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Loss-Driven Activism

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Abstract

I show that hedge funds react to unrealized losses on their passive positions by engaging with the management. The hedge fund managers' psychological response is consistent with cognitive dissonance: They blame the firms' management and switch to activism. The loss, which is hedge fund-investment specific, is distinct from economic factors such as the firm's industry-adjusted performance. Loss-driven activism is more likely to be unfocused on specific issues and results in worse firm performance. This study shows that an overlooked consequence of unrealized losses is to trigger an active engagement with the firm.

I. Introduction

One of the most robust findings in the behavioral finance literature is the disposition effect, that is, the investors' reluctance to realize losses (Shefrin and Statman (1985)). This literature examines how investors *trade* in response to past returns and claims that retail investors as well as mutual fund managers and professional traders hold onto losses longer than gains (Odean (1998), Locke and Mann (2005), and, Frazzini (2006)). However, the disposition effect describes trading decisions only, and it is thus a partial description of investor behavior (Zuchel (2001)). In this paper, I examine an alternative action that investors could take to reduce the psychological pain of losses: engage with the management.

I examine cognitive dissonance as a model to understand the investors' behavior. Cognitive dissonance is the discomfort that arises when a person makes choices and/or holds beliefs, or cognitions, that are inconsistent with each other (Festinger (1957)). In the context of investment decisions, it is the conflict between the belief that the investment was a good decision and the information that money has been lost in that particular position. Investors can resolve this dissonance by

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introducing an ameliorating cognition: They can blame the firm's management rather than themselves and switch to activism. The firm's management has a clear impact on returns, making it a good target for blame. This ego-defensive action allows investors to preserve their self-image that they make sound decisions.

Not all investors engage in activism. Retail investors do not have the ability and lack the required capital. Diversification requirements typically prevent mutual funds from holding large blocks of shares needed to effectively engage in activism campaigns. Other institutions such as pension funds may choose not to intervene because of conflicts of interest or political control (Brav, Jiang, Partnoy, and Thomas (2008), Edmans, Fang, and Zur (2013)). Following Edmans et al. (2013), I focus on activist hedge funds. They have a portfolio of passive holdings, that is, they hold stocks to implement investment strategies that do not require to influence the control of the firms. However, they also have the expertise and the resources to take an active stance and engage with the management. Therefore, when they experience a loss in a passive position, besides holding or selling the stock, they have the additional option of switching to activism.

Activism is a costly monitoring device. Economic theories posit that the activist's decision to initiate a campaign is based on a cost–benefit analysis. Edmans et al. (2013) *assume* that the hedge funds' high performance-based fees induce hedge fund managers to choose optimally whether to intervene or not. Hedge funds will choose to intervene when the firm's potential for value improvement exceeds the expected costs of the intervention. However, if the loss itself, which is hedge fund-investment specific, generates a psychological discomfort that can be reduced by shifting blame, then the switch will also be a psychological choice, not only an economic one. Therefore, when hedge funds suffer a loss, the expected net utility benefits from switching to activism will be higher, and the probability of intervention will jump discontinuously.

To identify the active and passive stance, I follow prior literature (Edmans et al. (2013), Brav, Jiang, and Kim (2015), and Gantchev, Gredil, and Jotikasthira (2019)) and I exploit a requirement in ownership disclosure. Any hedge fund that acquires more than 5% of a company's equity securities must disclose its holdings in a regulatory filing with the SEC. Hedge funds intending to influence the control of the company are required by law to file the Schedule 13D, while those who want to remain passive file the Schedule 13G.[1] Consistent with prior literature (Clifford (2008), Edmans et al. (2013), and Clifford and Lindsey (2016)), I find that hedge funds stay passive and file the Schedule 13G for most of their holdings. However, if a hedge fund decides to take actions to influence the control of the firm, then it is required to publicly disclose that its intentions have changed by switching to the 13D filing (Brav et al. (2015), Boyson, Gantchev, and Shivdasani (2017), and Brav, Jiang, Ma, and Tian (2018)).

The results show that the purchase price is a reference point and that hedge fund managers who experience a loss on a passive holding are more likely to switch and become activists. I find that for 65% of the switches, the hedge fund is sitting on an unrealized (paper) loss. The distribution of the holding period return at the time

[1]More details about Schedule 13D and Schedule 13G filings are described in Appendix A of the Supplementary Material.

of the switch shows that the frequency of the switches jumps discontinuously exactly at the zero-loss level. The number of switches with a moderate loss is around 60% higher than the number of switches with a moderate gain (77 vs. 48). This suggests a causal effect of the loss on the switch to activism.

Next, I analyze what hedge funds declare when they switch. Hedge funds must provide the objectives of the campaign in the 13D filing. If the loss generates psychological costs and hedge funds reduce these costs by blaming the firm's management and switching to activism, then when they are suffering a loss, they should be less likely to be specific in the objectives they declare. This is exactly what I find. When hedge funds are sitting on a paper loss, they are significantly less likely to state a specific objective for the campaigns they are about to start. Instead, they switch and raise multiple issues. They declare that they want to communicate with the management but without having a clear plan in mind. These results are consistent with the hypothesis that the switch to activism is also a psychological choice and not a choice that is only determined by economic factors.

A primary concern is that the switch, as predicted by economic theories, may be triggered by the firm's underperformance relative to a benchmark, a proxy for the potential for value improvement, and not by the loss itself. I find that the hedge fund's loss has independent explanatory power even after controlling for the target firm's prior underperformance. The loss increases the probability of switching by 1 percentage point, an increase of 50% from the unconditional probability of switching in a given quarter of 2%. If the firm is underperforming its industry peers, the probability of switching increases by 0.7 percentage points, an increase of 35% from the unconditional probability. Consistent with the loss generating psychological costs that can be reduced by shifting blame, the probability of switching jumps discontinuously exactly at the zero-loss level.[2]

Hedge fund managers' fees are linked to the absolute returns that funds generate. Another concern is that the switch to activism could be driven by these compensation incentives. The loss I analyze in this paper, and with respect to which I find a sharp discontinuity in the probability of switching, is specific to a particular hedge fund's passive position, and it is not the loss at the overall fund level, which is relevant for compensation. Nevertheless, I explore whether hedge funds' compensation incentives drive the results. Controlling for the overall fund performance as well as for fund characteristics such as the high-water mark, the hurdle rate, and lockup does not change the main results.

