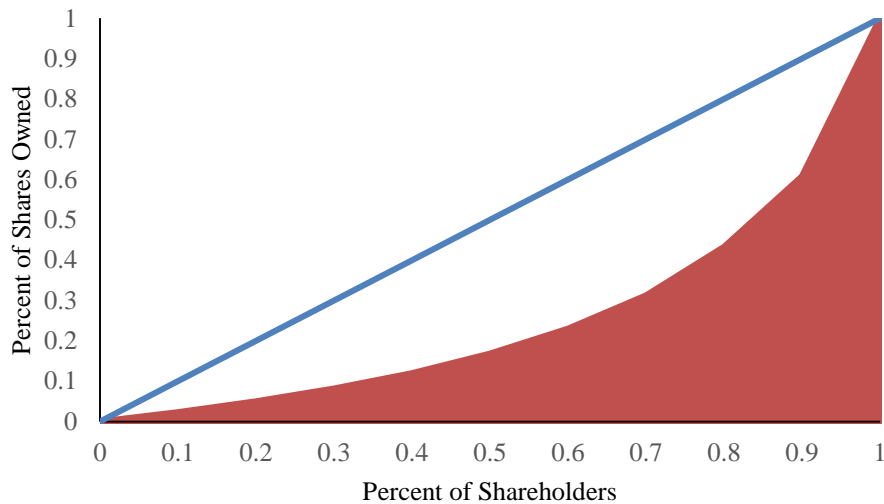
We then divided this relative mean absolute difference of the top 30 institutional shareholders for each company by 2. This yields the Gini Coefficient, a popular measure of inequality, of the data. The Gini Coefficient is preferable to the relative mean absolute difference, because the number directly represents the magnitude of the dispersion away from absolute equality. A Gini Coefficient of 0 would represent equal stock ownership among all the top 30 shareholders. A Gini Coefficient of 1 would represent the maximum possible inequality—or dispersion—in share ownership.

Gini Coefficients and Lorenz Curves of the sample

Overall at a high level, we can see by looking at the average Lorenz Curve of the sample that most targets have fairly concentrated ownership. Figure 6 displays the average Lorenz Curve of the sample, which yields an average Gini Coefficient of 0.406

for all companies targeted. The standard deviation of the sample of Gini Coefficients is 0.108, indicating a fair amount of variance in shareholder dispersion. The minimum of the sample was a Gini Coefficient of 0.209, which corresponded to a loss, and the maximum of the sample was a Gini Coefficient of 0.919, which corresponded to a win. From this curve, we can see that the sample on whole is defined by fairly concentrated ownership, with a typical case looking like a few funds owning most of the shares. The blue line represents absolute dispersion or absolute equality, where each of the top 30 shareholders holds the same number of shares. So, the area between the blue line and the red shaded region represents the Gini Coefficient, a measure of how concentrated share ownership is in the sample. In this graph, we can see that as the percent of shareholders reaches 100%, the percent of shares owned spikes dramatically, illustrating this concentration.

Figure 6: The Average Lorenz Curve of the Sample



If hypothesis 1 were true, we would expect the average Gini Coefficient to look very different in successful versus not successful interventions. However, the data revealed a less significant story, with the average Gini Coefficient of a failure amounting to ~0.387 and the average Gini Coefficient of a success amounting to ~0.410. Before we

performed the regression, the similarity of the average Gini Coefficients and Lorenz Curves in Figures 7 and 8 highlights that ownership dispersion does not seem to vary significantly across wins and losses.

