The Consequences of Hedge Fund Activism on the Cash Holdings and Working Capital Management of the Target Firm

Master Thesis
Financial Economics
Erasmus School of Economics

William Ponsteen
355497

29th of August 2018 – Rotterdam

Supervised by
S.R. Mayer

Second reader:
dr. C.S. Pfeil

ABSTRACT

This research investigates the relationship between hedge fund activism and the cash holdings of the target firm and the relationship between hedge fund activism and the working capital management, as approximated by the cash conversion cycle, of the target firm. This research shows evidence of negative relationship between the target firm's cash holdings and hedge fund activism in the two years before the activism event and provides evidence that hedge fund activist target firms who lowered their cash holdings. This result is based on a sample of 36825 observations of 6596 US listed firms between the years 2005 and 2015. Furthermore, this research provides evidence of a positive relationship between the target firm's working capital management and hedge fund activism. It seems that firms which are targeted by hedge fund activists improve their efficiency by reducing their cash conversion cycle in the two years after the event. This result is based on a sample of 39626 observations of 6672 US listed firms between the years 2005 and 2015.

Keywords: Hedge Fund Activism, Hedge funds, Shareholder Activism, Cash Holdings, Working Capital Management, Cash Conversion Cycle

Table of Contents

LIST OF TABLES

CHAPTER 1 – Introduction

Shareholders are often passive investors, they do not intervene in the firm's strategy. However, they can become active if they think that the board of the firm is not maximizing the firm's full potential. If the performance of the firm does not reach its full potential, the shareholders do not get their maximal return of investment and are thus incentivized to intervene and try to change the firm's strategy. They generally can exercise their right as partial owner of the firm and try to seek influence in order to change the firm's strategy. This is exactly what hedge fund activists pursue. Hedge funds are characterized as an investment fund which is only open for sophisticated investors and is, as a result of that, less regulated by government authorities than other funds. This requires them to pursue different strategies in obtaining returns compared to for example mutual funds. Hedge fund managers are often largely rewarded with performance-based fees, which give them the incentive to perform well with the fund. To increase the values and operating performance, hedge funds target firms of which they think that they do not have reached their maximal potential and try to change the strategy of the firm. Klein & Zur (2009) mention in their research that hedge funds are very successful in their activism campaigns. They succeed in changing the strategy of the firm in 60% of all campaigns. Furthermore, research indicates that target firms of hedge funds have, on average, increased their values and operating performance (Denes, Karpoff & McWilliams, 2017). Intervention in the firm's strategy by a hedge fund seems to pay-off for the firm as well for the shareholders. A limited amount of research has been done on how hedge fund activists obtain these increased values and operating performance. It seems that firms which are targeted by hedge fund activists reduce the free cash flows of the firm (Klein & Zur, 2009) and thereby the agency costs as described by the free cash flow problem of Jensen (1986). No previous literature has been found on the relationship between hedge fund activism and working capital management. However, if the working capital management changes after a hedge fund activism campaign, hedge funds might increase values and operating performance by improving the working capital management (a.o. Shin & Soenen, 1998).

This research will first investigate the impact of hedge fund activist events on the cash holdings of the target firm. Secondly, it will extend existing literature with investigating the impact of hedge fund activism events on the working capital management of the target firm. Therefore, the central research question will be:

What is the relationship between hedge fund activism and the cash holdings or working capital management of the target firm?

This research is structured with different chapters to answer this question properly. The next chapter describes the existing literature on hedge fund activism with a focus on literature which also describes a possible relationship with cash holdings or working capital management. Chapter 3 explains the data collecting and variable constructing process. It also gives a description of the datasets used in the analyses. Chapter 4 provides the methodology and explains the choice for a fixed effects model. Chapter 5 describes the results and gives a summary of the computed robustness checks. Finally, in chapter 6 an answer on the research question will be provided next to the limitations of this research and suggestions for further research.

CHAPTER 2 – Theoretical Framework

This chapter discusses previous research regarding the effect of shareholder activism, specifically hedge fund activism, on firm's characteristics. In the first paragraph, the general literature about hedge fund activism will be discussed in a broad manner. The second paragraph focuses on literature about the specific consequences of hedge fund activism on the cash holdings of the firm. The third paragraph focuses on literature about the working capital management of the firm and if this changes as a consequence of a hedge fund activism campaign. This chapter also introduces and explains the hypotheses which will be tested in this research.

2.1 Shareholder Activism: Hedge Fund Activism

Critics of hedge fund activism argue that hedge fund activists only create value for the short-term and then cash out, leaving the firm in worse condition than before. They would be targeting firms with excess cash and try to extract this cash from the target firm by increasing dividend pay-outs or share repurchases (e.g. Wynn, 2005). Klein & Zur (2009) find some evidence for the claims that, on average, hedge fund targets double their dividends, decrease their cash and short-term investments and increase their debt ratio in the year after filing the 13D Schedule. This seems characteristic for hedge fund activists because other activists do not make this demands. It seems they are more interested in the investment strategies of the target firms by lowering the capital expenditures and the investment in R&D.

However, these consequences do not necessarily mean that hedge fund activists are only creating value for the short-term. Denes, Karpoff & McWilliams (2017) summarize the results of 73 studies about the effect of shareholder activism on the target firms and find that the absence of block holders is associated with a small or insignificant change in firm value. On the contrary, they find that the presence of block holders, and hedge funds in particular, are associated with an increasing (operating) return on assets or return on equity. According to them, hedge funds became more effective in the recent years. The find some evidence that shareholder activism did not have significant effects in the 1980s and 1990s, but this changed in the recent years. They conclude that investors are able to mimic successful investment strategies and this results in higher firms values and operating performance of target firms. This would imply that hedge fund activists are not only creating value for the short-term, but are also focused on the long-term.

Furthermore, according to Brav, Jiang, Partnoy & Thomas (2008) hedge funds have a median holding period of up to 22 months, while Boyson & Mooradian (2007) find that aggressive hedge fund activists stay active for on average two years. This also provides some evidence that hedge fund activists are not that short-term focused as critics claim.

2.2 Effect of Hedge Fund Activism on Cash Holdings

A possible explanation for the consequences of hedge fund activism is that hedge fund activists address the free cash flow problem which is described by Jensen (1986). According to Jensen, agency costs between the principal, represented by the shareholders, and the agent, represented by the managers, are reduced by lowering the amount of cash available to the managers and by increasing the interest payments and dividend pay-outs. Managers are incentivized to keep more cash than what is optimal for the firm. Thus in line with the free cash flow theory, target firms would have a lower amount of cash holdings after a (successful) hedge fund activism campaign. Hedge fund activists would try to change the strategy of the firm by lowering the amount of cash holdings in order to perform more optimal and thus increase performance and firm value. This could also imply that target firms should have a higher amount of cash holdings compared to non-target firms, because this would make it more easily for the hedge fund activist to achieve the more optimal performance. However, empirical research does not provides a clear outcome on these consequences.

First, it is difficult to conclude if hedge fund activists target firms with a higher amount of cash holdings compared to non-target firms based on previous research. Brav, Jiang, Partnoy & Thomas (2008) find in their dataset a lower cash-to-asset ratio of the target firms compared with the peers. Klein & Zur (2009) find that hedge fund activists target firms with a significant higher ratio of cash-to-assets and cash plus the short-term investment-to-assets compared to other activists, but were not able to find a significant difference compared to their control group in their univariate analysis. They did find some evidence that hedge fund activists target firms with a higher cash plus the short-term investment-to-assets ratio compared to their control group in their logistic model.

Second, most of the literature suggests that the amount of cash holdings decrease after the hedge fund activism event. This would be in line with addressing the free cash flow cash problem and previous research. Klein & Zur (2009) find some evidence that target firms decrease their cash holdings in the year after the hedge fund activism event. Boyson & Mooradian (2007) find that the post-intervention changes in cash holdings are related to whether the hedge fund pursues a more aggressive strategy, a more aggressive strategy results in a more significant change of the cash holdings of the target firm.

Based on previous empirical research and the free cash flow theory of Jensen, a negative relationship between hedge fund activism and cash holdings is expected.

Hypothesis 1: A negative relationship is expected between hedge fund activism event and the target firm's cash holdings

2.3 Effect of Hedge Fund Activism on Working Capital Management

No previous research about hedge fund activism or the presence of hedge funds and their relationship with working capital management has been found. However, in accordance with the earlier discussed review of Denes, Karpoff & McWilliams (2017), the presence of hedge funds as block holders is associated with an increasing return of assets or return of equity. Hedge funds activists force the board to adapt to their strategy and work more efficiently. The increasing return of assets or equity might be caused by a more efficient working capital management. Previous research found evidence of a negative relationship between the firm's performance and the cash conversion cycle (from now "**CCC**") as an approximation of working capital management, among others Deloof (2003), Lazaridis & Tryfonidis (2006) & Padachi (2006).[1] It is possible that hedge fund activists influence the CCC of the targeted firm to achieve a more efficient and better performing firm.

Based on the existing literature about the relationship between profitability and working capital management and the relationship of the presence of hedge funds on firm performance, a positive relationship between hedge fund activism and the target firm's working capital management is expected.

Hypothesis 2: A positive relationship is expected between hedge fund activism events the working capital management of the target firm

---

[1] These researches do not fully address the causality problem between firm performance and working capital management. This is often the case with research on determinants on working capital management, but can been seen as a limitation.

CHAPTER 3 – Data

This chapter will describe the datasets used in the analysis. In the first paragraph, the data collecting process from the databases and the matching process will be discussed. The second paragraph describes the construction process of the proxies used as variables and the filters to prevent measurement errors. This results in two datasets, one for the analysis on cash holdings and one for the analysis on working capital management. The third and last paragraph of this chapter gives a detailed description of these two datasets.

3.1 Data Collection

Data regarding the financial fundamentals of the firm are obtained from the Compustat Capital IQ North America database via Wharton Research Data Services (WRDS). Selected is the data from active and inactive publicly held firms which report their financial fundamentals in USD in the date range of January 2003 to December 2017.[2] The selected date range deviates from the scope of this research, but the two extra years before and after the years of interest are used to construct the lagged and lead dummy variables of hedge fund activism, see paragraph 3.2 for a more detailed explanation.