[2]I perform several tests to investigate whether the effect of the loss is distinct from the effect of the prior poor relative performance of the firm. First, the results of a multivariate regression discontinuity analysis confirm that the probability of switching increases discontinuously exactly at the zero-loss level. Second, the main findings hold in both the subsamples of the over- and under-performing passive holdings. Third, the loss increases the probability of switching using a one-to-one matching, where each switch is matched with the hedge fund's passive holding that has the closest prior industry-adjusted return. The two positions are very similar in terms of the firm's prior underperformance, but in the former the hedge fund switches to activism, while in the latter it remains passive. Fourth, instead of using the industry-adjusted returns over a fixed time-window before the beginning of the activist campaign, I consider the industry-adjusted returns since the formation of the passive block. The results are unchanged.

Having established that hedge funds react to losses on their passive positions by engaging with the management, I turn to the consequences of this loss-driven activism. If the psychological costs of the loss are a trigger of the switch then, ex post, these switches should result in worse firm performance. The results show that the buy-and-hold returns (BHRs) and the buy-and-hold abnormal returns (BHARs) around the switches likely motivated by the loss are 6.1 and 6.4 percentage points lower compared to the returns around the switches that happen when the hedge funds are sitting on a gain. I find similar results for the change in operating performance.

In calendar-time regressions, I find that in the month of the switch, the abnormal returns of the switches that happen when the hedge fund is sitting on a paper gain are equal to 4.6%. However, the abnormal returns for the loss-driven switches are only 0.2%, and they are not statistically significant at conventional levels. In the subsequent months, for both types of switches, the abnormal returns are close to 0 and statistically indistinguishable from 0. Overall, it seems that the market is able to distinguish the 2 types of activism in the short term.

The empirical framework of this paper allows to add insights to the study of the causal impact of activism using the loss as an instrument.[3] Specifically, I exploit the discontinuous jump in the probability of switching in a small bandwidth around the zero-loss level in a fuzzy regression discontinuity design (RDD) framework (Dittmar, Duchin, and Zhang (2020)). This method allows to identify the effect of the discontinuity on the probability of switching.[4] In particular, these tests are able to tease out the average treatment effect (i.e., the causal effect of activism as if "hedge fund activists were randomly assigned to target firms"). By using the switch directly, prior literature (Brav et al. (2015), (2018), Aslan and Kumar (2016), and Boyson et al. (2017)) focused on the treatment effect on the treated (i.e., they answered the question "would the same changes have occurred at the target firms without the hedge funds' efforts?") (Brav et al. (2015)).

I do not find a statistically significant average treatment effect of activism. The results of the RDD analysis show that the change in operating performance as well as the change in the R&D investments and the probability of receiving a takeover bid are not significantly affected by activism. One explanation of these results is related to the level of effectiveness of activism that can vary significantly depending on the characteristics of the target firms and of the hedge funds. Only a limited number of firms can benefit from activism. For a significant number of firms, activism will likely be ineffective. For others, it could even be detrimental by distracting efforts and resources. Unlike the tests that use the switch directly, the RDD analysis identifies a targeting decision that is plausibly more exogenous and thus not the result of a cost–benefit analysis based on pure economic considerations. However, these results should be interpreted with caution as the lack of statistical power could simply be due to the small sample size in the small bandwidth around the zero-loss level.

[3]I am grateful to the editor for this suggestion.

[4]The key identifying assumption is that the positions whose holding period return is just below versus above 0, are similar except for the probability of switching to activism. I do not find significant preexisting differences between the two types of positions thus supporting the identifying assumption.

My paper contributes to the behavioral finance literature that studies the psychological effects of losses on investors' behavior. The disposition effect has received strong empirical support.[5] However, its underlying mechanism is still not well understood. An important challenge to overcome in order to distinguish among several theories is that this behavior is confounded by other factors affecting trading. This paper provides important new insights by broadening the scope of the disposition effect.[6] In particular, it investigates how investors react to losses in a setting where there is an alternative option besides selling and passively holding.

Chang, Solomon, and Westerfield (2016) argue for a cognitive dissonance-based explanation. They claim that "investors avoid realizing losses because they dislike admitting that past purchases were mistakes." This effect is then reversed in mutual funds and investors are more likely to sell losing funds compared to winning funds. They claim that "delegation reverses this effect by allowing the investor to blame the manager instead" and sell the position. My results are consistent with cognitive dissonance and provide a new perspective on why individual investors blame mutual fund managers and sell the position but do not blame the firm's management (and sell their position) when they are sitting on a loss in individual stocks. My paper shows that investors do blame CEOs, but only if they have the expertise and the resources to take an active stance and engage with the management.

In Barberis and Xiong's (2012) model of realization utility, investors derive utility and disutility directly from realizing gains and losses, respectively. This generates a greater propensity to sell stocks trading at a gain rather than stocks trading at a loss. Frydman, Barberis, Camerer, Bossaerts, and Rangel (2014) provide support for realization utility theory using neural data. However, the underlying source of this utility is still unclear. My results are consistent with realization utility being driven, in the loss domain, by cognitive dissonance. The cognitive explanation is compelling because it provides the source of disutility that is derived from realizations, but it also explains why hedge funds switch to activism without any realization taking place.

Finally, the results of this paper are not consistent with belief in mean reversion (Odean (1998)) which predicts that investors hold onto losses because they believe that the price of the stock will rise in the near future. According to this theory, hedge funds suffering losses should be less likely to engage in activism, as this should be unnecessary. My results suggest that this is not how hedge funds behave. The decision to take the more aggressive and costly action of switching to activism is not consistent with the belief that the price of the stock would have increased anyway.

The results of this paper also have implications for the hedge fund activism literature. This paper sheds light on a subset of activism that is not purely

[5]The disposition effect has been documented among retail investors (Odean (1998)), mutual fund managers (Frazzini (2006)), and professional futures traders (Locke and Mann (2005)). Lu, Ray, and Teo (2016) claim that inattentive hedge fund managers are more prone to the disposition effect. It has also been documented for assets other than stocks such as executive stock options (Heath, Huddart, and Lang (1999)) and real estate (Genesove and Mayer (2001)).

