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Hedge Funds: Stock Pickers or Managers?

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Overview

For decades, corporate managers have criticised analysts, fund managers, hedge fund managers and private equity professionals for telling them how to run their business, without having had the necessary experience. Now hedge fund activists are regularly suggesting operational decisions, and in some cases even in areas traditionally reserved for management. ‘Activism has gone from being frowned upon, something that marks you out as a rogue or maverick, to almost socially responsible.’¹ These hedge funds may have become an accepted part of the governance universe but are they actually adding value?

Recent studies have answered this question in the affirmative, but what if those companies picked out by hedge funds for their attention were already on their way to outperformance? The observed outperformance may not be due to a hedge fund’s ability to contribute to value creation but a mere reflection of their stock picking abilities. The difficulty is in identifying those companies that would have made typical hedge fund targets but which were not actually targeted, i.e. build an appropriate group of comparable companies. We have developed a statistical model to identify just these companies.

- *Hedge fund targets are the ‘usual suspects’.* Our model reveals that these companies have depressed valuations and have underperformed their peers. Size also matters as smaller companies are more likely to be targeted. Low dividend yield, leverage and insider ownership may also put you on the hedge fund radar. Stock liquidity is also important as hedge fund activists need to accumulate the critical level of ownership that will make their voice heard.
- *It’s all about who you compare yourself to.* When we measure company

performance following hedge fund activism involvement, using the traditional performance benchmarks, we confirm the results from earlier studies. However, when we compare the performance of hedge fund targets to companies that resemble these targets but were never actually targeted, the story changes. Most of the hedge fund targets either significantly underperform similar non target firms or generate returns which are not significantly different from the comparable group. Overall, we find that *Completed* hedge fund targets underperform similar non target firms by 15% during the two-year period following intervention.²

- *Stock pickers not managers.* Our results suggest that the shareholder wealth improvement experienced by the targets of hedge fund activism (that is documented by previous studies) is not caused by the hedge fund intervention per se. Instead, it merely demonstrates the activists’ ability to choose companies whose shareholder wealth is expected to improve in any event. The observed wealth creation is evidence of the hedge fund’s ‘stock picking’ skills rather than their ability to contribute to long-term value creation by inducing companies to implement proposed changes.
- *Recommendations.* Corporates should adopt a proactive strategy to dealing with activists. This could involve regular discussions at the board level of the risk of being targeted by an activist in order to raise awareness. Policymakers should consider the fact that activist interventions could be detrimental to shareholder wealth when defining the ‘rules of engagement’ between companies and hedge fund activists. And activists should stick to stock picking and avoid operational management.

¹ Ken Square, founder of activism database 13D Monitor.

² Please refer to the methodology section for a definition of Completed hedge fund engagements.

Background

Hedge funds are arguably the most controversial investors in the financial universe, having been referred to as short term speculators, vultures or 'locusts'. Thankfully, the reality is less one-sided. In particular, hedge fund activism is a fertile ground for research with findings on both sides of the argument.

The central question

Recent studies show that hedge fund activism can have a positive impact on subsequent company performance.³ While these studies examine value creation following a campaign they do not address the issue of which firms become targets in the first place, i.e. they do not have a model to 'predict' potential targets. A related and equally important issue neglected by these studies is that in their analyses they benchmark company value gains following hedge fund involvement against traditional measures of performance such as industry and index adjusted share price returns or change in accounting measures of performance such as ROA. These types of benchmarks are flawed and not completely reliable as they do not control for the bias which arises from the fact that hedge funds select for targets those firms that are most likely to respond to their campaign and thereby generate value. The resulting value gains reported by earlier studies may not be due to the hedge fund intervention at all but due to the inherent characteristics of the targets selected by these hedge funds. This does not mean that the undervalued or underperforming targets would have achieved value

enhancement by doing nothing, i.e. avoiding the changes that the hedge funds would have imposed on them. It merely means that the managers of the potential target firms might have done all the changes even absent being in the hedge funds' cross-hairs. Since prior studies do not distinguish the value outcomes in the presence of hedge funds from the value outcomes that would have been achieved in the absence of hedge funds, the value gains that these studies report cannot be unambiguously attributed to hedge funds alone.

Our approach

It is therefore necessary to adopt a more accurate methodology to correct for the presence of such biases. Performance measurement bias is an issue since hedge fund targets are not randomly selected, i.e., the very characteristics that make companies attractive targets to activist investors could also be the factors that cause the improvement in subsequent performance. We seek to answer the following question: Would the target company's performance have improved without the hedge fund's involvement? We use an advanced econometric methodology to answer this question. If the process of target selection for hedge fund activism depends on a group of observable company characteristics, the true performance effect can be evaluated by building a control sample of non-target companies and then by averaging the differences in performance that take place between the target and non-target subsamples.

³ Bebchuk, L., A. Brav and Wei, J., 'The Long-term Effects of Hedge Fund Activism', *Columbia Law Review*, Vol. 115, 2015, pp. 1085-1156; Becht, M., J. Franks, J. Grant and Wagner, H., 'The Returns to Hedge Fund Activism: An International Study', *CERP Discussion Paper No. 10507*, 2015; Brav, A., W. Jiang, F. Partnoy, and Thomas, R., 'Hedge Fund Activism, Corporate Governance, and Firm

Performance', *The Journal of Finance*, Vol. 63, 2008, pp. 1729-1775; Hamao, Y., K. Kutsuna and Matos, P., 'Investor Activism in Japan: The First 10 Years', *Center on Japanese Economy and Business Working Paper Series*, No. 289, 2010; Greenwood, R., and Schor, M., 'Investor Activism and Takeovers', *Journal of Financial Economics*, Vol. 92, 2009, pp. 362-375.