The data used to identify hedge fund activism events are gathered from the SharkWatch module of SharkRepellent.net, which is a corporate research tool focused on takeover defenses and corporate activism. The database only includes currently active public target firms that are incorporated in the United States. The input of this database is based on 13D filings. Investors are required by the SEC to file a 13D filing within ten days of the transaction when they own more than 5% of any class of the firm's shares in order to give transparency to the target firm and other shareholders. Investors also have to disclose their purpose of buying the shares. The threshold of owning at least 5% of the shares of the firm before any notification can cause a sample selection bias, because obtaining 5% of the shares of a large publicly traded firm can be very costly and it is possible that hedge funds obtain less than the threshold of 5% to start an activism campaign. The distribution of shares is also more dispersed for larger firms, so hedge funds will still become one of the larger shareholders when obtaining less than 5% of the firm's shares. Nevertheless, these hedge fund activism events are not included in the SharkWatch module so there could be a potential bias in the dataset towards hedge fund activities with smaller firms as target. Events of all available target firms with a hedge fund as activist type and announce date on or after 1 January 2003 to 31 December 2017 are selected.

The target firms of the hedge funds activism campaigns from the SharkWatch module are matched with the dataset of financial fundamentals from Compustat based on Cusip, non-matched target firms are

---

[2] Active and inactive firms are included in the datasets because excluding inactive firms would cause a survivorship bias. However, as a robustness check I excluded inactive firms and the results slightly change as discussed in paragraph 5.2 and 5.4.

removed from the sample. To match in a proper way, duplicate observations are excluded, meaning that similar combinations of Cusip and year of the observation are excluded. Observations with a missing Cusip are also removed from the dataset. Furthermore, target firms with a SIC code between 6000-6799 are dropped. These firms in financial services could influence the results because of deviating (statutory) capital requirements. This results in an unbalanced panel dataset with a total of 67741 observations distributed over 10336 firms and with 1059 hedge fund activism events.

3.2 Variable Construction

3.2.1 Construction of the Cash Holdings Analysis Variables

For the analysis on the cash holdings of the target firm, the dependent variable Cash holdings and the independent variables Size, Leverage, Cash flow, Liquid assets substitutes, Growth opportunities, Dividend and Activism are used. An explanation about the methodology and justification of using these variables can be found in paragraph 4.2.

Cash holdings is defined as the ratio of cash divided by total assets minus cash (from now the "net assets"). The cash of a firm is divided by the net assets instead of the total assets because of the view that the future profitability of the firm is related to the assets in place. This is in line with earlier research from Opler, Pinkowitz, Stulz & Williamson (1999) and Dittmar, Mahrt-Smith & Servaes (2002).

Size is measured as the natural logarithm of total assets. Leverage is constructed as the ratio of total of long-term debt divided by the total assets. The cash flows of the firms are constructed as the net income plus the depreciation divided by the net assets. As a substitute for liquid assets other than cash, the Liquid assets substitute variable is constructed and is defined as the net working capital divided by the net assets. Net working capital is measured by the current assets minus the current liabilities minus cash. The growth opportunities of the firm are captured with the market-to-book ratio and is constructed by multiplying the end-of-year closing price of the firm's share with the common shares outstanding, resulting in the market value of equity, divided by the outcome of the book value per share times the common shares outstanding, the book value of equity. A dummy for dividend pay-outs is constructed with the value of 1 in years of a dividend pay-out and a 0 in years without a dividend pay-out. For hedge fund activism, our variable of interest, the Activism dummy is created with the value of 1 in the case of an event and 0 otherwise. Next to dummy for a hedge fund activism event at t=0, there are also two lagged activism dummies constructed with a value of 1 if the hedge fund activism event is one year, or two years, after the event year and 0 otherwise. Furthermore, two lead activism dummies are constructed with the value 1 for one year, or two years, before the event year and 0 otherwise.

The observations with missing values of the cash ratio are dropped and cash ratio values above 1 are replaced with the value 1 to prevent measurement errors. Moreover, only observations with size values

7

bigger than 0 are kept to exclude small firms with total assets lower than 1 million USD. Leverage values greater or equal to 0 and with a maximum value of 1 are also kept, other observations are dropped. The observations of Cash flow and Liquid assets substitutes with values below minus 1 and above 1 are also filtered out to prevent measurement errors and get representative firms in the dataset. Finally, the values of the variables are winsorized at the 1% and 99% level to reduce the influence of potential outliers. This results in a dataset with 36825 observations of 6596 unique firms.

3.2.2 Construction of the Working Capital Management Analysis Variables

For the analysis on the working capital management of the target firm, the dependent variable Working capital management and the independent variables Profitability, Cash flow, Tangible assets, Growth opportunities, Leverage, Size and Activism are used. A explanation about the methodology and justification of using these variables can be found in paragraph 4.3.

A widely-used measure of working capital management is the cash conversion cycle ("**CCC**") (a.o. Shin and Soenen, 1998; De Loof, 2003). It is described as the time, in days, between the expenditures made for your materials and receiving your sales. It integrates the management of the firm's production, accounts receivable and accounts payable. If a firm has a long CCC, they have a large investment in working capital. The CCC is defined as the inventory divided by the cost of goods sold times 365 plus the accounts receivable divided by the sales times 365 minus the accounts payable divided by the cost of goods sold times 365.

Profitability of a firm is defined by the return on assets and is measured by dividing the EBIT by total assets. The cash flows of the firms are measured by taking the net income plus the depreciation divided by the total assets of the firm. The Tangible assets variable is constructed as the tangibility ratio of the firm which is constructed by subtracting the total assets with the intangible assets divided by the total assets. The firm's growth opportunities are approximated by the sales growth and is constructed by taking the sales of current year minus the sales of last year divided by the sales of last year. Leverage is measured as the ratio of total of long-term debt divided by the total assets. Size is measured as the natural logarithm of total assets. For hedge fund activism, a similar constructing process for the activism dummies as for the cash holdings analysis is done as described in paragraph 3.2.1. A dummy is created with the value of 1 in the case of an activism event and 0 otherwise. Furthermore, also two lagged and two lead activism dummies are created with a value of 1 if the hedge fund activism event is one or two years before or after the event year and 0 otherwise.

The observations with missing values and values above and below 3650 of the CCC are dropped to prevent measurement errors. Observations with size values bigger than 0 are kept to exclude small firms with total assets lower than 1 million USD. Leverage values greater or equal to 0 and with a maximum

value of 1 are also kept, other observations are dropped. The observations of Cash flow and Profitability values below minus 1 and above 1 are filtered out to prevent measurement errors and get representative firms in the dataset. Finally, the values of the variables are winsorized at the 1% and 99% level to reduce the influence of potential outliers. This results in a dataset with 39626 observations of 6672 unique firms.

3.3 Description of the Datasets

3.3.1 Description of the Cash Holdings Analysis Dataset

Table 1 gives us the descriptive statistics of the variables in the dataset used in the cash holdings analysis. For the total sample in Panel A, the average cash holdings of the firm-year observations in the dataset is 18.5% of their net assets. It can observed that the Cash holdings variable is somewhat distributed more towards the left side of 18.5% because the median is around 8.9% of the net assets.

The mean of the Size variable is 6.177 meaning that the average total assets of observations in the dataset is around 482 million USD where the smallest firm is around 3 million USD, the technology firm Cemtrex Inc., and the largest 100 billion USD in assets, being the energy corporation CononcoPhillips. The firms are leveraged around, on average, 18.2% of their net assets, varying from not leveraged at all to around 83%. The Cash flow variable is a little distributed towards the right side of the mean of 3% of net assets because the median is around 7.3% of the net assets. The mean of the Liquid assets substitutes variable is around 9.8% of net assets. The Growth opportunities variable has a lower amount of observations available compared to other variables, 45357 instead of 51666 observations, and has a mean value of almost 3. This implies that, on average, firms have substantial growth opportunities. Also quite of lot of firms pay out dividend as shown by the mean value of 0.411 of the Dividend dummy variable.

Furthermore, it can also be observed from Table 1 that the total number of observations for the hedge fund activism dummies differs. This makes sense because of the way this dataset is constructed. Because of missing observations in the unbalanced panel dataset, the value of the dummy of every observation in the years before and after the original event year is not known. Possibly, there could be a hedge fund activism event in the year prior to observation and it should have the value 1, or 0, and to prevent a bias in our results, these years do not have a value of 0 or 1 causing the total number of observations to decrease. Finally it can be seen from the means of the activism dummies that the amount of activism events relatively to the total number of observations slightly increase in the Activism dummies [t-1] and [t-2] and significantly decrease in the Activism dummies [t+1] and [t+2]. Table 3 describes the number of events within the total Activism dummies observations more detailed.

Table 1

Summary Statistics Variables Cash Holdings Analysis

The table provides variable means, standard deviations (in brackets), medians, the minimum and maximum values and the number of observations. Panel A shows the descriptive statistics of the total sample. Panel B shows similar descriptive statistics of a sample of firms who face hedge fund activism at least once in the period of 2005 to 2015.

Variables	Mean [SD]	Median	Min - Max	No. of observations
Panel A Full Sample				
Cash holdings	.185 [.243]	.089	.00 – 1.00	51666
Size	6.177 [2.328]	6.152	1.10 – 11.52	51666
Leverage	.182 [.201]	.125	.00 – .83	51666
Cash flow	.030 [.223]	.073	-.84 – .53	51666
Liquid assets substitutes	0.098 [.255]	.061	-.67 – .82	51666
Growth opportunities	2.906 [5.114]	1.948	-15.84 – 33.33	45357
Dividend	.411 [.492]	0	.00 – 1.00	51666
Activism [t=0]	.019 [.135]	0	.00 – 1.00	51666
Activism [t-2]	.022 [.147]	0	.00 – 1.00	42472
Activism [t-1]	.021 [.143]	0	.00 – 1.00	48037
Activism [t+1]	.014 [.117]	0	.00 – 1.00	50470
Activism [t+2]	.012 [.110]	0	.00 – 1.00	48576
Panel B Target Sample				
Cash holdings	.204 [.243]	.113	.00 – 1.00	6151
Size	6.325 [1.975]	6.165	1.10 – 11.52	6151
Leverage	.168 [.191]	.113	.00 – .83	6151
Cash flow	.055 [.185]	.082	-.84 – .53	6151
Liquid assets substitutes	0.122 [.239]	.099	-.67 – .82	6151
Growth opportunities	2.604 [4.108]	1.868	-15.84 – 33.33	6004
Dividend	.341 [.474]	0	.00 – 1.00	6151

Panel B of Table 1 shows the descriptive statistics of the firms which face hedge fund activism as a target firm at least once between the years 2005 to 2015. When comparing to the full sample in Panel A, it can be noticed that it seems that target firms have higher cash holdings and a slightly lower leverage. They also have higher cash flows, a higher amount of liquid assets substitutes and are slightly bigger than the average firm. The means of the Growth opportunities variable and the Dividend dummy variables have a lower value than compared to the full sample, suggesting that targets have less growth opportunities and pay out a dividend less often than the average firm in the sample.