[6]I am grateful to one of the referees for the numerous suggestions on the implications that my findings have for the disposition effect literature.

economically motivated. The activism campaigns motivated by paper losses are more likely to be unfocused on specific issues and result in worse firm performance when compared to well-motivated activism. Furthermore, prior studies in the hedge fund activism literature used the switch directly as a source of identification to study the treatment effect (treatment effect on the treated) of activism over a passive investment. My results suggest that using the loss as an instrument, activism does not significantly affect the performance of the average firm.

II. Conceptual Framework

The disposition effect has been viewed as an important window into investor psychology (Ben-David and Hirshleifer (2012)). The reluctance to realize losses of retail investors, professional traders, and institutions (Odean (1998), Locke and Mann (2005), and Frazzini (2006)) provides important insights into the drivers of investors' behavior above and beyond what is predicted by standard economic theories. However, an important limitation in precisely identifying the psychological factors at play is that prior research only considered the investors' trading decisions. In this paper, I look at how hedge fund investors, who have an alternative option besides selling and passively holding, react to losses, and I argue that their tendency to switch from holding the stock passively to activism is generated by cognitive dissonance.

Cognitive dissonance is the discomfort that arises when a person makes choices and/or holds beliefs or cognitions that are inconsistent with each other (Festinger (1957)). In the context of the investment decisions, it is the conflict between the belief that the investment was a good decision and the information that money has been lost in that particular position.

As explained by Chang et al. (2016), investors can reduce this discomfort in 3 ways. The first mechanism to resolve this dissonance is to simply change one or both cognitions so they are congruent. When faced with losses, investors would need to admit that they made a mistake. However, this would negatively impact their self-image that they make good investment decisions. Most investors, and in particular hedge funds, will likely resist this path. The second mechanism is to alter the importance of one of the cognitions. The paper loss can be interpreted as just a temporary setback. This would have the consequence of postponing the trading decision of selling the stake. This is a path that has been shown to be taken by investors when they are reluctant to realize their losses. The third mechanism to resolve the dissonance between the cognition that they make good investment decisions and that the stock has declined in value is to introduce an ameliorating cognition. For activist hedge funds, this is readily available: They can blame the firm's management rather than themselves and switch to activism.

The firm's management has a clear impact on returns, making it a good target for blame. This ego-defensive action allows hedge fund managers to preserve their self-image that they make sound decisions. Furthermore, evaluating the exact cause of the decline in the stock price since the time of purchase is highly subjective. This uncertainty increases the probability that psychological factors will have an influence on the choice of engaging with the management (Baker, Pan, and Wurgler (2012)). There are market and industry-wide factors that affect a firm's returns and

that are not under the management's control. However, scapegoating the management is very attractive since it avoids admitting that a mistake has been made when opening the position.

Chang et al. (2016) show that investors exhibit a strong disposition effect in individual stocks but a reverse-disposition effect in delegated assets such as mutual funds. Both behaviors that show up in different asset classes are consistent with cognitive dissonance. When investors suffer a loss in individual stocks, they interpret this as just a temporary setback. This has the consequence of postponing the trading decision of selling the stake. However, when they are sitting on a loss in delegated assets, they are more likely to sell the position. In this second case, investors exhibit a reverse-disposition effect because they can resolve the disutility of realized losses by scapegoating and blaming the fund manager.

An important question is why individual investors blame mutual fund managers and sell the position but do not blame the firm's management when they are sitting on a loss in individual stocks. Chang et al. (2016) suggest an explanation that relies on the specific actions that investors can actually take. Active portfolio managers and individual investors have a similar task: picking stocks. Fund managers' actions are therefore a good psychological substitute for the individual investor's actions. This makes a negative assessment easier ("I could have done a better job") and the fund manager, unlike the CEO of a company, is a salient scapegoat. However, hedge funds, unlike individual investors, have the skills and resources to raise their voice and run an activist campaign. Therefore, in this case, the firm management's actions become a good psychological substitute for the activist hedge funds' actions, making the blaming more likely. Clearly, an alternative psychological reaction could be for hedge funds to blame the firm's management and sell the stake. However, this is probably not an attractive option for the self-image of a type of investor who has the firepower to engage with the management.

Cognitive dissonance represents a departure from standard economic theories, which predict that hedge funds will switch to activism when the expected benefits in terms of value improvement exceed the costs. Activist hedge funds behave like value investors, and they target undervalued firms that have a high potential for value improvement (Brav, Jiang, and Li (2021)). Hedge funds create value primarily by reducing agency costs or by removing allocative inefficiencies through the sale of the target company or a change in business strategy, such as the spinning-off of noncore assets (Brav et al. (2008), (2021), Boyson et al. (2017)). These economic factors are indeed important. However, what the cognitive dissonance theory suggests is that the paper loss itself generates an additional and distinct psychological cost that can be reduced by blaming the firm's management. Empirically, unlike what is predicted by standard theories, we should observe a discontinuous jump in the probability of switching to activism around the zero-loss level.

III. Data and Descriptive Statistics

I collect data about the 13D and the 13G filings between 1994 and 2018 from the SEC Electronic Data Gathering, Analysis, and Retrieval System (EDGAR) database. The quarterly hedge fund ownership information is from the Thomson

Reuters Form 13F database. Accounting variables are from Compustat. Stock prices are from the Center for Research in Security Prices (CRSP). All continuous variables are winsorized at the 1% and 99% levels to reduce the influence of outliers.

A. Hedge Funds' Sample Construction

Following the hedge fund literature, I rely on multiple sources to construct my activist hedge funds' sample. I start with a search of hedge funds in Bloomberg (Aragon and Martin (2012)). Then, I perform a search in Factiva for activist hedge funds (Brav et al. (2008), Klein and Zur (2009), and Aslan and Kumar (2016)).

I require all the hedge funds of my sample to file the quarterly Schedule 13F with the SEC and thus be included in the Thomson Reuters Form 13F database. This filter, which excludes the smallest hedge funds,[7] is needed in order to compute the purchase price of the passive positions in the hedge funds' portfolios starting from the quarterly 13F holdings (see Section IV.C).