Figure 7: Average Lorenz Curve of the Sample Given an Activist Win

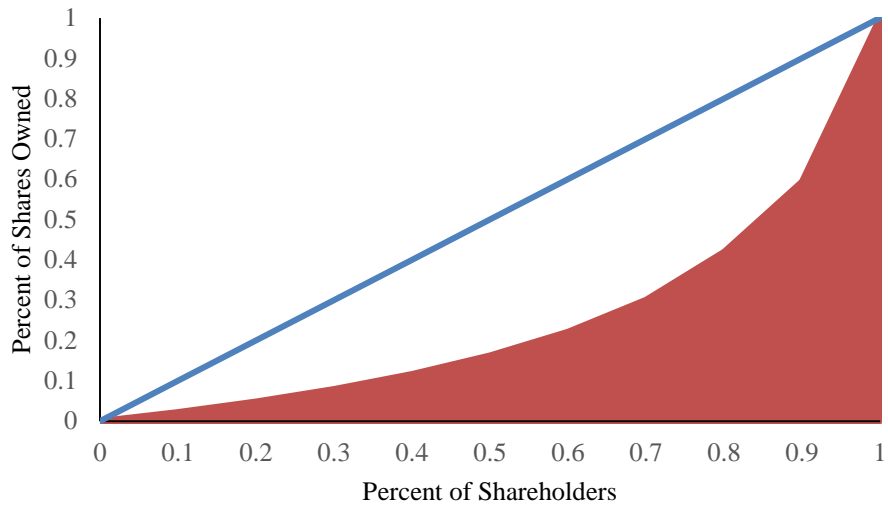
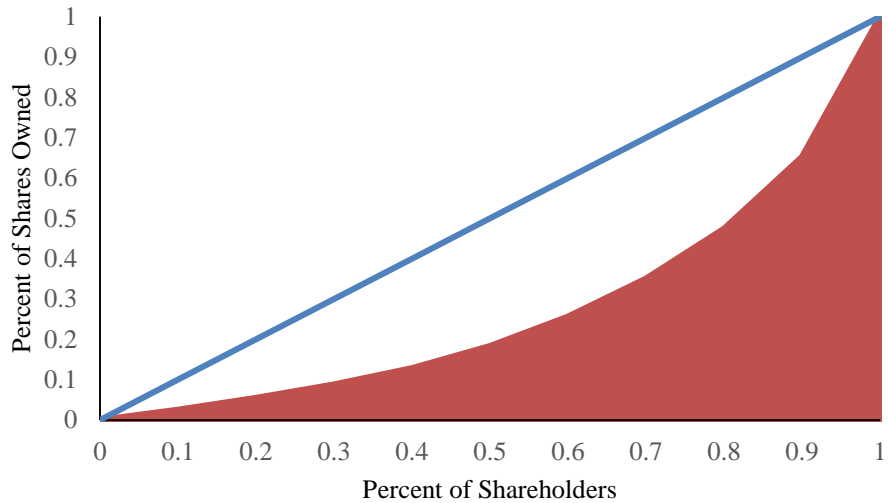


Figure 8: Average Lorenz Curve of the Sample Given an Activist Loss



In figure 7 we can see that the area under the blue equality line is slightly larger, indicating more concentration of ownership. But this concentration difference is not significant given the standard deviation of the Gini Coefficients.

Gini Coefficient and Success Regression

To further test this relationship, we performed a Logistic Regression with the Gini Coefficient as the independent variable and a 1 or 0 dependent variable to represent a win or loss respectively. This regression revealed that there is not a statistically significant relationship between shareholder dispersion measured by a Gini Coefficient and likelihood of success in an activist intervention. The logistic regression generated the following equation to describe the relationship between dispersion and likelihood of success:

$$\ln\left(\frac{p}{1-p}\right) = 0.45 + 2.26G + \varepsilon$$

p = the probability that the activist intervention is successful in achieving its objectives

1-p = the probability that the activist intervention fails in achieving its objectives

G = the Gini Coefficient of the top 30 institutional shareholders of the target company

ε = Error

At a high level, this equation means that for every 1% increase in the Gini Coefficient of a target company in an activist intervention, the activist is 2.26% more likely to succeed than they are to fail in that intervention. However, as we can see from Figure 9, the regression results show that this relationship is not statistically significant. Specifically, based on this statistically insignificant P-Value, we can conclude that there is insufficient evidence to establish a relationship between shareholder dispersion and activism success described in hypothesis 1.