From Table 2 it can be observed that the total number of hedge fund activism events has decreased compared to the collected dataset. This is due to the cleaning of the dataset as described in paragraph 3.2.1. The dataset contains 958 hedge fund activism events, or in other words, the dummy has the value 1 in 958 observations. Furthermore, it can observed the distribution of hedge fund activism events per year. In the years 2006 and 2007 the number of hedge fund activism events was relatively high. After that, the number of hedge fund activism events per year decreased, but is rising again since 2011. This might be explained by the Global Financial Crisis. The number of hedge fund activism events peaked just before the Crisis and is on its recovery ever since.

Table 2

Number of Hedge Fund Activism Events per Year I

The distribution of the hedge fund activism events in the years 2005 – 2015 in the dataset of the cash holdings analysis after the variable construction.

Year	Number of events	Year	Number of events
2005	65	2011	73
2006	107	2012	76
2007	136	2013	82
2008	76	2014	104
2009	53	2015	124
2010	62	Total number of events	958

It can be seen in Table 3 that the hedge fund activism event observations with the value 1 differ per dummy. This is because observations are needed in the years before and after the original event year and these observations are in some cases missing in the dataset. They are missing because the dataset is an unbalanced panel dataset. It can also be observed that the hedge fund activism event observations with the

value 1 in one year before the event year increases. This could also be explained in the way this dataset is constructed. In the dummy constructing process the years 2016 and 2017 are included and because there were a lot of hedge fund activism events in those years, the number of observations with a hedge fund activism event one year before the original event is even bigger than the original number of events in the dataset. Because of a low amount of hedge fund activism events in the years 2003 and 2004, this is not the case for the dummies with a one or two year lag.

Table 3

Number of Events per Activism Dummy I

Description of the number of observations with the value 1 per activism dummy from two years before the event [t – 2] to two years after the event [t + 2] in the dataset of the cash holdings analysis.

Dummy variable	*Number of events*	*Number of observations*
Two years before event [t-2]	943	42472
One year before event [t-1]	1010	48037
Event year [t=0]	958	51666
One year after event [t+1]	699	50470
Two years after event [t+2]	560	48576

3.3.2 Description of the Working Capital Management Analysis Dataset

Panel A of Table 4 describes the characteristics of the full sample used in the analysis on working capital management. On average, a firm from the dataset has a CCC of around 62 days. The median is around more than 53 days, so this means that the distribution is more concentrated to the left. The average profitability of the firms is around 1.6% of total assets, but the median is around 6%. This is caused by some firms with big losses, which are still included in the dataset despite the winsorizing. The latter is also the case with the distribution of the cash flows and tangible assets. A more right-skewed distribution is observed with the growth opportunities and the leverage of the firms. Firms grow on average with 25% based on sales per year, but this is caused by some influential observations since the median is around 7%. The average firm is levered around 18% of their total assets and have an average size of 472 million USD. The smallest firm in the sample is a little bit less than 3 million USD, being N-Viro International Corp. and the biggest firm with almost 107 billion USD in assets is AT&T Inc. The variables Tangible assets and Growth opportunities contains a smaller amount of observations compared to the other variables because of more missing observations.

Table 4

Summary Statistics Variables Working Capital Management Analysis

The table provides variable means, standard deviations (in brackets), medians, the minimum and maximum values and the number of observations. Panel A shows the descriptive statistics of the total sample. Panel B shows similar descriptive statistics of a sample of firms who face hedge fund activism at least once in the period of 2005 to 2015.

Variables	Mean [SD]	Median	Min - Max	No. of observations
Panel A Full sample				
CCC	62.096 [132.312]	53.619	-557.270 – 587.578	52708
Profitability	.016 [.188]	.059	-.764 – .374	52708
Cash flow	.018 [.198]	.066	-.791 – .379	52708
Tangible assets	.826 [.206]	.913	.205 – 1.00	51837
Growth opportunities	.243 [1.007]	.069	-.884 – 8.248	50950
Leverage	.183 [.202]	.126	.000 – .828	52708
Size	6.157 [2.365]	6.134	1.061 – 11.579	52708
Activism [t=0]	.019 [0.135]	0	.00 – 1.00	52708
Activism [t-2]	.022 [.147]	0	.00 – 1.00	43388
Activism [t-1]	.021 [.143]	0	.00 – 1.00	49062
Activism [t+1]	.014 [.117]	0	.00 – 1.00	51513
Activism [t+2]	.011 [.106]	0	.00 – 1.00	49667
Panel B Target sample				
CCC	67.937 [117.995]	54.521	-557.270 – 587.578	6305
Profitability	.037 [.147]	.061	-.764 – .374	6305
Cash flow	.039 [.160]	.070	-.791 – .379	6305
Tangible assets	.813 [.198]	.878	.205 – 1.00	6224
Growth opportunities	.136 [.651]	.053	-.884 – 8.248	6305
Leverage	.167 [.190]	.111	.000 – .828	6305
Size	6.284 [2.014]	6.119	1.061 – 11.579	6305

As also described in the previous paragraph, the amount of observations per activism dummy differs. This is because the way the dataset is constructed, see paragraph 3.3.1 for the full description. Table 6 describes the number of events within the total Activism dummies observations more detailed.

The target sample which is described in Panel B of Table 4, differs from the full sample. Firms who are targeted at least once by a hedge fund activist are included in this panel. Panel B suggests that targets have on average a higher CCC of almost 8 days, are more profitable and have higher cash flows. Furthermore, it seems that targets have less growth opportunities and are somewhat less levered. Targets also seems to be bigger than the average firm included in the full sample.

From Table 5 it can be observe that the dataset used in the working capital management analysis contains 980 hedge fund activism events. This is lower than the collected amount of hedge fund activism events because of the cleaning of the data as described in paragraph 3.2.2. The events are distributed over the years 2005 and 2015. There are relatively more observations in the years 2006, 2007, 2014 and 2015. The decrease of hedge fund activism events in the years 2008 and 2009 could be explained by the start Global Financial Crisis. The amount of hedge fund activism events starts to rise again in the year 2010 to and including year 2015.

Table 5

Number of Hedge Fund Activism Events per Year II

The distribution of the hedge fund activism events in the years 2005 – 2015 in the dataset of the working capital management analysis after the variable construction.

Year	Number of events	Year	Number of events
2005	66	2011	73
2006	107	2012	78
2007	141	2013	84
2008	79	2014	105
2009	58	2015	126
2010	63	Total number of events	980

Table 6 shows the number of events and the total number of observations per activism dummy. The total number of observations differs per activism dummy. This is caused because there are missing observations in the year(s) before and after the original event year as a consequence of an unbalance panel dataset. To prevent a distorting effect, the dummy does not get a value of 0 or 1 and is treated as a missing observation. The number of hedge fund activism events also differs per activism dummy. This is caused by the way the dummy is constructed as explained in paragraph 3.3.1, but the difference is mostly because the fact that were a lot of hedge fund activism events in the years 2016 and 2017 and a low number of events in the years 2003 and 2004. The consequence of the way the dummy is constructed is that there are more events in the Activism [t-1] dummy than the Activism [t=0] dummy.

Table 6

Number of Events per Activism Dummy II

Description of the number of observations with the value 1 per activism dummy from two years before the event [t – 2] to two years after the event [t + 2] in the dataset of working capital management analysis.

Dummy variable	Number of events	Number of observations
Two years before event [t-2]	960	43388
One year before event [t-1]	1020	49062
Event year [t=0]	980	52708
One year after event [t+1]	711	51513
Two years after event [t+2]	568	49667

CHAPTER 4 – Methodology

This chapter describes the methodology that is used for examining the relationships between hedge fund activism and cash holdings, and hedge fund activism and working capital management as mentioned in the hypotheses in the second chapter. Therefore this chapter is divided into three parts: the first paragraph describes the general methodology used in both of the analysis. The second paragraph is about the cash holdings analysis and the third paragraph about the analysis of working capital management.

4.1 Regression analysis

For investigating the relationship between hedge fund activism and cash holdings, and hedge fund activism and working capital management, a fixed effects model is used. A fixed effects models controls for unobserved heterogeneity, assuming this is constant over time.[3] A fixed effects model is more preferable than a random effects model because it is likely that the specific intercepts are correlated with the independent variables causing the random effects model to be inconsistent. After looking at them separately, firm and year-fixed effects in the regressions are included so that every observations has unique firm-year intercepts. Robust standard errors are used to account for heteroscedasticity. To control for potential multicollinearity of the variables, the variance inflation factor is calculated after every regression.

The regressions are first used on the total sample as described in Panel A of Table 1/Table 4 to see if there is a relationship between hedge fund activism and cash holdings, and hedge fund activism and working capital management. The regressions are also used on the target sample as described in Panel B of Table 1/Table 4 with varying time windows [t-k, t+k] with k=1 from k=5 to see if the investigated relationships also occurs with the condition that the firm is going to be a hedge fund activist target at some point in time. Otherwise the potential effects could also be caused by the fact that hedge funds just target firms who already improve their efficiency, so decrease their cash holdings or working capital management, without an effect of an activism event.

4.2 Regression analysis on Cash Holdings

To investigate the first hypothesis about the expected negative effect of hedge fund activism on the cash holdings of the target firm, regression (1) is computed. The first regression with cash holdings as dependent variable contains only 1 Activism dummy, the dummy in the year the event takes place, and some control variables to control for the omitted variable bias. The effect of the Activism dummy is

---

[3] In this analysis, the unobserved heterogeneity is assumed to be constant over time. This is often seen as an innocuous assumption. However, this might be a potential concern and it is thus not fully possible to eliminate an omitted variable bias.

captured by β, where the effect of the control variables $X_{i,t}$ is captured by γ. The year and firm-specific intercepts are denoted by $\alpha_{i,t}$ and the random errors terms are captured by $\varepsilon_{i,t}$.

$$Cashholdings_{i.t} = \alpha_{i,t} + \beta * Activism_{i,t} + \gamma * X_{i,t} + \varepsilon_{i,t} \tag{1}$$

The control variables $X_{i,t}$ are based on previous research of Opler, Pinkowitz, Stulz & Williamson (1999), Dittmar, Mahrt-Smith & Servaes (2002) and Bates, Kahle & Stulz (2009). The control variables included in $X_{i,t}$ are Size, Leverage, Cash flow, Liquid asset substitute, Growth opportunities and Dividend. According to the static trade-off theory, firm size would have a negative impact on the cash holdings of a firm. There are economies of scale in holding liquid assets so a bigger firm would benefit less from holding cash. Leverage is included to see whether firms hold more cash at the expense of more leverage. It is expected that a firm's leverage has a negative impact of the cash holdings according to the pecking order theory (Myers & Majluf, 1984). Manager would uses internal funds such as cash first before financing the firm through debt because of the costs of financing. Cash flow is included as a control variable because it is expected that is has a positive effect on cash holdings, firms with a higher cash flow accumulate more cash. Firms can also hold other liquid assets besides cash. It is relatively easy to discount certain liquid assets such as for example receivables by factoring or securitization in order to raise cash. Therefore, a negative effect is expected and Liquid assets substitutes is included as a control. Firms with a lot of growth opportunities value cash more because it will cost them more if they are financially constrained. A positive effect of Growth opportunities is therefore expected on the firm's cash holdings. Finally a dummy for dividend pay-outs is included because firms can easily gain extra cash holdings by cutting off the dividend, because of that a negative effect between dividend pay-outs and cash holdings is expected.