An Evolving View

Shareholder proposals

The impact of shareholder activism on firm value has been the subject of academic investigation for over 30 years now. The profile of activists has changed significantly over time. First it was the corporate raiders in the 1980s undertaking hostile and break-up takeovers in an attempt to discipline company management and directors. The regulatory changes of the 1990s saw the rise of activist institutional investors by putting more power in the hands of shareholders and increasing their ability to express their views.

Earlier studies of activism examined the effect of shareholder proposals on value creation. Such shareholder proposals tended to be of advisory nature only and were not often supported by a majority of company shareholders. In addition, there is evidence that these proposals tended to generate low or no value for shareholders. For example, a study of 356 US shareholder proposals between 1987 and 1993 shows that there is no evidence of significant positive abnormal short- and long-term share price returns following the filing of these proposals.⁴ Another study of 146 governance proposals filed by public pension funds between 1988 and 1994 reported significant negative wealth impact associated with the announcement of such proposals. The authors use industry and index benchmarks to measure abnormal returns.⁵

⁴ Wahal, S., 'Pension Fund Activism and Firm Performance', *Journal of Financial and Quantitative Analysis*, Vol. 31, 1996, pp. 1-23.

⁵ Prevost, A. and Rao, R., 'Of What Value are Shareholder Proposals Sponsored by Public Pension Funds?', *Journal of Business*, Vol. 73, 2000, pp. 177-204.

⁶ Bebchuk, L., A. Brav and Wei, J., 'The Long-term Effects of Hedge Fund Activism', *Columbia Law Review*, Vol. 115, 2015, pp. 1085-1156.

The resurgence of hedge fund activism

More recently the activist arena has been dominated by a different type of activist investor, namely, hedge funds. The old perception of these activists as purely short term in time horizon has been rebutted by empirical evidence showing that hedge funds are more likely to take medium to long term positions in target companies and that through engagement with companies these activist investors can bring about value enhancing changes.⁶

In addition, owing to the higher expenses associated with certain more impactful activist procedures, such as those involving a proxy fight, these procedures tend to be pursued primarily by hedge funds. The use of more effective activist tactics such as proxy votes can be considerably more costly than submitting a shareholder proposal.⁷ It is estimated that in the US the average public activist engagement through a proxy fight can result in \$10 million in expenses, representing approximately two thirds of the total abnormal returns that the average campaign generates.⁸

Activist hedge funds tend also to be much more specialised and their portfolios typically consist of 10 to 30 companies while the value of their positions tends to be relatively large.⁹ This approach differs significantly from that of other types of activist investors such as institutional investors who can hold hundreds or thousands of positions in different stocks.

Becht, M., J. Franks, J. Grant and Wagner, H., 'The Returns to Hedge Fund Activism: An International Study', *CERP Discussion Paper No. 10507*, 2015.

⁷ Gantchev, N., 'The Costs of Shareholder Activism: Evidence from a Sequential Decision Model', *Journal of Financial Economics*, Vol. 107, 2013, pp. 610-631.

⁸ *Ibid.*

⁹ Becht, M., J. Franks, J. Grant and Wagner, H., 'The Returns to Hedge Fund Activism: An International Study', *CERP Discussion Paper No. 10507*, 2015.

Evidence from US studies

The most recent major study on the effect of US hedge fund activism was performed by Bebchuk et al. (2015).¹⁰ The study uses a sample of approximately 2,040 engagements announced between 1994 and 2007 to evaluate the long-term effects of hedge fund activism on company performance. The study measures the abnormal returns following the activist's disposal of ownership in the target firm using a holding period starting one month after and ending 36 (or 60) months after the departure of the hedge fund. Expected returns are calculated using the Fama-French four factor model. The authors report average abnormal returns amounting to 7.17% (-0.29%). The authors conclude that there is little evidence to support the claim that activists hurt long-term performance through short-sighted "pump-and-dump" trading methods.

And outside the US...

Similar to studies which focus on activism in the US, the recent literature on hedge fund activism outside the US demonstrates that activist investors can contribute to shareholder value creation. The most recent major study of hedge fund activism outside the US was performed by Becht et al. (2015).¹¹ The study analyses an international sample of 1,740 activist involvements between 2000 and 2010 and finds that activist interventions with an outcome result in average abnormal returns of 8% while interventions without outcome result in 2.3% returns. The authors conclude that the involvement of hedge funds can lead to positive alpha but that the size of returns is contingent upon the activist achieving the desired outcome from the intervention. Becht et al. (2015) also show that the cumulative abnormal returns around outcome announcements can vary

dramatically depending on the type of outcome that the hedge fund achieves. The study documents that, measured over a (-20, +20) day event window, interventions resulting in takeovers can generate 9.7% returns, other forms of restructuring can result in 5.6% returns, changes to boards can result in 4.5% returns, while changes to payout policies generate -0.2% returns.