I finally merge my hedge fund data set with the SEC EDGAR database of the 13D and 13G filers by manually matching the hedge fund names. I follow Edmans et al. (2013), and I require the hedge funds to have filed at least one 13D and one 13G over the sample period from 1994 to 2018, in order to be included in my sample. These are the hedge funds that effectively engage in both active and passive investments, that is the institutions that have the "full menu" of governance options at their disposal.[8]

B. Descriptive Statistics

Panel A of Table 1 provides the summary characteristics of the initial sample of 491 hedge funds. These hedge funds filed a total of 3,338 Schedule 13Ds[9] and 6,911 Schedule 13Gs over the sample period from 1994 to 2018. The mean (median) number of 13Ds filed by each hedge fund is 7 (3), while it is 14 (4) for the 13Gs. The prevalence of passive positions is consistent with prior literature (Clifford (2008), Edmans et al. (2013), and Clifford and Lindsey (2016)). Possible explanations for why, on average, hedge funds stay passive in most of their holdings are related to the limited number of firms that can benefit from activism and the high costs of running an activist campaign. Gantchev (2013) estimates that the monitoring costs of activism are substantial and reduce activist returns by more than two-thirds. The mean net activist return is close to 0, and only the top quartile of activists' campaigns exceeds the returns of the passive holdings.

[7] Section 13(f) of the Securities Exchange Act of 1934 requires institutional investment managers that exercise investment discretion over a portfolio of securities whose market value is $100M or more, to file the quarterly Form 13F with the SEC disclosing their quarterly holdings. The institutions required to disclose their holdings in the aggregate under Section 13(f) include broker/dealers, insurance companies, banks, registered investment advisors, hedge funds, private equity firms, and mutual funds.

[8] Appendix B of the Supplementary Material reports some anecdotes of hedge funds that have only active or only passive investments, and that use both strategies.

[9] From my sample I exclude pure activist hedge funds, i.e., hedge funds that only filed 13Ds and never filed a single 13G over the entire sample period from 1994 to 2018. There are 76 of such funds that filed a total of 327 campaigns, representing around 9% of the overall activist hedge fund campaigns.

TABLE 1

Descriptive Statistics

Table 1 reports descriptive statistics for the sample of hedge funds and switches over the period 1994–2018. Panel A summarizes the number of hedge funds, their overall number of 13D and 13G initial filings, and the mean (median) number of 13D/13G filings for each hedge fund. Panel B reports the sample of the switches after applying all the filters.

Panel A. Initial Sample of Activist Hedge Funds	
Activist hedge funds	491
Number of 13D filings	3,338
Number of 13G filings	6,911
Mean (median) number of 13Ds	7 (3)
Mean (median) number of 13Gs	14 (4)
Panel B. Sample of Activist Hedge Funds and Switches	
Initial sample of switches	859
Without ownership>20% and no evidence of activism	758
With purchase price information	671
With matched positions	585
Final sample of hedge funds	209
Final sample of switches	585

In the 13D filings, the hedge funds must declare whether they are switching from a former 13G filing. I identify an initial sample of 859 switches made by the hedge funds of my sample by manually reading their filings. The number of switches is significant as they represent more than 20% of the total 3,338 13D activist filings. That is, 20% of the activists' 13D filings are actually switches from former passive holdings. Following Brav et al. (2008), I exclude 14 switches where the hedge funds filed Schedule 13D in order to participate in the bankruptcy reorganization of the firm. If a passive hedge fund increases the ownership in the target firm above 20%, it is required by law to switch to the 13D filing. In my sample, I identify 132 such switches. In order to properly classify these cases as actual switches from a passive to an active stance, I follow Edmans et al. (2013), and I look at the information provided in item 4 "Stated Purpose of the Filing" of the 13D filing. If I find evidence that the hedge fund wants to engage with the management, then I keep the switches in my main sample (31 cases). If there is no evidence of activism (101 cases), then I exclude them from my main sample, as the 13D filing is likely to be motivated only by the regulation. Figure 1 provides the time-series of the annual number of "regular" 13Ds (13Ds that are not switches), switches, and 13Gs. Consistent with prior literature (Brav et al. (2008), Edmans et al. (2013)), the figure shows some variation over time and an overall prevalence of passive holdings.

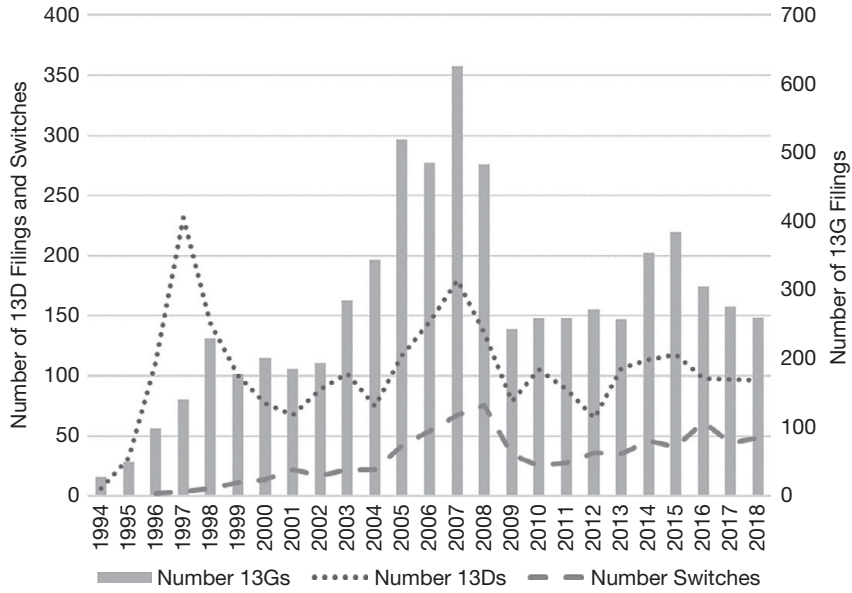
In the empirical tests, the key variable of interest is the LOSS dummy. It is equal to 1 if the HOLDING_PERIOD_RETURN is negative, and 0 otherwise. I compute this variable by comparing the purchase price that I collect from Item 3, "Source and amount of funds" of the 13D filing, with the stock price at the time of the switch. When it is missing, I estimate the purchase price following the procedure described in Section IV.C. The market price considered is the price at the end of the day prior to the date of the switch (event date). If it is not available, I consider the closest price within 30 days before the date of the switch.