The second regression also includes dummies in the year before and after the hedge fund activism event. The effect of the lead t-1 and lagged t+1 activism dummies is captured by β_2 and β_3.

$$Cashholdings_{i.t} = \alpha_{i,t} + \beta_1 * Activism_{i,t} + \beta_2 * Activism_{i,t-1} + \beta_3 * Activism_{i,t+1} + \gamma * X_{i,t} + \varepsilon_{i,t} \tag{2}$$

The third regression also contains dummies in the two years before and after the hedge fund activism event. The effect of the lead t-2 and lagged t+2 activism dummies is captured by β_4 and β_5.

$$Cashholdings_{i.t} = \alpha_{i,t} + \beta_1 * Activism_{i,t} + \beta_2 * Activism_{i,t-1} + \beta_3 * Activism_{i,t+1} + \quad (3)$$
$$\beta_4 * Activism_{i,t-2} + \beta_5 * Activism_{i,t+2} + \gamma * X_{i,t} + \varepsilon_{i,t}$$

4.3 Regression analysis on Working Capital Management

The second hypothesis about the expected positive effect of hedge fund activism on working capital management is investigate by Regression (4). In the fourth regression only 1 Activism dummy, the dummy in the year the hedge fund activism event took place included as independent variable together with some control variables. The dependent variable in this regression is the CCC, the cash conversion cycle. The effect of the Activism dummy is captured by β, where the effect of the control variables $X_{i,t}$ is captured by γ. The year and firm-specific intercepts are denoted by $\alpha_{i,t}$ and the random errors terms are captured by $\varepsilon_{i,t}$.

$$CCC_{i.t} = \alpha_{i,t} + \beta * Activism_{i,t} + \gamma * X_{i,t} + \varepsilon_{i,t} \quad (4)$$

The control variables $X_{i,t}$ as determinants of the CCC are based on previous research of Baños-Caballero, García-Teruel and Martínez-Solano (2010) and Elbadry (2018). Profitability is included as control variable because as shown by Petersen and Rajan (1997) and Shin and Soenen (1998), firms with higher returns because of their dominance in the market, have a better working capital management. They have more bargaining power towards customers and suppliers and receive significant more credit from suppliers. Therefore, a negative effect of profitability on the CCC is expected. Firms with a higher leverage reflect a higher risk level and thus a higher risk premium, so I expected a negative effect of leverage on the working capital management. Empirical research has shown that size positively influences working capital management, a.o. Chiou, Cheng and Wu (2006). A possible explanation for this is that it might be cheaper for larger firms to invest in current assets because of a smaller information asymmetry. Large firms also have a smaller risk of bankruptcy as they tend to be more diversified than small firms, and this will have an effect on the trade credit granted to the firm (Niskanen and Niskanen, 2008).

There are also some control variables included of which there is evidence that they effect the working capital management of a firm, but the existing literature is not unambiguous about the direction of the effect. Cash flow is included because it represents the capacity to generate internal resources, but it is not clear in which direction the ability to generate internal resources affects the working capital

management of a firm. This similar with Tangible assets. Intangible assets hold more asymmetric information and this may lead to higher costs to raise funds and might decide the board to increase their CCC. On the other hand it is shown that investments in working capital are a substitute for an investment in fixed assets because they compete for funds if firms are financially constrained (Fazzari & Petersen, 1993). Finally, growth opportunities of a firm could also influence the working capital management and is therefore included as a control variable. Firms with a high growth opportunity expects to sell more in the future, and can built up inventories for expected sales. This will have a positive effect on the CCC. On the other hand, firms with a high growth opportunity will use the trade credit to financing their growth. This can have a negative impact on the CCC.

The fifth regression also includes dummies in the year before and after the hedge fund activism event. The effect of the lead t-1 and lagged t+1 activism dummies is captured by β_2 and β_3.

$$CCC_{i.t} = \alpha_{i,t} + \beta_1 * Activism_{i,t} + \beta_2 * Activism_{i,t-1} + \beta_3 * Activism_{i,t+1} + \gamma * X_{i,t} + \varepsilon_{i,t} \quad (5)$$

The sixth regression also contains dummies in the two years before and after the hedge fund activism event. The effect of the lead t-2 and lagged t+2 activism dummies is captured by β_4 and β_5.

$$CCC_{i.t} = \alpha_{i,t} + \beta_1 * Activism_{i,t} + \beta_2 * Activism_{i,t-1} + \beta_3 * Activism_{i,t+1} + \beta_4 * \qquad (6)$$
$$Activism_{i,t-2} + \beta_5 * Activism_{i,t+2} + \gamma * X_{i,t} + \varepsilon_{i,t}$$

CHAPTER 5 – Results

This chapter provides the results of the analysis based on the methodology described in the previous chapter. The first paragraph of this chapter describes the results of the relationship between hedge fund activism and the cash holdings of the targeted firm and is followed by the executed robustness checks. The third paragraph gives us the results on the relationship between hedge fund activism and working capital management and is followed by additional robustness checks.

5.1 Results of Hedge Fund Activism on Cash Holdings

Table 7 shows the result of the regression analysis on the cash holdings. In the first column of Table 7 only the control variables are included without year or firm-fixed effects. When year-fixed effects are included as seen in column II, there are no significant changes in the results. In column III, firm-fixed effects are included and the Cash flow variable becomes significant, but the Dividend dummy loses its significance. When including firm and year-fixed effects in the fourth column the Dividend dummy becomes statistically significant again at a 10% level, only the sign of the coefficient is the opposite direction as expected. The positive coefficient of 0.006 can be interpreted as a raise of the cash holdings ratio with on average 0.006 if a firm pays out a dividend. This is however of little economic significance. The control variables Size, Leverage and Liquid assets substitutes are of more economic significance and are statistically significant at a 1% level. They have a negative relationship with the cash holdings of a firm as expected in paragraph 4.2. The interpretation of the variables Leverage and Liquid assets substitutes is somewhat more difficult because these variables are constructed as ratios. E.g. if the Leverage ratio of a firm raises with 0.1 then it would have the cash holdings of the firm would decrease with almost 0.01. The Cash flow and Growth opportunities variable have as expected a positive relationship with the cash holdings of a firm at a 1% significance level. The impact of Growth opportunities on the cash holdings is, however, rather small. If the market-to-book ratio of a firm rises with 1, the impact on the cash holdings ratio is around 0.001.

Our variable of interest, the Activism dummy, is added to the regression in column V. The results show no significant relationship between hedge fund activism and the cash holdings of the firm. This might be caused by the fact that the date of the hedge fund activism event could also be at the end of the year. This means that there could be no effect of the activism campaign yet. The coefficients and significance of the other variables stay unchanged.

Table 7
Regression Analysis of Hedge Fund Activism on Cash Holdings

This table gives the results of the regression analyses with Cash holdings as dependent variable. Cash holdings is defined as the ratio of cash divided by net assets. Size is the natural logarithm of total assets. Leverage is the ratio of total of long-term debt divided by the total assets. Cash flow is the net income plus the depreciation divided by the net assets. Liquid assets substitutes are approximated by the net working capital divided by the net assets. Growth opportunities is defined by the market-to-book ratio. The Dividend variable is a dummy with the value of 1 when a firms pays out dividend.

Variables	(I)	(II)	(III)	(IV)	(V)	(VI)	(VII)
Size	-.014***	-.015***	-.038***	-.040***	-.040***	-.041***	-.042***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Leverage	-.331***	-.332***	-.101***	-.097***	-.097***	-.094***	-.093***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Cash flow	-.009	-.007	.113***	.114***	.114***	.110***	.111***
	(0.255)	(0.376)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Liquid assets	-.032***	-.031***	-.182***	-.177***	-.177***	-.191***	-.207***
substitutes	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Growth	.004***	.004***	.001***	.001***	.001***	.001***	.001***
opportunities	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Dividend	-.052***	-.052***	.004	.006*	.006*	.007**	.007*
	(0.000)	(0.000)	(0.181)	(0.068)	(0.068)	(0.026)	(0.058)
Activism [t=0]	-	-	-	-	-.006	-.007	-.010
					(0.344)	(0.205)	(0.125)
Activism [t-1]	-	-	-	-	-	-.017***	-.019***
						(0.002)	(0.002)
Activism [t-2]	-	-	-	-	-	-	-.013**
							(0.025)
Activism [t+1]	-	-	-	-	-	-.003	.002
						(0.696)	(0.733)
Activism [t+2]	-	-	-	-	-	-	.008
							(0.276)
Year-fixed effects	No	Yes	No	Yes	Yes	Yes	Yes
Firm-fixed effects	No	No	Yes	Yes	Yes	Yes	Yes
# obs.	45357	45357	45357	45357	45357	42078	36825
R-squared	.15	.15	.70	.70	.70	.71	.72
Adj. R-squared	-	.15	.64	.64	.64	.65	.67

***, **, * Significant at 1%, 5% and 10% level (p-values between parentheses)

In column VI, the activism dummies with one year deviation from the original hedge fund activism event date are included in the regression. The amount of observations is somewhat lower because of the missing observations of these activism dummies as explained in paragraph 3.3.1. The results provide evidence of a significant negative relationship with the cash holdings of the firm in the year before the hedge fund activism event at a 1% significance level. Firms that become a target in the year before the event have on average a lower cash holdings ratio of 0.019. When comparing this to the average cash holdings

ratio of 0.185, as described in paragraph 3.3.1, one could argue that there is a significant impact on the cash holdings on a firm. The results suggest that hedge fund activists target firms who lowered their cash holdings ratio. Lowering your cash holdings ratio might be interpreted by hedge fund activists as a signal that the firm is not managed efficiently and that it might be attractive to invest in. There is no evidence of a significant effect of the hedge fund activism event on the cash holdings in the year after the event, so it does not seem that hedge fund activist improves efficiency further by lowering the cash holdings ratio. However, there might be an effect on other efficiency measures. Another possible explanation is that the hedge funds already owned a certain amount of shares before the activism event and convinced the management to change their strategy and lower the cash holdings. However, the change of strategy might not be sufficient enough for the hedge funds and they start an activism campaign. The original activism dummy stays insignificant and the other control variables do not significantly change, only the Dividend dummy becomes more significant.