A significant drawback of studying activism is the inability, or considerable challenge, to measure the activism that takes place behind the scenes. While research can identify the number of 13D filings¹² in a given year or shareholder proposals voted on at AGMs, it is thought that a significant proportion never make the news. The number of such engagements is estimated to be around 50% in Europe, although through its discussions with and studies of activist funds, Activist Insight estimates this number to be as high as 66%.¹³

To sum up, most recent studies show that the involvement of activist investors can generate positive short and long-term shareholder returns. However, this evidence is based on measures of wealth creation that do not account for the fact that the targets of hedge fund activists are inherently different from non-target firms. That is to say, the observed improvement in post engagement performance could be due to the fact that hedge fund targets are systematically different from non-targets and that the improvement in performance would have taken effect irrespective of the activist's engagement. The very factors that attract hedge fund activists to certain companies may also be the factors that drive the observed increase in shareholder value creation following intervention. This is the focus of the rest of this report

¹⁰ Bebchuk, L., A. Brav and Wei, J., 'The Long-term Effects of Hedge Fund Activism', *Columbia Law Review*, Vol. 115, 2015, pp. 1085-1156.

¹¹ Becht, M., J. Franks, J. Grant and Wagner, H., 'The Returns to Hedge Fund Activism: An International Study', *CERP Discussion Paper No. 10507*, 2015.

¹² This type of filings is a legal requirement for any investor who holds 5% or more of a firm's shares and who intends to impact corporate control.

¹³ Cristerna, H. and Ventresca, C., 'Knocking on the door-Shareholder activism in Europe: Five things you need to know', J.P. Morgan Research Paper Series, 2014; Activist Insight (2015).

What Makes an Attractive Target for Shareholder Activism?

Most studies of hedge fund activism identify performance benchmarks based on industry and company size. We highlight the importance of selecting control firms based on more than two characteristics. We first identify a comprehensive group of control variables that will allow us to estimate accurately the probability of becoming a target of hedge fund activism. We then estimate two probability models to predict the likelihood of becoming a target. Figure 1 displays the results of the models. Model 1 is based on unadjusted financial characteristics and Model 2 is based on industry-adjusted financial characteristics. Please refer to the Appendices for an in-depth description of our methodology and detailed definitions of the variables used in our probability models.

Our analysis shows that hedge funds are likely to target smaller companies since the larger the target, the larger the initial capital investment that is necessary in order to obtain a sizeable stock holding in the target that would allow the hedge fund to exert any meaningful influence.¹⁴ Buying a significant stake in any large company could increase the exposure of the activist's portfolio to idiosyncratic risk that is too large even for a hedge fund. We use the market capitalisation of companies measured one year before the announcement of the hedge fund involvement in order to account for the effect of company size.

We also show that the targets of hedge fund activists are likely to be 'value driven', i.e. they tend to invest in companies with low market-to-book ratios.¹⁵ Furthermore, our models indicate that the degree to which the hedge fund activist perceives a given company to be undervalued

is an important determinant of activists' choice to engage with a given company.¹⁶ We employed a number of different variables to measure a given company's degree of perceived undervaluation, such as the ratio of price to free cash flow, the price earnings ratio, as well as the average upside to broker's target prices.

Among some of the main objectives of activist hedge funds are to improve the strategies and operations of target firms. As a result, we expect that the targets of activists are likely to have poor measures of operational performance.¹⁷ We account for this effect by including a measure of the annual sales growth of the target company during the three years before the announcement of the activist engagement. In addition, we include a measure of the firm profitability given by the return on capital employed (ROCE) as of one year before the intervention. Our models confirm this idea.

Target firm capital structure is different from that of non-targets.¹⁸ When company leverage is relatively high, managers are less likely to undertake value destroying projects as the interest payments associated with high leverage would decrease the amount of free cash flow. Our analysis shows that hedge fund targets are likely to have low levels of leverage on their balance sheets. We control for this difference between targets and non-targets by including the ratio of net debt to market capitalisation in our probability model.

Our models also demonstrate that target companies' dividend payout is lower compared to their non-target peers as indicated by the lower dividend yield. Our models also account for the amount of capital companies invest for

¹⁴ Greenwood, R., and Schor, M., 'Investor Activism and Takeovers', *Journal of Financial Economics*, Vol. 92, 2009, pp. 362-375.

¹⁵ Ibid.

¹⁶ Brav, A., W. Jiang, F. Partnoy, and Thomas, R., 'Hedge Fund Activism, Corporate Governance, and

Firm Performance', *The Journal of Finance*, Vol. 63, 2008, pp. 1729-1775.

¹⁷ Ibid.

¹⁸ Ibid.

the purpose of organic growth. We use the ratios of capital expenditures to sales as well as research and development to sales in order to capture this effect. The analysis shows that these factors are not significant determinants of the likelihood of being targeted by an activist hedge fund.

We also expect that target companies tend to have underperformed their industry in the years before the activist engagement. We measure the relative performance of companies by calculating the three-year growth in the total returns index for each company before the activist's engagement. We also include a measure of the earning per share outcome for each company relative to analyst consensus estimates, this variable captures the degree of 'earnings surprise' associated with the given company. A negative operational performance relative to market expectations would suggest that there is scope for operational improvements. Not surprisingly our models confirm this idea.

We also show that high trading volume is crucial in order to allow the activists to accumulate the necessary number of shares in a short period of time. This is because the actions of some activists are followed by other investors and these other investors could drive up the cost of amassing the necessary ownership stake that would enable the activist to exert influence on company management. Stocks that are characterised with high trading volume make it easier for the activist to acquire a significant ownership position before other, tag-along investors. High trading volume also makes it easier for hedge funds to exit their position. We measure the trading liquidity as share volume divided by adjusted shares outstanding.

Finally, we also account for the percentage of shares that are owned by company insiders. Our models indicate that the likelihood of being targeted is significantly lower, the higher the percentage of shares owned by company insiders. The larger the stake owned by company insiders the more difficult it is for the activist hedge fund to exert any influence on company management and achieve change.