Finally, in order to perform the multivariate tests, I need to match the switches with the passive holdings that do not switch to activism (Section IV.C describes the

FIGURE 1

Number of 13Ds, 13Gs, and Switches by Year

Figure 1 reports the annual number of "regular" 13D filings (13Ds that are not switches) and switches (left axis), and the number of 13G filings (right axis) over the sample period from 1994 to 2018.



control group). The sample of switches that have at least one matched passive holding consists of 585 switches made by 209 hedge funds. Klein and Zur (2009) examine the confrontational activism of 101 hedge funds. Greenwood and Schor (2009) look at the ability of activists to force target firms into a takeover. Their sample includes 139 unique hedge funds. The pioneering study by Brav et al. (2008), which includes different types of activism even below 5%, examines 236 hedge funds.

IV. Evidence of Loss-Driven Activism

In this section, I present evidence of loss-driven activism. I analyze how the loss affects the probability of switching to activism and what hedge funds declare when they switch. I consider and rule out several alternative explanations. I subject the main results to a variety of robustness tests.

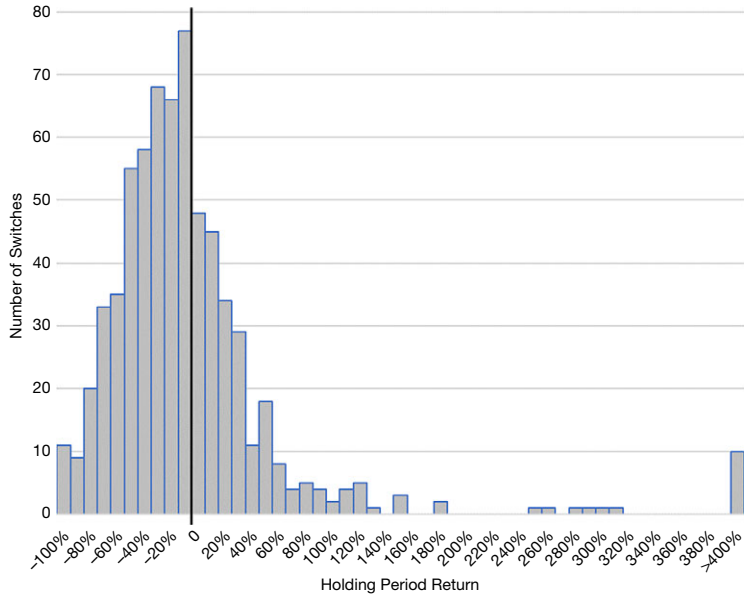
A. Discontinuity Around the Zero-Loss Level

If the loss itself generates psychological costs that can be reduced by shifting blame, then the hedge funds' net (expected) utility benefits from the intervention will not only depend on the potential for value improvement and the expected costs of the intervention, but it will also depend on whether the position is at a gain or at a loss. Therefore, hedge fund managers will be more likely to switch to activism when they are suffering a loss in a particular passive holding. To test this prediction, I first

FIGURE 2

Distribution of the Holding Period Return at the Time of the Switch

Figure 2 plots the distribution of the holding period return computed at the time of the switch. The bin size is equal to 10%.



examine whether the frequency of the switches increases discontinuously moving from moderate gains to moderate losses. The direction and magnitude of the jump in the frequency of the switches around the zero-loss threshold is indicative of the loss having a causal effect on the switch to activism.

Figure 2 shows the frequency distribution of the switches as a function of the holding period return. The bin size is equal to 10%. Consistent with the loss being a trigger of the switches, the frequency of the switches jumps discontinuously at the zero-loss cutoff. The number of switches with a moderate loss is around 60% higher than the number of switches with a moderate gain (77 vs. 48).

The magnitude of the discontinuity suggests a causal effect of the loss on the switch to activism. The purchase price is an important reference point, and when hedge funds suffer a paper loss, they are more likely to become activists. The psychological costs related to the loss increase the frequency of the observed switches at the zero-loss threshold: This is the first evidence that supports the main hypothesis.

B. Stated Reasons for the Switch

Next, I analyze what hedge funds declare when they switch. Hedge funds must provide the objectives of the campaign in the 13D filing. Following the general classification of Brav et al. (2008), Table 2 reports the reasons for the switch that are declared by the hedge funds in item 4 "Stated Purpose of the Filing." The first

TABLE 2

Stated Reasons for the Switch

Table 2 reports the hedge funds' stated reasons for the switch as reported in item 4 of Schedule 13D, "Stated purpose of the filing." NO_SPECIFIC_REASON includes boilerplate statements that involve multiple goals and communication with the management. BUSINESS_STRATEGY includes operational efficiency, business restructuring, spinning off, and M&A related reasons. SALE_OF_THE_TARGET_COMPANY includes the objectives of selling the company to a third party or taking it private. CAPITAL_STRUCTURE includes the objectives of increasing dividends and/or repurchases. CORPORATE_GOVERNANCE includes the demand of a board seat, firing the CEO, more information disclosure, and the reduction of executive compensation. OWNERSHIP > 20% includes the cases where the hedge fund increased the ownership over 20%, and there is evidence of activism in the 13D filing. The first column reports the percentage of each reason for all the switches in the main sample. The second and third columns report the percentages for the switches where the hedge fund has a loss and a gain, respectively. The last column reports the difference between the second and the third columns. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	All Switches (%)	LOSS = 1 (%)	LOSS = 0 (%)	Diff. (LOSS = 1) – (LOSS = 0) (%)
NO_SPECIFIC_REASON	50.4	53.9	43.9	10**
BUSINESS_STRATEGY	15.4	11.6	22.2	−10.6***
SALE_OF_THE_TARGET_COMPANY	6.4	4.6	9.6	−5**
CAPITAL_STRUCTURE	5.8	6.9	3.8	3.2*
CORPORATE_GOVERNANCE	18.2	18.3	18	0.3
OWNERSHIP > 20%	3.6	4.4	2.1	2.3

column reports the percentages of each stated reason for all the switches in the main sample. In 50.4% of the switches, the hedge funds do not declare a specific objective. Brav et al. (2008) report that such events make up 48% of their sample of 13D filings. The hedge funds typically include multiple goals and communication with the management. In 15.4% of the switches, the declared reason is related to the *business strategy*, which includes operational efficiency, business restructuring, spinning off, and M&A related reasons. In 6.4% of the cases, the objective is the *sale of the target company.* Reasons related to the *capital structure,* such as the increase of dividends and/or repurchases, appear in 5.8% of the switches. In 18.2% of the switches, the hedge funds declare that the objective is related to *corporate governance.* The last category, *ownership > 20%,* represents 3.6% of the switches and includes the switches where the hedge funds increased the ownership over 20%, and there is evidence of activism in the 13D filing.