In column VII, the activism dummies with two year deviation from the original hedge fund activism event year are also included in the regression. Because these dummies are missing some more observations than the other dummies, the amount of observations decreases to 36825 observations. The results also provides evidence of a significant negative relationship with the cash holdings of the firm two years before the hedge fund activism event at 5% significance level. Although this effect is smaller than the 1-year effect, an average decrease of 0.013 is still of great economic significance. It seems that firms who become a hedge fund activist target lowered their cash holdings in the two years before the activism event. There is no evidence of a significant effect of the hedge fund activism event on the cash holdings in the years after the event. The original activism dummy stays insignificant and the other control variables do not significantly change, only the Dividend dummy becomes significant at 10% level again. The results in column VII provides somewhat more evidence for the possible explanations of a negative relationship between hedge fund activism and cash holdings described for the results of the regression in column VI.

The analysis on the full sample of the dataset in Table 7 shows indications of a significant relationship between a hedge fund activism event and the cash holdings of a firm in the years before the activism event. The results indicate that hedge fund activist targets have lower cash holdings in the years before an activism event. Table 8 provides the regression analysis with target firms only and includes observations based on different time windows to investigate if the found relationship still occurs. From column III to column V of Table 8, comparable results are received with column VII of Table 7 which is based on the whole sample. The activism dummies in the years before the activism event are statistically significant and have a comparable impact on the cash holdings of the firm. Table 8 provides more evidence of the negative relationship between hedge fund activism and the cash holdings on the target firm. It seems that hedge fund activists target firms who lowered their cash holdings and became more efficient in the last

years before a hedge fund activism event. Therefore, the first hypothesis is partially rejected because the results do not provide evidence for a negative relationship between hedge fund activism and the cash holdings of a targeted firm in the years after the event. It holds however for the years before an activism event.

Table 8
Regression Analysis of Hedge Fund Activism on Cash Holdings with target firms only

This table gives the results of the regression analyses with Cash holdings as dependent variable. The regression are computed on a sample of targets firms only with varying time windows [t-k, t+k] with k = 1, 2, 3, 4, 5. Cash holdings is defined as the ratio of cash divided by net assets. Size is the natural logarithm of total assets. Leverage is the ratio of total of long-term debt divided by the total assets. Cash flow is the net income plus the depreciation divided by the net assets. Liquid assets substitutes are approximated by the net working capital divided by the net assets. Growth opportunities is defined by the market-to-book ratio. The Dividend variable is a dummy with the value of 1 when a firms pays out dividend.

Variables	(VII) Table 7	(I) k=1	(II) k=2	(III) k=3	(IV) k=4	(V) k=5
Size	-.042***	-.055**	-.035**	-.035***	-.038***	-.39***
	(0.000)	(0.019)	(0.034)	(0.010)	(0.001)	(0.000)
Leverage	-.093***	.045	.026	.003	-.013	-.009
	(0.000)	(0.490)	(0.557)	(0.927)	(0.693)	(0.761)
Cash flow	.111***	.040	.051	.061*	.086***	.097***
	(0.000)	(0.413)	(0.184)	(0.058)	(0.002)	(0.000)
Liquid assets substitutes	-.207***	-.287***	-.227***	-.242***	-.260***	-.272***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Growth opportunities	.001***	.002	.002	.002**	.002**	.001**
	(0.000)	(0.188)	(0.121)	(0.005)	(0.028)	(0.025)
Dividend	.007*	-.023	.003	-.012	-.010	-.005
	(0.058)	(0.206)	(0.852)	(0.350)	(0.372)	(0.657)
Activism [t=0]	-.010	-.010	-.014	-.010	-.010	-.010
	(0.125)	(0.356)	(0.136)	(0.148)	(0.129)	(0.137)
Activism [t-1]	-.019***	-.019	-.019**	-.016**	-.017***	-.019***
	(0.002)	(0.123)	(0.045)	(0.019)	(0.007)	(0.003)
Activism [t-2]	-.013**	-	-.015	-.011*	-.011**	-.013**
	(0.025)		(0.147)	(0.063)	(0.042)	(0.019)
Activism [t+1]	.002	.011	-.007	-.002	-.002	-.001
	(0.733)	(0.369)	(0.533)	(0.788)	(0.822)	(0.894)
Activism [t+2]	.008	-	-.005	.000	-.001	.004
	(0.276)		(0.673)	(1.00)	(0.882)	(0.619)
Year-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Firm-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
# obs.	36825	2162	2762	3508	4137	4652
R-squared	.72	.86	.84	.82	.79	.77
Adj. R-squared	.67	.76	.77	.75	.74	.71

***, **, * Significant at 1%, 5% and 10% level (p-values between parentheses)

5.2 Robustness Checks on the Cash Holdings Analysis

To mitigate potential concerns, I perform some robustness checks on the analysis of cash holdings. One might argue that hedge fund activists decrease the cash holdings of a target firm by introducing a dividend pay-out, so that the potential effect of the hedge fund activism event is not captured by the Activism dummy but (partially) by the Dividend dummy. As a robustness check the dividend dummy is omitted in the regression in the first column of Table A1 in the Appendix. There are no significant changes in the results. It is also possible that hedge fund activists increase the leverage of the target firm to extract more cash and thereby influencing the effect of the activism dummy on the cash holdings of the firm. When omitting Leverage in the regression as shown in the second column, no significant changes in the results are found. Furthermore, hedge funds activists could also try to influence the investment in working capital, but when omitting Liquid assets substitutes in the third column the results show no significant changes.[4] When omitting the Growth opportunities variable because of a lower amount of available observations, no changes were found as shown in the fourth column. As control for influence of outliers of the cash ratio, a regression is computed with the log of the cash ratio as dependent variable in the fifth column. Except for the insignificance of the Activism dummy [t-2], the results do not change significantly. To see if there are some sticky effects , an aggregate dummy for hedge fund activism was constructed with the value 1 in the event window [t-2, t+2] as an extreme case, but no significant dummy is found.

More checks are performed in Table A2 in the Appendix. As mentioned earlier when selecting only active firms and leaving the inactive firms out of the dataset in the first column, the Activism dummy [t=0] becomes significant, but the Activism dummy [t-2] loses its significance. When dropping the events with the hedge fund activism campaign still open or multiple events at the same target firm during the years 2005-2015 in the column II and III, no changes in results are seen. In the fourth column a regression with only successful events is computed. This is constructed by keeping the events which were successful in the governance demands according to the SharkRepellent database. There are 334 (successful) hedge fund activism events left, but dropping the other events does not have a significant impact on the results. To control for potential arbitrageur risk events as mentioned by Brav, Jiang, Partnoy & Thomas (2008), potential events with arbitrageur risk are left out the hedge fund activism dataset.[5] Hedge funds activists who are engaged in merger-and-acquisition related risk arbitrage do have other motives and pursue other consequences and could therefore influence the results. This resulted in 927 hedge fund activism events, but dropping these events do not lead to significant changes as shown in column V. Moreover, there is also

---

[4] Only the Activism dummy [t-2] becomes somewhat less significant and the Activism dummy becomes slightly significant on a 10% level. The effect of the latter, as mentioned earlier, might be distorted by the fact that not yet every activism event could have an effect on the target firms.

[5] This is done by dropping the events which contained 'to be acquired' in the Outcome column of the SharkRepellent database.

investigated in columns VI and VII if the amount of shares a hedge fund owns at announcement of the activism event have impact, but no significant effect is found.

Finally, Table A3 provides us the influence of the different kinds of events which are collected under the definition of hedge fund activism to see if there are any differences in the results when distinguish the activism event into different events. The total sample contains 237 proxy fights, 146 no publicly disclosed events, 9 exempt solicitations[6] and 566 other stockholders campaigns. These dummies still shows significant relationships between the activism event and the cash holdings of the firm. The effect of the Activism dummy [t-1] seems to be caused by the proxy fights and other stockholders campaigns, while the effect of the Activism dummy [t-2] seems to be caused by no publicly disclosed events.

5.3 Results of Hedge Fund Activism on Working Capital Management

Table 9 gives us the result of the regression analysis on working capital management. In the first column, the column without year or firm-fixed effects, every included control has a significant effect on the CCC at a 5% or 1% level. In the second column with the year-fixed effects, no significant changes in coefficients or significance can be seen. However, when including firm-fixed effects in the third column the sign of the coefficients of Profitability, Cash flow, Leverage and Size change direction. These directions do no change when including both year and firm-fixed effects and shown in column IV. Profitability has a negative impact on the CCC as expected in previous research discussed in paragraph 4.3. The leverage of a firm has a positive relationship with the CCC of the firm, this is also in accordance with previous research. The firm's cash flow and tangibility seem to have a positive relationship with the CCC, while the result of Growth opportunities shows a negative one. As discussed in paragraph 4.3, it was not clear how these variables would influence the CCC but the results show that they have a relationship with the CCC on a 5% or 1% significance level. Size is also found to be statistically significant, but according to Table 9 with a positive effect on the CCC. This is the opposite direction as expected. The variables Profitability, Cash flow, Tangible assets and Leverage are interpreted as the effect of a change in the ratio on the CCC e.g. if the leverage ratio of a firm increases by 0.1 the CCC increases on average with around 1 day. The results suggests that more profitable firms with higher growth opportunities have a more efficient working capital management, while bigger, more leveraged firms with higher cash flows and more tangible assets have a less efficient working capital management.

---

[6] The exempt solicitations are left out because of the low amount of observations.

The Activism dummy, one of the variables of interest, is added to the regression in column V. There is no significant effect of hedge fund activism on the working capital management of the firm. The coefficients and significance of the other variables stay unchanged.

<div align="center">

Table 9
Regression Analysis of Hedge Fund Activism on Working Capital Management

</div>

This table gives the results of the regression analyses with the CCC as dependent variable. The CCC is defined as the inventory divided by the cost of goods sold times 365 plus the accounts receivable divided by the sales times 365 minus the accounts payable divided by the cost of goods sold times 365. Profitability is defined by the return on assets. Cash flow is the net income plus the depreciation divided by the total assets. Tangible assets is the tangibility ratio of a firm. Growth opportunities are approximated by the sales growth. Size is the natural logarithm of total assets.