Figure 1: Hedge Fund Target Characteristics

Variable Name	Model 1 Unadjusted metrics	Model 1 Marginal Probabilities	Model 2 Industry adjusted metrics	Model 2 Marginal Probabilities
Total return (3-year)	-0.184***	-1.16%	-0.154***	-0.98%
Net debt to market cap	-0.0662***	-0.42%	-0.0409**	-0.26%
Return on capital employed	-0.164	-1.03%	-0.290**	-1.84%
Undervaluation	-0.229***	-1.44%	-0.363***	-2.31%
Forward P/E ratio	-0.00210**	-0.01%	-0.00178*	-0.01%
Earnings surprise	-0.126***	-0.79%	-0.110***	-0.70%
Sales growth (3-year)	-0.176***	-1.11%	-0.158**	-1.01%
Capex to sales	-0.154	-0.97%	-0.134	-0.85%
Dividend yield	-0.112***	-0.71%	-0.0991***	-0.63%
Price to free cash flow	0.000257	0.002%	0.000293*	0.00%
Market to book	-0.0146*	-0.09%	-0.0102	-0.06%
Cash to total assets	0.0366	0.23%	-0.0612	-0.39%
Market cap.	-0.0763***	-0.48%	-0.0836***	-0.53%
R&D to sales	0.00761	0.05%	-0.000665	-0.004%
Closely Held Shares	-0.983***	-6.19%	-1.016***	-6.46%
Share turnover	0.0391***	0.25%	0.0435***	0.28%
Constant	-1.004***	-	-1.206***	-
Activist Engagements	1,750		1,750	
Pseudo R ²	0.095		0.092	

Figure 1 presents the probability regression models based on unadjusted financial characteristics (Model 1) and industry- adjusted characteristics (Model 2). Please refer to the Data and Methodology section for further details. For each variable we report the regression coefficient, the corresponding t-statistic and the marginal probability change induced by a one-standard deviation change in the values of the variables from their respective sample averages. *** refers to statistical significance at the 1% level, ** refers to statistical significance at the 5% level and * refers to statistical significance at the 10% level.

Performance Following Activism

We now proceed to investigate the principal question of whether hedge fund involvement causes improvements in shareholder wealth. Figures 2 through 4 present our results. Figures 2 and 3 show the change in shareholder returns over different time periods before and after the hedge fund engagement. Importantly, Figure 4 shows the change in shareholder returns for the targeted group of firms relative to the control group. The results are broken down per engagement outcome:

- a) *All Announced* interventions,
- b) *Completed* interventions where the hedge fund disposed of its investment in the target company and the outcome was either that the demands of the hedge fund activist were partially or fully met or that the company's management was able to avoid implementing the proposed changes,
- c) *HF Victory* where the hedge fund's demands were partially or fully met, and
- d) *Management Victory* where the company's management was able to avoid implementing the proposed changes.

Abnormal returns are calculated relative to each company's market index.

Figure 2 shows that the targets of hedge fund activists tend to underperform during the period before the engagement announcement. This is evidenced by the significantly negative shareholder returns calculated during periods spanning (-36m, -1m), (-24m, -1m), and (-12m, -1m) months before hedge fund involvement. For example, we find that the target firms of all announced engagements significantly underperform their index, by 11.8% respectively, over the period starting 24 months before and ending one month before the hedge fund's engagement. These results confirm the idea that hedge fund activists target companies which have been underperforming their peers.

Furthermore, we observe in Figure 3 that the returns generated following the activists' intervention tend to be either significantly positive or at least not negative. For example, targets of *Completed* engagements outperform their index by 4.6% over the 25-month period

starting one month before the hedge fund's intervention. In addition, the targets of hedge funds that succeed in implementing their proposed changes, the *HF Victory* outcome in Figure 3, outperform their index by 4.1% in the 25-month period starting one month before the hedge fund's intervention. At face value these findings indicate that improvements in shareholder wealth creation accompany interventions of hedge fund activists. However, in order to infer causation from hedge fund activism to shareholder wealth creation it is necessary to examine target performance relative to an appropriate control group of firms.

Figure 4 shows this analysis. Most of the hedge fund targets either significantly underperform similar non target firms or generate returns which are not significantly different from the comparable group. These results are consistent across different types of outcomes (i.e. irrespective of whether the hedge fund succeeds or not) and different time horizons. For example, the targets of completed hedge fund campaigns underperform their comparable group by 22.6%, 30.9%, and 38.3% over the 37-, 49-, and 61-month time windows following intervention. Considering the different types of engagements, we observe that interventions which involve changes in company governance or restructuring of the business underperform by 23.3% (23.7%) and 67.9% (11.8%) respectively during the 49- (61-) month period following the activist engagement. What is more, we see that although the targets of hedge fund activists underperform in the period before the activists' involvement, the degree of underperformance worsens following the activists' intervention. This is particularly the case over the longer, (-1m, +24m), (-1m, +36m), (-1m, +48m), and (-1m, +60m) time windows. These results demonstrate that companies which become the targets of hedge fund activists are truly different from their peers that do not, and it is this difference that causes the improvements in shareholder wealth creation rather than the hedge fund activism per se.

Performance per type of engagement

Our results are largely confirmed when we breakdown the analysis of the long-term wealth effects of hedge fund activism per type of engagement. The results are summarized in Figure 5. We distinguish between four broad categories of engagement:

- a) *Strategic Direction*, i.e. the activist is challenging the status quo of the firm without proposing any specific guidelines on how to achieve the change,
- b) *Governance*, i.e. the activist proposes changes at the board or senior management level as well as other changes that involve increasing the influence of shareholders,
- c) *Restructuring*, i.e. performing a spin-off, partial or full sale of the company's assets. All returns are adjusted to the respective market index of each company,
- d) *Other*, i.e. changes that do not fit into any of the above categories.