The second and the third columns of Table 2 report the percentages of each stated reason for the switches that happen when the hedge funds are sitting on a loss and on a gain, respectively. The last column reports the difference between the two. Interestingly, the percentage of the switches where the hedge funds do not declare a specific reason is equal to 53.9% in the subsample of the switches with a loss, while it is only equal to 43.9% for the switches with a gain. The difference of 10% is statistically significant at the 5% level.

These results provide some insights on the underlying trigger of the switch and are consistent with the hypothesis that the switch to activism is also a psychological choice and not a choice that is only determined by economic factors. The loss generates psychological costs, and hedge fund managers can reduce these costs and preserve their self-image by blaming the firm's management and starting campaigns that however are not well motivated. They switch to activism and raise multiple issues. They declare that they want to communicate with the management but without having a clear plan in mind.

C. Univariate Tests

In order to study what causes hedge funds to become activists in former passive holdings instead of sticking to the original plan of not influencing the control of the firm, I then compare the characteristics of the switches to the characteristics of the control group of holdings, where the hedge funds maintain a passive posture without switching to activism. In particular, for a specific quarterly hedge fund's holding to be included in the control group, I first require that the hedge fund has a 5% ownership in the firm, as reported in the quarterly Thomson Reuters Form 13F database, and that it filed the Schedule 13G for that particular position. Then, I require the hedge fund to hold this passive position for the entire quarter. Finally, I consider all the following quarters until the ownership drops below 5%.[10] The control group includes 29,513 hedge fund-firm-quarter observations.

Since Schedule 13G does not require the disclosure of the price at which hedge funds purchased their stake, in order to compute the LOSS variable for the control group, I estimate the purchase price following the procedure used by Frazzini (2006).[11] Therefore, I estimate the purchase price starting from the quarterly 13F holdings. In more detail, I look at the change in holdings, as reflected by the end-of-quarter holdings relative to the end of the previous quarter. If the 13F holding of a particular hedge fund of a particular stock increases, I assume that the purchase is executed at the quarter-end market price. If the holding decreases, I use the first-in, first-out (FIFO) method to calculate the purchase price of the remaining shares. The purchase price estimated using this procedure that relies on the quarterly changes in the hedge funds' holdings is a noisy measure. The actual price at which the transactions happen is usually different from the price at the end of the quarter. There is, however, no reason to expect that this will systematically over- or under-estimate the purchase price. Finally, the dummy variable LOSS is defined to equal 1 if the stock price is greater than the purchase price, and 0 otherwise.

Table 3 presents univariate tests on mean values. The results are consistent with the hypothesis that hedge funds are more likely to switch if they are suffering losses. I find that the mean value of LOSS is 0.65 (i.e., for 65% of the switches, the hedge fund is sitting on a paper loss). This compares to 46% of the hedge funds' passive holdings that do not switch (control group), and the difference of 19% is statistically significant at the 1% level.

Standard economic theories predict that hedge funds will switch to activism when the firm suffers from agency issues or other problems that activism could address. The poor performance relative to a benchmark could be a proxy for the expected benefits of activism. To investigate this issue, I measure the ABNORMAL_RETURN as the difference between the raw stock return of the target firm over the previous 12 months and the Fama–French 48 industry portfolio return over the same time period. UNDERPERFORMANCE is then a dummy variable that is equal to 1, if the abnormal return over the previous 12 months is

[10] In robustness I consider alternative control groups.

[11] Frazzini (2006) estimates the purchase price of mutual funds' holdings starting from the quarterly 13F holdings. He then computes an aggregate measure, the *capital gains overhang*, that measures the percentage deviation of the aggregate cost basis for all mutual funds from the current price.

TABLE 3

Characteristics of the Switches and the Control Group

Table 3 compares the characteristics of the switches with the characteristics of the control group of quarterly holdings, where the hedge funds maintain a passive posture. The last column reports the difference in the means. LOSS is a dummy variable that is equal to 1 if there is a paper loss, and 0 otherwise; HOLDING_PERIOD_RETURN is the hedge fund's return since purchase; UNDERPERFORMANCE is a dummy variable that is equal to 1 if the target firm is underperforming its industry peers (Fama–French 48 industries) during the previous 12 months, and 0 otherwise; ABNORMAL_RETURN is the Fama–French 48 industry-adjusted return during the previous 12 months; M&A_TARGET is a dummy variable that is equal to 1 if the firm receives a takeover bid during the previous 12 months, and 0 otherwise; LIQUIDITY is defined as −ln(1 + AMIHUD). The Amihud illiquidity ratio is computed using daily prices over the previous 12 months; INST is the proportion of shares held by other institutional investors; *Q* is Tobin's *Q* defined as (market value of equity + total assets − book value equity)/(total assets); DIVIDEND_YIELD is defined as (common dividend)/(market value of common stock); return on assets (ROA) is defined as earnings before interest, tax, depreciation and amortization (EBITDA) scaled by total assets; LEVERAGE is the book leverage ratio; CASH is defined as (cash + cash equivalents)/assets. All continuous variables are winsorized at the 1st and 99th percentile. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	Switches		Control Group		Switches-Control Group
	N	Mean	*N*	Mean	Diff. in Means
LOSS (dummy)	585	0.65	29,513	0.46	0.19***
HOLDING_PERIOD_RETURN	585	−6%	29,513	8%	−14%***
UNDERPERFORMANCE (dummy)	585	0.76	29,513	0.59	0.17***
ABNORMAL_RETURN	585	−21%	29,513	−2%	−19%***
M&A_TARGET	585	0.13	29,513	0.02	0.11***
LIQUIDITY	585	−0.53	29,513	−0.57	0.04
INST	585	0.49	29,513	0.55	−0.06***
Q	504	1.66	25,633	1.77	−0.11*
DIVIDEND_YIELD	507	0.5%	25,656	0.7%	−0.2%***
ROA	503	−0.4%	25,512	2.8%	−3.2%***
LEVERAGE	505	0.26	25,545	0.22	0.04***
CASH	505	0.23	25,630	0.22	0.01

negative, and 0 otherwise. Table 3 shows that 76% of the target firms at the time of the switch underperform the industry peers. Interestingly, also the firms of the control sample underperform their peers most of the time (59%). The difference of 17% is statistically significant at the 1% level.