Variables	(I)	(II)	(III)	(IV)	(V)	(VI)	(VII)
Profitability	109.871***	111.235***	-64.798***	-65.122***	-65.122***	-68.714***	-71.796***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Cash flow	-80.516***	-80.706***	13.221**	12.634**	12.641**	12.836**	22.395***
	(0.000)	(0.000)	(0.028)	(0.037)	(0.037)	(0.049)	(0.001)
Tangible assets	17.469***	17.730***	23.420***	23.805***	23.826***	22.511***	18.248***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.005)
Growth opportunities	-7.431***	-7.305***	-2.607***	-2.658***	-2.659***	-2.738**	-3.211**
	(0.000)	(0.000)	(0.002)	(0.002)	(0.002)	(0.024)	(0.022)
Leverage	-57.017***	-57.202***	11.188**	11.143**	11.154**	18.341***	23.742***
	(0.000)	(0.000)	(0.011)	(0.011)	(0.011)	(0.000)	(0.000)
Size	-.600**	-.714**	11.039***	11.911***	11.920***	10.720***	9.272***
	(0.035)	(0.013)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Activism [t=0]	-	-	-	-	-3.152	-5.100**	-5.192**
					(0.165)	(0.043)	(0.026)
Activism [t-1]	-	-	-	-	-	-.734	-1.940
						(0.734)	(0.448)
Activism [t-2]	-	-	-	-	-	-	-5.192**
							(0.017)
Activism [t+1]	-	-	-	-	-	-5.912**	-7.517**
						(0.044)	(0.022)
Activism [t+2]	-	-	-	-	-	-	-9.152***
							(0.008)
Year-fixed effects	No	Yes	No	Yes	Yes	Yes	Yes
Firm-fixed effects	No	No	Yes	Yes	Yes	Yes	Yes
# obs.	50095	50095	50095	50095	50095	45579	39626
R-squared	.15	.15	.76	.76	.76	.77	.78
Adj. R-squared	-	.15	.71	.71	.71	.72	.74

***, **, * Significant at 1%, 5% and 10% level (p-values between parentheses)

In column VI, the activism dummy with one year deviation from the original hedge fund activism event year are included in the regression. The number of observations decreases because of the missing observations of the one year lead and lead Activism dummies. There is evidence of a significant negative effect on the CCC of the firm in the year after the hedge fund activism event. When a hedge fund activism event takes place in a target firm, this results in a lower CCC with on average around 6 days. As described in paragraph 3.3.2, the average CCC of a target firm is around 68 days and an impact of 6 days can be considered as economically significant. The results suggest that firms become more efficient in managing their working capital management after facing a hedge fund activism event. There is no evidence of a significant effect of the hedge fund activism event on the working capital management in the year before the event. The original activism dummy becomes significant at a 5% level as well and shows a negative effect of more than 5 days on the CCC. However, this effect is not unambiguous because no effect is found in column when only including the original Activism dummy. The other control variables do not significantly change, only the Growth opportunities variable becomes somewhat less significant.

In column VII, the activism dummy with two year deviation from the original hedge fund activism event year are also included in the regression. Besides the significant relationship of the Activism dummy with a one year lag on the CCC, there also is evidence of a significant negative relationship on the CCC of the firm two years after the hedge fund activism event. This coefficient is even higher with a negative impact of more than 9 days on the CCC. These results imply that the improved efficiencies could not be achieved in just one year. The efficiencies are improved further for at least two years after a hedge fund activist target the firm. There is also evidence of a significant effect of the hedge fund activism event on the working capital management two years before the event. It seems that hedge fund activist targets improved their working capital management two years before the activism event, but do not reach their maximum efficiency level. The original activism dummy stays significant, but as mentioned earlier the effect is not unambiguous. The other control variables do not significantly change, only the coefficient of the Cash flow variable has a bigger influence and is more significant.

The significant relationship between hedge fund activism and working capital management needs further investigation to see if hedge fund activists just target firms who already improve their working capital management or if this improvement in efficiency is caused by the hedge fund activism event. Therefore, Table 10 provides us the results of the regression analysis with target firms only based varying time windows. The regression of the second column only contains observations within one year before or after the hedge fund activism event while the sixth column included observations five years before and after the event date. The results of our variables of interest, the activism dummies, do not differ a lot from the results found in column VII of Table 9. The original Activism dummy, the Activism dummy [t-2], the Activism dummy [t+1] and Activism dummy [t+2] are still significant at the same significance levels in

Table 10
Regression Analysis of Hedge Fund Activism on Working Capital Management with target firms only

This table gives the results of the regression analyses with the CCC as dependent variable. The regression are computed on a sample of targets firms only with varying time windows [t-k, t+k] with k = 1, 2, 3, 4, 5. The CCC is defined as the inventory divided by the cost of goods sold times 365 plus the accounts receivable divided by the sales times 365 minus the accounts payable divided by the cost of goods sold times 365. Profitability is defined by the return on assets. Cash flow is the net income plus the depreciation divided by the total assets. Tangible assets is the tangibility ratio of a firm. Growth opportunities are approximated by the sales growth. Size is the natural logarithm of total assets.

Variables	(VII) Table 9	(I) k=1	(II) k=2	(III) k=3	(IV) k=4	(V) k=5
Profitability	-71.796***	-117.421***	-28.112	-51.695	-39.884	-41.316
	(0.000)	(0.007)	(0.483)	(0.126)	(0.205)	(0.139)
Cash flow	22.395***	-2.046	-.468	30.905*	16.639	15.402
	(0.001)	(0.925)	(0.981)	(0.080)	(0.316)	(0.316)
Tangible assets	18.248***	-44.184	-22.246	-33.834	-15.355	-24.552
	(0.005)	(0.271)	(0.498)	(0.177)	(0.611)	(0.326)
Growth opportunities	-3.211**	14.053**	2.492	.553	.631	.132
	(0.022)	(0.033)	(0.720)	(0.933)	(0.923)	(0.983)
Leverage	23.742***	98.301***	98.076***	81.892***	74.725***	60.936***
	(0.000)	(0.007)	(0.000)	(0.000)	(0.000)	(0.000)
Size	9.272***	-4.881	4.213	-3.703	1.303	-.354
	(0.000)	(0.716)	(0621)	(0.607)	(0.838)	(0.946)
Activism [t=0]	-5.192**	-2.614	-2.032	-5.448*	-7.038**	-7.131**
	(0.026)	(0.580)	(0.630)	(0.082)	(0.021)	(0.017)
Activism [t-1]	-1.940	2.863	1.317	-1.006	-2.423	-2.438
	(0.448)	(0.591)	(0.606)	(0.734)	(0.390)	(0.371)
Activism [t-2]	-5.192**	-	2.806	-3.625	-5.384**	-5.334**
	(0.017)		(0.507)	(0.143)	(0.021)	(0.017)
Activism [t+1]	-7.517**	-4.208	-4.349	-7.063**	-7.911**	-8.149**
	(0.022)	(0.431)	(0.272)	(0.030)	(0.017)	(0.016)
Activism [t+2]	-9.152***	-	-5.877	-9.141**	-9.989**	-10.284***
	(0.008)		(0.184)	(0.013)	(0.005)	(0.003)
Year-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Firm-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
# obs.	39626	2166	2790	3565	4215	4751
R-squared	.78	.90	.87	.84	.82	.82
Adj. R-squared	.74	.82	.81	.78	.77	.77

***, **, * Significant at 1%, 5% and 10% level (p-values between parentheses)

columns IV and V. The coefficients of these activism dummies in the last two columns are even slightly higher compared to the results when including the whole sample. The results of Table 10 show more evidence that the decrease in the CCC is due to the hedge fund activism event. If firms face a hedge fund activism event, they improve on average their efficiency by reducing their CCC. This improvement in

efficiency cannot be achieved in just one year after the hedge fund activism event and further improvement is found in the second year after the event. This is in line with hypothesis 2 and is therefore not rejected.

5.4 Robustness Checks on the Working Capital Management Analysis

Some additional robustness checks on the analysis of working capital management are provided in Tables A4, A5 and A6. These tables are located in the Appendix. In column I of Table A4 the Leverage variable is omitted in the regression because hedge fund activists might demand a higher leverage and with the consequence that the impact of the hedge fund activism is not captured by the Activism dummies. When omitting the Leverage variable the results do not change significantly. In column II I included the variable Cash holdings because as discussed in theory, hedge fund activists can demand lower cash holdings and this could have influence on the CCC. However, when including the Cash holdings variable no significant changes in the significance or coefficients of the activism dummies are found. To control for the stickiness of an event, an aggregate dummy[7] for the most extreme case is constructed in the third column. The significance of the dummy shows an indication of the negative relationship between the hedge fund activism event and the CCC. When including the interaction variable between a hedge fund activism event and the amount of shares owned by the hedge fund activist at the start of the activism event, no significant results of the interaction variable are found in the year of the activism event or one or two years later.

In column I of Table A5, the inactive firms are left out the dataset and although the significance of the Activism dummy [t+1] and Activism dummy [t+2] becomes somewhat less, the results still show evidence of a negative relationship between hedge fund activism and the CCC. As shown in column II, no significant changes occur when dropping the events of which are the hedge fund activism campaigns still open. The third column shows the results of the regression based on the dataset where firms who face multiple events are dropped. The Activism dummy [t+1] loses its significance, but the negative relationship of the Activism dummy [t+2] becomes almost 1.5 times bigger. When including only successful events as an activism event[8], the Activism dummy and the Activism dummy [t+2] loses its significance and the effect of the Activism [t+1] becomes almost 1.5 times bigger as shown in the fourth column. In the fifth column the events which face potential arbitrageurs risk[9], as described more extensively in paragraph 5.2, are left out the dataset. This results in 948 hedge fund activism events left, but does not result in significant changes.

---

[7] The dummy has a value of 1 in the two years before and after the hedge fund activism event besides the original year.

[8] This is constructed by keeping the events which were successful in the governance demands according to the SharkRepellent database.

[9] This is done by dropping the events which contained 'to be acquired' in the Outcome column of the SharkRepellent database.

Table A6 is included in the Appendix to control for effects of the different kind of hedge fund activism events. The total sample contains 235 proxy fights, 152 no publicly disclosed events, 9 exempt solicitations[10] and 584 other stockholders campaigns. These dummies still shows significant relationships between the activism event and the cash holdings of the firm. The effect of the Activism dummy [t+1] seems to be caused by the proxy fights and other stockholders campaigns, while the effect of the Activism dummy [t+2] also seems to be caused by other stockholders campaigns. The effect of the Activism dummy [t-2] seems to be caused by proxy fights.

---

[10] The exempt solicitations are left out because of the low amount of observations.