In most cases presented in Figure 5, the long-term performance of hedge fund targets is either significantly worse or not significantly different from the performance of similar companies that were not targeted by hedge fund activists. For example, engagements related to *Governance* or *Restructuring* changes significantly underperform similar firms by 23.7% and 11.8% respectively over the period starting one month before and ending 60 months after the announcement of the engagement.

Possible Explanations

Our results suggest that the shareholder wealth improvement experienced by the targets of hedge fund activism (that is documented by previous studies) is not caused by the hedge fund intervention per se. Instead, it merely demonstrates the activists' ability to choose companies whose shareholder wealth is expected to improve in any event. We conclude that the observed wealth creation is evidence of the hedge fund's 'stock picking' skills rather than their ability to contribute to long-term value creation by inducing companies to implement proposed changes.

What is more, our results show that, when compared to the performance of companies with similar characteristics, the activist targets appear to perform worse. These findings indicate that the hedge funds' engagement exerts a detrimental effect on company management by either disturbing the normal operations of the business or proposing changes that are not appropriate given the specific circumstances/characteristics of the targets.

Practitioner Implications

For corporates: Given the potential negative impact of hedge fund engagement on company value we recommend a proactive strategy to dealing with activists. Such a strategy could involve regular discussions of the potential risk of being targeted by an activist at the board level in order to raise awareness. In addition, effective and clear communication with the capital markets is key. Companies should make sure that their current strategies to generate value and the financial policies that accompany these strategies are comprehensively conveyed to company shareholders.

For regulators: Our analysis carries important implications for a number of ongoing policy debates. Specifically, our findings are relevant to policy discussions around determining:

- a) shareholders' influence vis-à-vis boards of directors,
- b) shareholders' power to replace directors,
- c) the rights of short-term investors,
- d) the disclosure requirements associated with stock acquisitions by hedge fund activists, and
- e) the degree to which boards of directors should accommodate the preferences of activists. Policymakers should consider the fact that activist interventions could be detrimental to shareholder wealth when defining the 'rules of engagement' between companies and hedge fund activists.

For hedge funds activists: Our results suggest that activists should stick to stock picking and place less emphasis on trying to encourage companies to change. According to our analysis a 'silent' strategy of selecting targets could increase the returns that hedge funds generate.