An anecdote suggests that a possible economic trigger for the switch could be a takeover attempt. In Jan. 2005, the hedge fund Diker Management, a passive blockholder in I-Many Inc., switched to Schedule 13D. I-Many Inc. received a takeover bid from Selectica, and Diker believed that "the terms of the merger do not give full and fair value to the Company." The hedge fund decided "to vote against the merger and to actively encourage the Company to seek alternate means of delivering value for its shareholders."[12]

This anecdote recalls jawboning in risk arbitrage (Jiang, Li, and Mei (2018)). Hedge funds file Schedule 13D and initiate activists' campaigns in M&A targets after the announcement of the deal, in order to oppose the merger, and to improve the deal terms. In all the multivariate tests, I control for this determinant of the switch. Using data from Thomson Reuters Securities Data Company (SDC) Platinum, I construct the dummy variable M&A_TARGET that is equal to 1, if the firm receives a takeover bid during the previous 12 months, and 0 otherwise.

Table 3 shows that passive hedge funds are more likely to switch to activism when the portfolio company receives a takeover bid during the previous 12 months: 13% of the switches happen after the firm receives a takeover bid. This compares to 2% of the control group, which is consistent with the evidence of prior literature

[12]Item 4 "Purpose of the Transaction" of Schedule 13D filed by Diker Management on Jan. 6, 2005.

on the importance of mergers and acquisitions for value creation in hedge fund activism.

The firms where the hedge funds switch have a lower Tobin's *Q*. Consistent with what is predicted by economic theories, hedge funds are more likely to target undervalued firms where the potential for value improvement is high (Brav et al. (2021)). The other univariate results show that the switches have a lower proportion of shares held by other institutional investors (INST), a lower dividend yield (DIVIDEND_YIELD) and ROA, and a higher leverage (LEVERAGE). Finally, the switches and the control group are indistinguishable in terms of liquidity (LIQUIDITY)[13] and cash holdings (CASH).

D. Multivariate Tests

In this section, I proceed to formal multivariate tests of my hypothesis. To assess how the loss affects the switch to activism, I estimate the following linear probability model:[14]

$$\text{SWITCH}_{i,j,t} = \alpha + \beta_1 \text{LOSS}_{i,j,t} + \delta' X_{j,t} + \gamma_i + \theta_t + \varepsilon_{i,j,t}.$$

Observations are at the hedge fund (*i*), firm (*j*), and quarter (*t*) level. The dependent variable, $\text{SWITCH}_{i,j,t}$ is a dummy variable equal to 1 if the hedge fund *i* switches from the 13G to the 13D filing in firm *j* in quarter *t*, and 0 otherwise. The explanatory variable of interest is the LOSS dummy. It is equal to 1 if the holding period return is negative, and 0 otherwise. A positive coefficient on LOSS would suggest that hedge funds are more likely to switch to activism when they are suffering a paper loss.

The vector **X** includes the firm characteristics that are described in the previous section and that may affect the probability of switching to activism as predicted by economic theories: the firm's stock underperformance dummy (UNDERPERFORMANCE), the M&A target dummy (M&A_TARGET), the stock liquidity (LIQUIDITY), the firm's institutional ownership (INST), Tobin's *Q* (*Q*), the dividend yield (DIVIDEND_YIELD), the return on assets (ROA), leverage (LEVERAGE), and cash holdings (CASH). I estimate the regressions with and without these controls. In all regressions, I include hedge fund (γ_i) and quarter (θ_t) fixed effects. Standard errors are clustered by quarter and hedge fund.

Table 4 reports the coefficient estimates from the multivariate regressions. Column 1 reports the results with only the LOSS variable. Consistent with the main hypothesis, the coefficient on LOSS is significantly positive. Columns 2 and

[13]Liquidity facilitates block formation by lowering the costs of entering and exiting the position (Kahn and Winton (1998), Maug (1998)), and thus it encourages the formation of both passive and active blocks. Norli, Ostergaard, and Schindele (2015) claim that higher liquidity increases the probability of a firm to be targeted by activist hedge funds. Edmans, Fang, and Zur (2013), however, claim that conditional on block formation, higher liquidity increases the likelihood that the hedge fund governs through the threat of exit, i.e., they are more likely to stay passive. To measure liquidity, I follow Edmans, Fang, and Zur (2013) and I use LIQUIDITY = −ln(1 + AMIHUD). The Amihud illiquidity ratio is computed using daily prices over the previous year. Higher values of LIQUIDITY correspond to higher liquidity.

[14]I also estimate probit and logit models. The results, not reported, are qualitatively similar, indicating that the results are not sensitive to the model specification.

TABLE 4

Main Results

Table 4 reports the estimates of the probability of switching to activism. The dependent variable is a dummy variable that is equal to 1 if the hedge fund switches from Schedule 13G to Schedule 13D, and 0 otherwise. Columns 1 and 2 include the loss and the underperformance dummies separately. Column 3 includes both variables. Column 4 includes both variables and the other controls. All regressions include quarter and hedge fund fixed effects. Standard errors clustered by quarter and hedge fund are reported under the coefficients. The final rows of each column report the number of observations and R^2. Observations are at the hedge fund-firm-quarter level. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Variable	1	2	3	4
LOSS	0.014***		0.011***	0.010***
	(0.003)		(0.002)	(0.003)
UNDERPERFORMANCE		0.011***	0.007***	0.007***
		(0.002)	(0.002)	(0.002)
M&A_TARGET				0.080***
				(0.017)
LIQUIDITY				0.001***
				(0.001)
INST				−0.020***
				(0.008)
Q				−0.002
				(0.001)
DIVIDEND_YIELD				−0.002***
				(0.001)
ROA				−0.020**
				(0.008)
LEVERAGE				0.007
				(0.006)
CASH				−0.008
				(0.008)
Intercept	Yes	Yes	Yes	Yes
Quarter FE	Yes	Yes	Yes	Yes
Hedge fund FE	Yes	Yes	Yes	Yes
No. of obs.	30,098	30,098	30,098	25,917
R^2	0.081	0.080	0.081	0.109