CHAPTER 6 – Conclusion & Discussion

6.1 Conclusion

This research has investigated the consequences of hedge fund activism on the cash holdings and working capital management of the targeted firm and tries to identify relationships between them. These potential consequences and relationships could give an insight how hedge fund activists increase the values and operating performance of their investments. The results provide an extension of previous research about the impact of hedge fund activism on their targets, with a unique contribution of the significant relationship between hedge fund activism and working capital management. The results are obtained with using a fixed effect model with year and firm-fixed effects on a dataset consisting of US listed firms from the period 2005 to 2015. Hedge fund activism events are identified by regulatory 13D filings of hedge funds.

A negative relationship between hedge fund activism and the cash holdings has been found. Firms lowered their cash holdings ratio in the years before a hedge fund activism event with the magnitude of 0.019 in the year before and 0.013 two years before. Seemingly, hedge fund activist target firms who lower their cash holdings. If a firm lowers their cash holdings it might be a signal for a hedge fund activist that the firm is not managed efficiently. However, no significant results can be obtained of a relationship between hedge fund activism and the cash holdings of the target firm in the years after the event, but there might be an effect on other efficiency measures. Another possibility is that hedge funds already own a certain amount of shares below the 5% threshold and manage to convince the managers to lower their cash holdings, but it takes more effort to convince them to take other efficiency measures. The found results do not support the results found by Klein & Zur (2009) who find lower cash holdings of the target firm in the first year after the 13D filing neither do they provide support for the claim that hedge fund activist address the free cash flow problem of Jensen (1986) in order to improve performance.

This research also provides evidence of a significant relationship between hedge fund activism and working capital management. It seems that the target firms decrease their CCC, thus improve their working capital management, in the two years after the activism event. The magnitude of the relationship is of great economics influence with an average decrease of the CCC of more than 8 days in the first year and an average decrease of more than 10 days in the second year after the event. The more efficient management of working capital might be one of the drivers of the increased values and operating performance of hedge fund activist targets. More research is provided to conclude the latter, but is beyond of the scope of this research. This research only provides an indication of a potential driver of the strategy of hedge funds. It also seems that targets improved their working capital management two years before the activism event, but did not reach their maximum efficiency.

6.2 Discussion

The found results provide evidence of existing relationships, but one has to be careful interpreting them. There are some potential issues which can have an effect on the results. These issues can be divided into issues regarding the data and issues regarding the methodology.

The dataset used to perform the analysis could be influenced by a potential selection bias towards small firms who face hedge fund activism. This research uses 13D filings as an identifier for hedge fund activism events, but these filings are only needed in case the hedge fund activist obtains 5% of the total amount of outstanding shares. Obtaining 5% of the total amount of outstanding shares for large firms is extremely expensive and it might be questionable if hedge funds could afford such an investment or are willing to spend such a relatively large amount of their fund to one investment. Furthermore, the distribution of shares of large firms is often more dispersed and owning less than 5% of the shares is required to gain influence as a block holder. So it is possible that hedge fund activists target larger firms than included in the dataset and it is not clear if the found results are valid for large targets.

The fixed effect model methodology used for the analysis assumes that unobservable confounders are time invariant. If this assumption does not hold there could still be an omitted variable bias. An omitted variable bias can cause problems with the identification strategy and one has to be careful with concluding about the causal relationship between hedge fund activism and cash holdings and the relationship between hedge fund activism and working capital management. This is a common known problem in the research field of shareholder activism and corporate finance. A suggestion to tackle these endogeneity issues is to identify investors, for this research specifically hedge funds, who switch from a passive investor to an active investor. Passive investors can be identified with the filing of a 13G filing. If they want to become active they have to refile a 13D filing. Another possibility to identify passive investors is based on a 13F filing. Investors with at least 100 million USD in equity assets under management are obliged to quarterly report their holdings. If a 13F filing is followed by a 13D filing in a certain period of time, the investor switches from a passive investor to an active investor. It is also possible to reduce the bias of confounding variables and address potential endogeneity issues with the use of a propensity score matching technique. It compares outcomes of the group that gets the treatment, in this case this would be firms who face a hedge fund activism event, and a control group. This control group is matched with firms in the treatment group on the propensity score which is based on certain firm characteristics. However, these identification strategies are beyond the scope of this research due to the fact that these strategies are very time-consuming and are therefore suggestions for further research.

APPENDIX A – Robustness Checks

Table A1
Robustness checks on Cash Holdings I

This table gives the results of the robustness checks on the regression analyses with Cash holdings as dependent variable. Cash holdings is defined as the ratio of cash divided by net assets. Size is the natural logarithm of total assets. Leverage is the ratio of total of long-term debt divided by the total assets. Cash flow is the net income plus the depreciation divided by the net assets. Liquid assets substitutes are approximated by the net working capital divided by the net assets. Growth opportunities is defined by the market-to-book ratio. The Dividend variable is a dummy with the value of 1 when a firms pays out dividend.

Variables	(VII) Table 7	(I)	(II)	(III)	(IV)	(V)	(VI)
Size	-.042***	-.042***	-.045***	-.044***	-.033***	-.256***	-.040***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Leverage	-.093***	-.094***	-	-.106***	-.098***	-.864***	-.097***
	(0.000)	(0.000)		(0.000)	(0.000)	(0.000)	(0.000)
Cash flow	.111***	.112***	.119***	.094***	.105***	.544***	.114***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Liquid assets substitutes	-.207***	-.207***	-.211***	-	-.198***	-.619***	-.177***
	(0.000)	(0.000)	(0.000)		(0.000)	(0.000)	(0.000)
Growth opportunities	.001***	.001***	.001***	.001***	-	.005***	.001***
	(0.000)	(0.000)	(0.000)	(0.000)		(0.001)	(0.000)
Dividend	.007*	-	.007**	.006*	.005	.026	.006*
	(0.058)		(0.035)	(0.088)	(0.111)	(0.203)	(0.067)
Activism [t=0]	-.010	-.010	-.010	-.011*	-.009	-.037	-
	(0.125)	(0.126)	(0.122)	(0.084)	(0.164)	(0.331)	
Activism [t-1]	-.019***	-.019***	-.019***	-.020***	-.018***	-.133***	-
	(0.002)	(0.002)	(0.001)	(0.001)	(0.004)	(0.000)	
Activism [t-2]	-.013**	-.012**	-.012**	-.011*	-.010*	-.038	-
	(0.025)	(0.025)	(0.026)	(0.051)	(0.086)	(0.238)	
Activism [t+1]	.002	.002	.002	.003	.003	.014	-
	(0.733)	(0.722)	(0.795)	(0.715)	(0.625)	(0.722)	
Activism [t+2]	.008	.008	.008	.008	.009	.063	-
	(0.276)	(0.277)	(0.295)	(0.296)	(0.209)	(0.127)	
Aggr. Activism	-	-	-	-	-	-	-.006
							(0.199)
Year-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
# obs.	36825	36825	36825	36825	40288	36640	45357
R-squared	.72	.72	.72	.71	.72	.77	.70
Adj. R-squared	.67	.67	.67	.66	.67	.72	.64

***, **, * Significant at 1%, 5% and 10% level (p-values between parentheses)

Table A2
Robustness check on Cash Holdings II

This table gives the results of the robustness checks on the regression analyses with Cash holdings as dependent variable. Cash holdings is defined as the ratio of cash divided by net assets. Size is the natural logarithm of total assets. Leverage is the ratio of total of long-term debt divided by the total assets. Cash flow is the net income plus the depreciation divided by the net assets. Liquid assets substitutes are approximated by the net working capital divided by the net assets. Growth opportunities is defined by the market-to-book ratio. The Dividend variable is a dummy with the value of 1 when a firms pays out dividend.

Variables	(VII) Table 9	(I)	(II)	(III)	(IV)	(V)	(VI)	(VII)
Size	-.042***	-.040***	-.042***	-.042***	-.042***	-.042***	-.042***	-.042***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Leverage	-.093***	-.098***	-.093***	-.094***	-.093***	-.093***	-.093***	-.093***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Cash flow	.111***	0.105***	0.111***	0.108***	.112***	.111***	.111***	.111***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Liquid assets substitutes	-.207***	-.190***	-.207***	-.205***	-.207***	-.207***	-.207***	-.207***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Growth opportunities	.001***	.001***	.001***	.001***	.001***	.001***	.001***	.001***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Dividend	.007*	.006	.007*	.009**	.007*	.007*	.007*	.007*
	(0.058)	(0.107)	(0.057)	(0.016)	(0.060)	(0.059)	(0.057)	(0.058)
Activism [t=0]	-.010	-.016**	-.010	-.010	.002	-.010	.001	.002
	(0.125)	(0.025)	(0.115)	(0.271)	(0.888)	(0.122)	(0.950)	(0.816)
Activism [t=0] * % ownership	-	-	-	-	-	-	-.001	-.002
							(0.236)	(0.190)
Activism [t-1]	-.019***	-.022***	-.010	-.010	-.019**	-.018***	-.019***	-.019***
	(0.002)	(0.001)	(0.115)	(0.271)	(0.021)	(0.002)	(0.002)	(0.002)
Activism [t-2]	-.013**	-.007	-.019***	-.019**	.002	-.012**	-.013**	-.013**
	(0.025)	(0.299)	(0.001)	(0.016)	(0.849)	(0.031)	(0.022)	(0.022)
Activism [t+1]	.002	.001	-.013**	-.013*	.002	.002	.002	.010
	(0.733)	(0.942)	(0.022)	(0.061)	(0.879)	(0.720)	(0.767)	(0.386)
Activism [t+1] * % ownership	-	-	-	-	-	-	-	-.001
								(0.411)
Activism [t+2]	.008	.008	.008	.008	.002	.008	.008	.012
	(0.276)	(0.234)	(0.282)	(0.466)	(0.826)	(0.268)	(0.284)	(0.361)
Activism [t+2] * % ownership	-	-	-	-	-	-	-	-0.001
								(0.729)
Year-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
# obs.	36825	28416	36803	35665	36825	36825	36825	36825
R-squared	.72	.71	0.72	.72	.72	.72	.72	.72
Adj. R-squared	.67	.66	0.67	.66	.67	.67	.67	.67

***, **, * Significant at 1%, 5% and 10% level (p-values between parentheses)

Table A3
Regression Analysis on Cash Holdings with different Hedge Fund Activism Events

This table gives the results of the regression analyses with Cash holdings as dependent variable including different kind of hedge fund activism events. Cash holdings is defined as the ratio of cash divided by net assets. Size is the natural logarithm of total assets. Leverage is the ratio of total of long-term debt divided by the total assets. Cash flow is the net income plus the depreciation divided by the net assets. Liquid assets substitutes are approximated by the net working capital divided by the net assets. Growth opportunities is defined by the market-to-book ratio. The Dividend variable is a dummy with the value of 1 when a firms pays out dividend.