Figure 2: Target Performance before Hedge Fund Activism

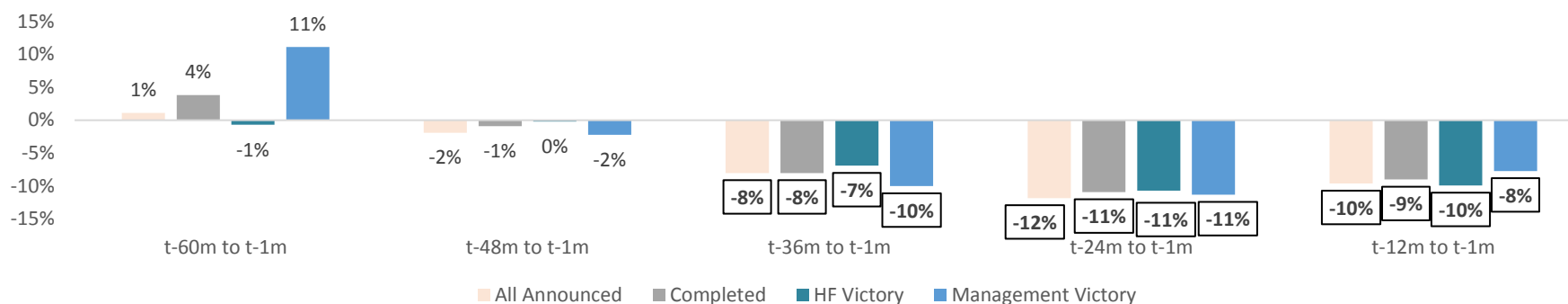


Figure 3: Target Performance following Hedge Fund Activism

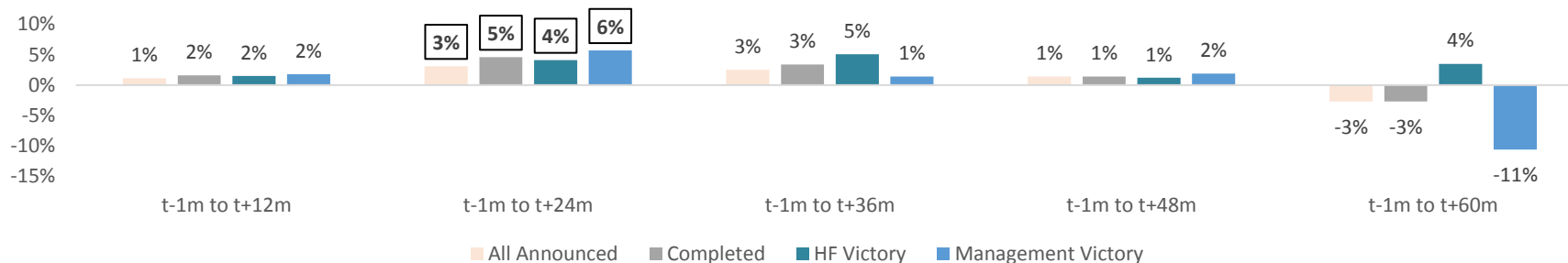


Figure 2 presents the performance of targets before hedge fund intervention. The sample is broken down per type of engagement outcome as follows: a) *All Announced* interventions, b) *Completed* interventions where the hedge fund disposed of its investment in the target company and the outcome was either that the demands of the hedge fund activist were partially or fully met or that the company's management was able to avoid implementing the proposed changes, c) *HF Victory* where the hedge fund's demands were partially or fully met, and d) *Management Victory* where the company's management was able to avoid implementing the proposed changes. Abnormal returns are calculated relative to each company's market index. In addition, Figure 3 presents the performance of the targets following hedge fund interventions. The returns have been calculated on the basis of the Buy-and-Hold Abnormal Returns (BHAR) methodology. BHAR are adjusted to each company's respective market index. We consider five different event windows: a) 13-month, b) 25-month, c) 37-month, d) 49-month and e) 61-month. Please refer to the Data and Methodology section of this report for a detailed description of the methodology of this study. Statistically significant returns are delineated in squares with bold font. The sample consists of 1, 750 hedge fund engagements globally announced between January 2000 and December 2014.

Figure 4: Target Performance following Hedge Fund Activism Relative to Comparable Firms: Breakdown per Engagement Outcome

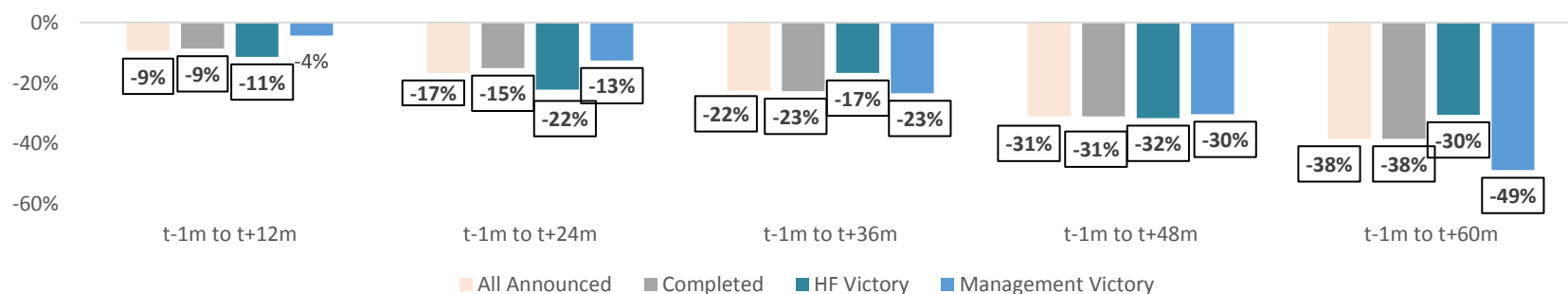


Figure 5: Target Performance following Hedge Fund Activism Relative to Comparable Firms: Breakdown per Engagement Type

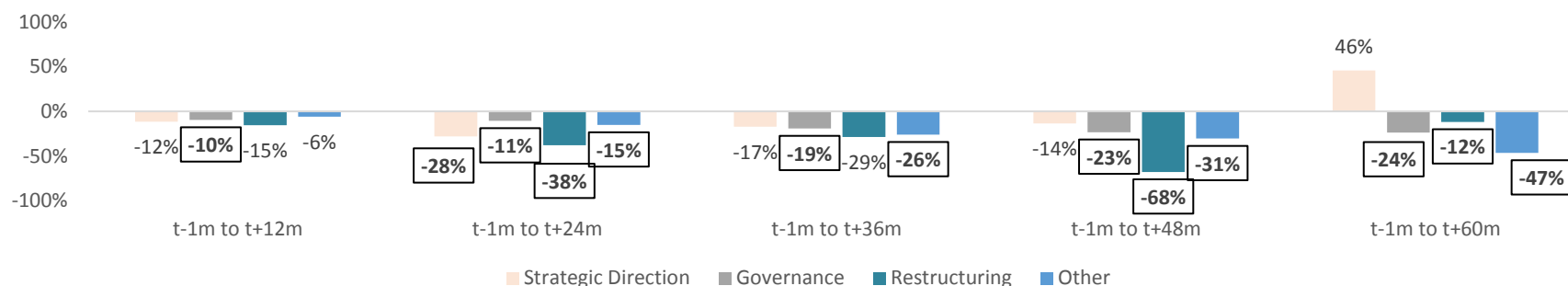


Figure 4 presents the performance of targets following hedge fund interventions relative to a comparable group of firms that were not targeted by activists. The sample is broken down per type of engagement outcome as follows: a) *All Announced* interventions, b) *Completed* interventions where the hedge fund disposed of its investment in the target company and the outcome was either that the demands of the hedge fund activist were partially or fully met or that the company's management was able to avoid implementing the proposed changes, c) *HF Victory* where the hedge fund's demands were partially or fully met, and d) *Management Victory* where the company's management was able to avoid implementing the proposed changes. Abnormal returns are calculated relative to each company's market index. In addition, Figure 5 presents the performance of the targets following hedge fund interventions relative to a comparable group of firms that were not targeted by activists. a) *Strategic Direction*, i.e. the activist is challenging the status quo of the firm without proposing any specific guidelines on how to achieve the change, b) *Governance*, i.e. the activist proposes changes at the board or senior management level as well as other changes that involve increasing the influence of shareholders, c) *Restructuring*, i.e. performing a spin-off, partial or full sale of the company's assets. All returns are adjusted to the respective market index of each company. The returns have been calculated on the basis of the Buy-and-Hold Abnormal Returns (BHAR) methodology. BHAR are adjusted to each company's respective market index. We consider five different event windows: a) 13-month, b) 25-month, c) 37-month, d) 49-month and e) 61-month. Please refer to the Data and Methodology section of this report for a detailed description of the methodology of this study. Statistically significant returns are delineated in squares with bold font. The sample consists of 1,750 hedge fund engagements globally announced between January 2000 and December 2014.