The classification table reinforces this conclusion, because the Logistic Regression equation predicts incorrectly more often than it predicts correctly for this sample when we use a cutoff ratio of 79% based on the frequency of success in the sample. While this data shows that there is not a relationship between shareholder dispersion and the likelihood of activist success, it's possible that only using S&P 500 companies in the sample could be skewing the data. It's also possible that the sample size is not large enough in this experiment to make a conclusion.

Figure 9: The Logistic Regression of Gini Coefficient Predicting Activism Success

Summary Measures	Numerical Expression		Meaning	
P-Value	0.387 > 0.05		The Gini Coefficient is not a statistically significant predictor of success	
Somers' D Value	0.12		Little to no separation in Gini Coefficient between win and loss cases	
Classification Table		Suc-Obs	Fail-Obs	The Logistic Regression equation has a 45.6% accuracy rate at predicting success or failure for this sample
	Suc-Pred	30	7	
	Fail-Pred	43	12	
Accuracy: 0.456				

Activist Position Size and Success Regression

If hypothesis 2 were true, we would expect a significant relationship between wins and the sizes of the activists' position in the target relative to the other major shareholders. To test this, we performed another Logistic Regression with a 1 or 0 dependent variable to represent a win or loss respectively, and two independent variables: 1) the amount of shares owned by the activist divided by the total amount of shares owned by the top 30 institutional investors, and 2) a 1 or 0 dummy variable to capture

whether or not the activist ranked in the top 30 institutional investors. The Logistic Regression generated the following equation describing the relationship:

$$\ln\left(\frac{p}{1-p}\right) = 1.23 + 1.07A + 0.06T + \varepsilon$$

p = the probability that the activist intervention is successful in achieving its objectives

1-p = the probability that the activist intervention fails in achieving its objectives

A = The amount of shares in the target company owned by the activist divided by the amount of shares owned by the top 30 institutional shareholders of the target company

T = A 1 or 0 indicator of whether the activist is or isn't one of the top 30 institutional shareholders of the target company

ε = Error

This regression equation indicates that a 1% increase in the amount of shares owned by the activist relative to other top institutional shareholders increases the likelihood of success of the intervention by 1%. The equation also indicates that if the activist is in the top 30 institutional shareholders of the target, they are 6% more likely to achieve success with their objectives. However, as we can see from Figure 10, these results are not statistically significant.

Figure 10: The Logistic Regression of Activist Position in Predicting Activism Success

Summary Measures	Numerical Expression			Meaning
P-Value	0.937 > 0.05			The activist position size is not a statistically significant predictor of success
Classification Table		Suc-Obs	Fail-Obs	The Logistic Regression equation has a 55.4% accuracy rate at predicting success or failure for this sample
	Suc-Pred	39	7	
	Fail-Pred	34	12	
Accuracy: 0.554				

While this Logistic Regression has an accuracy of 55.4% in predicting success or failure based on the size of the activist position, the statistically insignificant P-Value means we can conclude that there is insufficient evidence to establish a relationship between activist relative ownership size and activism success described in hypothesis 2. Again, while this data demonstrates that there is not enough evidence to confirm a relationship, this is also possibly caused by a sample size that is too small.

6. Conclusion

These results show that there is not enough evidence to support a relationship between activism success and either shareholder dispersion or activist relative position size. While the results were not statistically significant, the methodology for both data collection and analysis could have potential applications in future studies on stock ownership characteristics in cases of activism. Future studies could focus on increasing the sample size and expanding the sample size to more companies than just those in the S&P 500. Future studies could also test other characteristics of shareholder ownership, including but not limited to insider ownership, share liquidity, and the impact of multiple activists targeting the same company.

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