Variables	(VII) Table 7	(I)
Size	-.042***	-.0419***
	(0.000)	(0.000)
Leverage	-.093***	-.093***
	(0.000)	(0.000)
Cash flow	.111***	.112***
	(0.000)	(0.000)
Liquid assets substitutes	-.207***	-.208***
	(0.000)	(0.000)
Growth opportunities	.001***	.001***
	(0.000)	(0.000)
Dividend	.007*	.007*
	(0.058)	(0.063)
Activism [t=0]	-.010	-
	(0.125)	
Activism [t-1]	-.019***	-
	(0.002)	
Activism [t-2]	-.013**	-
	(0.025)	
Activism [t+1]	.002	-
	(0.733)	
Activism [t+2]	.008	-
	(0.276)	
Proxy Fight [t=0]	-	.000
		(0.997)
Proxy Fight [t-1]	-	-.018*
		(0.099)
Proxy Fight [t-2]	-	.001
		(0.942)
Proxy Fight [t+1]	-	-.010
		(0.436)
Proxy Fight [t+2]	-	-.007
		(0.622)
No publicly disclosed activism [t=0]	-	-.035**
		(0.044)

No publicly disclosed activism [t-1]	-	-.014
		(0.539)
No publicly disclosed activism [t-2]	-	-.051***
		(0.003)
No publicly disclosed activism [t+1]	-	-.008
		(0.682)
No publicly disclosed activism [t+2]	-	-.000
		(0.999)
Other stockholder campaign [t=0]	-	-.007
		(0.367)
Other stockholder campaign [t-1]	-	-.019***
		(0.007)
Other stockholder campaign [t-2]	-	-.010
		(0.125)
Other stockholder campaign [t+1]	-	.0111
		(0.203)
Other stockholder campaign [t+2]	-	0.018*
		(0.085)
Year-fixed effects	Yes	Yes
Firm-fixed effects	Yes	Yes
# obs.	36825	36825
R-squared	.72	.72
Adj. R-squared	.67	.67

***, **, * Significant at 1%, 5% and 10% level (p-values between parentheses)

Table A4
Robustness Checks on Working Capital Management I

This table gives the results of the robustness checks on the regression analyses with the CCC as dependent variable. The CCC is defined as the inventory divided by the cost of goods sold times 365 plus the accounts receivable divided by the sales times 365 minus the accounts payable divided by the cost of goods sold times 365. Profitability is defined by the return on assets. Cash flow is the net income plus the depreciation divided by the total assets. Tangible assets is the tangibility ratio of a firm. Growth opportunities are approximated by the sales growth. Size is the natural logarithm of total assets.

Variables	(VII) Table 9	(I)	(II)	(III)	(IV)	(V)
Profitability	-71.796***	-71.502***	-71.167***	-65.169***	-71.802***	-71.848***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Cash flow	22.395***	19.867***	23.403***	12.582**	22.408***	22.418***
	(0.001)	(0.004)	(0.001)	(0.038)	(0.001)	(0.001)
Tangible assets	18.248***	14.920**	26.242***	23.943***	18.277***	18.295***
	(0.005)	(0.020)	(0.000)	(0.000)	(0.005)	(0.005)
Growth opportunities	-3.211**	-3.161**	-3.277**	-2.660***	-3.212**	-3.212**
	(0.022)	(0.025)	(0.021)	(0.002)	(0.022)	(0.022)
Leverage	23.742***	-	21.411***	11.205**	23.769***	23.817***
	(0.000)		(0.000)	(0.011)	(0.000)	(0.000)
Size	9.272***	9.780***	9.326***	11.998***	9.284***	9.295***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Cash holdings	-	-	-9.671***	-	-	-
			(0.000)			
Activism [t=0]	-5.192**	-6.514**	-6.770**	-	-10.246**	-10.686**
	(0.026)	(0.027)	(0.022)		(0.017)	(0.019)
Activism [t=0] * % ownership	-	-	-	-	.500	.567
					(0.197)	(0.160)
Activism [t-1]	-1.940	-1.812	-2.039	-	-1.879	-1.801
	(0.448)	(0.479)	(0.426)		(0.462)	(0.480)
Activism [t-2]	-5.192**	-5.261**	-5.382**	-	-5.103**	-5.105**
	(0.017)	(0.016)	(0.015)		(0.019)	(0.019)
Activism [t+1]	-7.517**	-7.324**	-7.207**	-	-7.436**	-10.440**
	(0.022)	(0.027)	(0.029)		(0.024)	(0.012)
Activism [t+1] * % ownership	-	-	-	-	-	.390
						(0.188)
Activism [t+2]	-9.152***	-9.070***	-9.479***	-	-9.112***	-10.174**
	(0.008)	(0.009)	(0.006)		(0.008)	(0.026)
Activism [t+2] * % ownership	-	-	-	-	-	.142
						(0.632)
Aggr. Activism	-	-	-	-6.357***	-	-
				(0.000)		
Year-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Firm-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
# obs.	39626	39626	39279	50095	39626	39626
R-squared	.78	.78	.78	.76	.78	.78
Adj. R-squared	.74	.74	.74	.71	.74	.74

***, **, * Significant at 1%, 5% and 10% level (p-values between parentheses)

Table A5
Robustness Checks on Working Capital Management II

This table gives the results of the robustness checks on the regression analyses with the CCC as dependent variable. The CCC is defined as the inventory divided by the cost of goods sold times 365 plus the accounts receivable divided by the sales times 365 minus the accounts payable divided by the cost of goods sold times 365. Profitability is defined by the return on assets. Cash flow is the net income plus the depreciation divided by the total assets. Tangible assets is the tangibility ratio of a firm. Growth opportunities are approximated by the sales growth. Size is the natural logarithm of total assets.

Variables	(VII) Table 9	(I)	(II)	(III)	(IV)	(V)
Profitability	-71.796***	-76.546***	-71762***	-73.705***	-71.7776***	-71.784***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Cash flow	22.395***	27.025***	22.379***	23.314***	22.481***	22.374***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Tangible Assets	18.248***	21.938***	18.236***	19.838***	18.320***	18.267***
	(0.005)	(0.003)	(0.005)	(0.003)	(0.005)	(0.005)
Growth opportunities	-3.211**	-3.983**	-3.211**	-3.326**	-3.217**	-3.210**
	(0.022)	(0.015)	(0.022)	(0.020)	(0.022)	(0.022)
Leverage	23.742***	24.125***	23.759***	22.857***	23.705***	23.729***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Size	9.272***	9.240***	9.271***	9.885***	9.230***	9.271***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Activism [t=0]	-5.192**	-5.221	-6.580**	-6.664*	-6.442	-6.509**
	(0.026)	(0.126)	(0.026)	(0.073)	(0.186)	(0.027)
Activism [t-1]	-1.940	1.502	-1.964	1.284	-4.244	-1.817
	(0.448)	(0.608)	(0.445)	(0.690)	(0.316)	(0.482)
Activism [t-2]	-5.192**	-3.623	-5.200**	-4.867*	-9.201**	-5.302**
	(0.017)	(0.204)	(0.018)	(0.070)	(0.017)	(0.017)
Activism [t+1]	-7.517**	-6.584*	-7.552**	-5.844	-10.755**	-7.518**
	(0.022)	(0.083)	(0.022)	(0.197)	(0.038)	(0.023)
Activism [t+2]	-9.152***	-8.634**	-9.171***	-13.636***	-8.219	-9.183***
	(0.008)	(0.026)	(0.008)	(0.005)	(0.125)	(0.008)
Year-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Firm-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
# obs.	39626	30736	39604	38439	39626	39626
R-squared	.78	.77	.78	.78	0.78	.78
Adj. R-squared	.74	.74	.74	.74	0.74	.74

***, **, * Significant at 1%, 5% and 10% level (p-values between parentheses)

Table A6
Regression Analysis on Working Capital Management with different Hedge Fund Activism Events

This table gives the results of the regression analyses with Cash holdings as dependent variable including different kind of hedge fund activism events. The CCC is defined as the inventory divided by the cost of goods sold times 365 plus the accounts receivable divided by the sales times 365 minus the accounts payable divided by the cost of goods sold times 365. Profitability is defined by the return on assets. Cash flow is the net income plus the depreciation divided by the total assets. Tangible assets is the tangibility ratio of a firm. Growth opportunities are approximated by the sales growth. Size is the natural logarithm of total assets.

Variables	(VII) Table 9	(I)
Profitability	-71.796***	-71.805***
	(0.000)	(0.000)
Cash flow	22.395***	22.316***
	(0.001)	(0.001)
Tangible assets	18.248***	18.313***
	(0.005)	(0.005)
Growth opportunities	-3.211**	-3.204**
	(0.022)	(0.023)
Leverage	23.742***	23.653***
	(0.000)	(0.000)
Size	9.272***	9.260***
	(0.000)	(0.000)
Activism [t=0]	-5.192**	-
	(0.026)	
Activism [t-1]	-1.940	-
	(0.448)	
Activism [t-2]	-5.192**	-
	(0.017)	
Activism [t+1]	-7.517**	-
	(0.022)	
Activism [t+2]	-9.152***	-
	(0.008)	
Proxy Fight [t=0]	-	-6.856
		(0.174)
Proxy Fight [t-1]	-	-7.297
		(0.157)
Proxy Fight [t-2]	-	-11.763**
		(0.030)
Proxy Fight [t+1]	-	-13.553**
		(0.035)
Proxy Fight [t+2]	-	-5.042
		(0.462)
No publicly disclosed activism [t=0]	-	-8.927
		(0.229)
No publicly disclosed activism [t-1]	-	-11.035
		(0.123)

No publicly disclosed activism [t-2]	-	-6.805
		(0.214)
No publicly disclosed activism [t+1]	-	1.652
		(0.850)
No publicly disclosed activism [t+2]	-	-5.848
		(0.338)
Other stockholder campaign [t=0]	-	-6.364
		(0.109)
Other stockholder campaign [t-1]	-	1.341
		(0.672)
Other stockholder campaign [t-2]	-	-2.543
		(0.304)
Other stockholder campaign [t+1]	-	-8.637**
		(0.035)
Other stockholder campaign [t+2]	-	-12.161**
		(0.012)
Year-fixed effects	Yes	Yes
Firm-fixed effects	Yes	Yes
# obs.	39626	39626
R-squared	.78	.78
Adj. R-squared	.74	.74

***, **, * Significant at 1%, 5% and 10% level (p-values between parentheses)