Appendix 1: Notes on Methodology

To perform the analysis in this study we construct an international database of exchange-listed targets of hedge fund activism which covers all engagements announced in the period January 2000 – December 2014. Our sample of hedge fund engagements is obtained from a number of different sources. First, we identify US hedge fund involvements by looking at Schedule 13D filings to the Securities and Exchange Commission (SEC). This type of filing is a legal requirement for any investor who holds 5% or more of a firm's shares and who intends to impact corporate control. We merge this database with the data provided by Thomson One Banker on activist interventions.

To identify the purpose of each hedge fund engagement we examine the 13D filings and other filings provided by Thomson One Banker. We also perform news searches to substantiate and complement the data obtained from company filings where necessary. Our final sample consists of 1,750 activist interventions. The top three countries with highest number of interventions in our sample are the US (1,465), United Kingdom (94), and Canada (81) and taken together these countries account for approximately 94% of the interventions in our sample.

Measures of post activist engagement performance

We measure performance on the basis of company share price returns using the buy-and-hold abnormal returns (BHAR) which accrue to companies over different event windows such as (+1m, +12m), (+1m, +24m), (+1m, +36m), (+1m, +48m), and (+1m, +60m).¹⁹ The BHAR approach to measuring abnormal returns has been widely used in

studies involving share price performance.²⁰ BHAR can be defined as “the average multiyear return from a strategy of investing in all firms that complete an event and selling at the end of a pre-specified holding period versus a comparable strategy using otherwise similar non-event firms.”²¹ An advantage of using BHAR is that this approach to measuring company share price performance is closer to investors' actual investment experience compared to the periodic rebalancing which other approaches to share price performance analysis involve. The BHARs are equally weighted and adjusted to the performance of the respective Datastream local index or MSCI industry index of each company over the same period.

Identifying a group of comparable companies

We use the Abadie and Imbens (2006) matching technique to evaluate the 'average treatment effect' from becoming the target of an activist intervention, i.e. the effect of the hedge fund's involvement on subsequent performance.²² This matching procedure is superior to the other methods since it does not involve any parametric assumptions regarding the distributions of the variables. Relaxing such assumptions is particularly important when using income and balance-sheet statement items because the distribution of these line items is not accurately captured by the logistic or normal distributions which are the two distributions used by other matching techniques. Please refer to Figure 6 for detailed definitions of all the variables included in our probability models.

¹⁹ Note that the BHAR analysis uses the total returns of a company, i.e. it includes share price appreciation or depreciation as well as the return from reinvesting the paid dividends.

²⁰ Barber, B. and Lyon, J., 'Detecting Long-run Abnormal Stock Returns: The empirical power and specification of test statistics', *Journal of Financial Economics*, Vol.43, 1997, pp. 341-72.

²¹ Mitchell, M. and Stafford, E., 'Managerial Decisions and Long-term Stock Price – performance', *Journal of Business*, Vol.73, No.3, 2000, pp. 287-329.

²² Abadie, A. and Imbens, G., 'Large Sample Properties of Matching Estimators for Average Treatment Effects', *Econometrica*, 75, 2006, 235–267.

Figure 6: Variable Definitions

Variable Name	Definition
Total return (3-year)	The geometric growth rate in the total return index of each company during the 3-year period before activist intervention
Net debt to market cap	The ratio of net debt to market capitalisation
Return on capital employed	$(\text{Net Income} - \text{Bottom Line} + ((\text{Interest Expense on Debt} - \text{Interest Capitalized}) * (1 - \text{Tax Rate}))) / \text{Average of Last Year's and Current Year's (Total Capital + Short Term Debt \& Current Portion of Long Term Debt)} * 100$
Undervaluation	The percentage difference between actual share price and the average analyst target price
Forward P/E ratio	$\text{SUM}(\text{IBNOSH} * \text{IBP}) / \text{SUM}(\text{F1FD12} * \text{IBNOSH})$ Where: F1FD12 = 12 Month Forward EPS Earnings Per Share IBNOSH = Number of Shares Outstanding IBP = Closing Price
Earnings surprise	The earning per share outcome for each company relative to analyst consensus estimates
Sales growth (3-year)	The geometric growth rate in net sales of each company during the 3-year period before activist intervention
Capex to sales	The ratio of capital expenditures to sales
Dividend yield	Expresses the dividend per share as a percentage of the share price
Price to free cash flow	The ratio of share price to the cash earnings per share, net of capital expenditures and total dividends paid
Market to book	The ratio of company market value to company book value
Cash to total assets	The ratio of cash and short-term investments divided by total assets
Market cap.	Market capitalisation
R&D to sales	The ratio of Research and Development expenses to sales
Closely Held Shares	Percentage of shares owned by company insiders
Share turnover	Share volume divided by adjusted shares outstanding

Appendix 2: Matching Target to Non-target Firms

The central question addressed by this report is: Would the target company's performance have improved without the hedge fund's involvement? To answer this question we estimate the average treatment effect of being targeted by a hedge fund activist. If the process of target allocation to hedge fund activism is exogenous, i.e. contingent upon a group of observable company characteristics, the treatment effect can be evaluated by building a control sample of non-target companies and then by averaging the differences in performance that take place between the target (treatment) and non-target (control) subsamples.

We use a recent econometric development in the analysis of average treatment effects created by Abadie and Imbens (2006). This matching procedure is arguably superior owing to the fact that it corrects for the presence of asymptotic bias in simpler matching procedures such as the propensity score matching methodology developed by Dehejia and Wahba (1999, 2002). This bias arises when the treated and control subsamples are not sufficiently comparable, i.e. the distributions of control variables (hedge fund target characteristics) of the treated and control subsamples are different.

The general set up

We discuss the general problem of obtaining consistent treatment effects estimates here. Let T be a variable which takes the value of one if a company is targeted by an activist hedge fund and zero otherwise. Let $S_n(T)$ be the level of the share price or total returns index as a function of T for observation n . Using this notation, $E(S_n(1)|T=1)$ represent the expected effect of being targeted by a hedge fund activist (the treatment) on the group of hedge fund targets (treated group). Likewise, $E(S_n(0)|T=1)$ represents the 'counterfactual' expected effect of not being targeted by a hedge fund activist, given that the firm experienced hedge fund involvement (i.e. treatment took place). In our analysis we examine the change in $S_n(T)$ relative to its level before the hedge fund

involvement, which is denoted as $\Delta S_n(T)$. By taking the change in the share price or total returns index we are able to control for time-invariant and unobservable differences between the target (treatment) and non-target (control) subsamples. This procedure is similar to differencing to remove fixed effects in a panel dataset. We estimate the average impact of becoming an activist target on company performance for a group of companies that were targeted by activist hedge funds, i.e. the average treatment impact on the treated:

$$\theta|_{T=1} \equiv E(\Delta S_n(1) - \Delta S_n(0)|T=1) \quad (1)$$

Since we cannot directly measure the effect of both being targeted by an activist hedge fund and not being targeted by a hedge fund on the same company, $E(\Delta S_n(0)|T=1)$ represents a hypothetical event that cannot be observed.

The recent studies on the impact of hedge fund activism on company performance have measured:

$$E(\Delta S_n(1)|T=1) \quad (2)$$

By averaging the difference in share price or total return index for targeted companies before and after hedge fund involvement. The problem with this method is that equation (2) is a biased estimator of equation (1), in any case apart from when $E(\Delta S_n(0)|T=1) = 0$. The latter situation would happen if the companies that were targeted by hedge funds would not have experienced any change in performance in the absence of the activist's involvement. This condition would only be true if hedge fund involvement is the sole way to enhance share price performance or if the targeted companies have no other characteristics that impact share price performance. The first requirement is false and the second one is a matter that can be determined empirically.

Since we cannot observe $\theta|_{T=1}$ we need to make certain assumptions in order to estimate the unobservable part of the function: $E(\Delta S_n(0)|T=1)$. The typical assumption in the treatment effects literature is that allocation to

treatment is random, dependent on a group of observable pre-treatment characteristics (i.e. observable variables that distinguish between hedge fund targets and non-targets), Z . Simple matching procedures use this assumption by assigning each treated observation to one or more untreated observations with similar pre-treatment characteristics, Z . Then, $E(\Delta S_n(0) | T = 1)$ is estimated by taking the average of $\Delta S_n(0)$ over the matches (control subsample). This makes it possible to obtain an estimate of $\theta|_{T=1}$ by taking the difference between $\Delta S_n(1)$ and estimate of $E(\Delta S_n(0) | T = 1)$.

How our methodology differs

There are two important differences between the simple matching procedures described above and the Abadie and Imbens (2006) procedure which are related to the fact that simple matching estimators are asymptotically biased when the vector of company characteristics Z contains more than one variable. When the matches of treated and non-treated observations are not exact the treatment effects estimator is asymptotically biased.

The first difference is the introduction of matching with replacement in order to minimise the asymptotic bias and the second difference is the estimation of a term that corrects for the bias. The bias correction is only necessary for the estimate of $E(\Delta S_n(0) | T = 1)$ as the term $E(\Delta S_n(1) | T = 1)$ can be observed directly. The bias correction is an estimate of the difference between two components. The first component is the impact of treatment on the control subsample with perfect matching.

The second component is the actual impact of treatment on the control subsample. To obtain these two terms it is necessary to estimate the conditional expectation of $\Delta S_n(0)$ given Z_n which is given by regressing $\Delta S_n(0)$ on Z_n on the basis of the control subsample. To estimate the conditional expectation we need to take $\widehat{\omega}_0(Z_n) \equiv \widehat{\beta}_0 + \widehat{\beta}_1 Z_n$, where $\widehat{\beta}_0$, s scalar, and $\widehat{\beta}_1$, a vector with the same dimension as Z_n , are the estimated coefficients from the regression. The bias corrected estimate of $E(\Delta S_n(1) | T = 1)$ is

equal to the simple regression estimate presented above plus a component which we denote as $\widehat{\omega}_0(Z_n) - \widehat{\omega}_0(Z_i)$. This component is defined as the difference between the predicted values of $\Delta S_n(0)$ using a group of controls for the n th treated observation and the group of controls for its associated match, indexed by i .

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Notes

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Cass Business School

In 2002, City University's Business School was renamed Sir John Cass Business School following a generous donation towards the development of its new building in Bunhill Row. The School's name is usually abbreviated to Cass Business School.

Sir John Cass's Foundation

Sir John Cass's Foundation has supported education in London since the 18th century and takes its name from its founder, Sir John Cass, who established a school in Aldgate in 1710. Born in the City of London in 1661, Sir John served as an MP for the City and was knighted in 1713.