3 report the results with only the UNDERPERFORMANCE variable, and with both LOSS and UNDERPERFORMANCE, respectively. The coefficient on LOSS continues to be significantly positive, even after controlling for the target firm's underperformance. The effect of the loss is also economically large. Column 4 shows that controlling for the firm's underperformance, as well as for the other firm characteristics, the loss increases the probability of switching by 1 percentage point, an increase of 50% compared to the unconditional probability of 2% of switching in each quarter. In contrast, if the firm is underperforming its industry peers, the probability of switching increases by 0.7 points, an increase of 35% from the unconditional probability.

With respect to the other control variables, I find that the coefficient on M&A_TARGET is significantly positive. This implies that hedge funds are significantly more likely to switch to activism if the firm is the target of a takeover attempt (i.e., if it receives a takeover bid during the previous 12 months). Conditional upon receiving the takeover bid, the probability of switching increases by 8%. The magnitude of the effect is large but not surprising. Hedge funds switch to activism in order to improve the terms of an announced M&A (Jiang et al. (2018)).

TABLE 5

Discontinuity Tests

Table 5 presents evidence for a discontinuity in the probability of switching around the zero-loss level. The dependent variable is the SWITCH dummy. In all regressions, the sample is limited to positions with holding period return of ±0.5 standard deviation around 0. Column 1 presents the baseline results. Columns 2 and 3 include the polynomials of the holding period return up to the second and third power, respectively. Columns 4 and 5 include the polynomials of the holding period return up to the second and third power, and the interactions with the LOSS dummy. All regressions include quarter and hedge fund fixed effects, and the controls. Observations are at the hedge fund-firm-quarter level. Standard errors clustered by quarter and hedge fund are reported under the coefficients. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Variable	1	2	3	4	5
LOSS	0.007**	0.011***	0.019***	0.019***	0.021**
	(0.003)	(0.004)	(0.006)	(0.006)	(0.008)
UNDERPERFORMANCE	0.007***	0.008***	0.008***	0.008***	0.008***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
RET polynomials 2nd power	No	Yes	Yes	Yes	Yes
RET polynomials 3rd power	No	No	Yes	No	Yes
LOSS × RET polynomials 2nd power	No	No	No	Yes	Yes
LOSS × RET polynomials 3rd power	No	No	No	No	Yes
Intercept	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes
Quarter FE	Yes	Yes	Yes	Yes	Yes
Hedge fund FE	Yes	Yes	Yes	Yes	Yes
No. of obs.	13,265	13,265	13,265	13,265	13,265
R^2	0.126	0.127	0.127	0.128	0.128

In the next tests, reported in Table 5, I focus on identifying the discontinuity at the zero-loss threshold by applying a multivariate regression discontinuity framework. Specifically, I test whether the discontinuity at the zero-loss threshold survives after the inclusion of the polynomials of the holding period return. I restrict the sample to the holdings whose holding period returns are within 0.5 standard deviation around 0. The trade-off is to keep a significant number of observations to allow the polynomial to fit the shape of the switching probability without being influenced by extreme values. Column 1 reports the results without including the polynomials of the holding period return; columns 2 and 3 include the polynomials up to the second and third power, respectively; columns 4 and 5 include the polynomials of the holding period return up to the second and third power and their interactions with the LOSS dummy. The last 2 specifications allow the coefficients of the holding period return polynomials to vary on either side of the zero-loss threshold.

The results show that LOSS is still statistically significant in all model specifications. The probability of switching jumps discontinuously exactly at the zero-loss threshold. In terms of economic significance, the magnitude of the discontinuity increases when controlling for higher order polynomials and by including their interactions with the LOSS dummy. These results support the hypothesis that hedge funds see the purchase price as a reference point. The loss, which is specific to the hedge fund that previously initiated the passive position by filing Schedule 13G, generates psychological costs that increase discontinuously the probability of intervention.

E. Alternative Explanations

Economic theories predict that hedge funds will choose to intervene when the gains that can be made by engaging with the management will exceed the costs.

This section evaluates whether alternative explanations based on economic factors drive the results.

1. Target Firm's Underperformance

The evidence presented so far shows that the psychological effect of the loss of a hedge fund in a particular passive holding triggers the switch to activism. One possibility is that the loss is simply capturing the effect of the firms' underperformance, a proxy for the firms' potential for value improvement. It is important to underline that if the results are driven by the firm's poor performance relative to a benchmark, there would be no reason to see a discontinuity exactly at the zero-loss level, a level that is not common to all investors in the firm, but that is specific to each hedge fund. Nevertheless, in this section I further investigate whether the effect of the loss is distinct from the effect of the prior poor relative performance of the firm.

First, I split the sample into 2 groups based on whether the abnormal return of the firm in the previous 12 months is positive or negative. In particular, I construct the 2 subsamples by matching each hedge fund's switches with positive (negative) prior abnormal return with only the passive holdings of the same hedge fund with positive (negative) prior abnormal return. As in the baseline tests, I require at least one matched passive holding for each switch. If it is the loss itself that triggers the switch, I expect to find that the loss has explanatory power in both subsamples, and this is exactly what I find. Columns 1 and 2 of Table 6 show that the loss increases the probability of switching in both subsamples. In particular, column 2 shows that even in the subsample of only positive abnormal returns, and even if the sample size is much smaller, the economic significance of the effect of the loss is virtually unchanged if compared to the main tests reported in Table 4.

Second, I consider a one-to-one matching where, among all the hedge funds' holdings that remain passive, each switch is matched with the single position that has the closest prior abnormal return. The 2 positions are very similar in terms of the firm's prior underperformance. The only difference is that in one the hedge fund switches to activism, while in the other it remains passive. This matching criterion is a further attempt to control for the effect of the abnormal return and to identify the effect of the loss on the probability of switching. Column 3 of Table 6 shows that the coefficient on the LOSS variable is still positive and statistically significant.

Third, I also address the concern that the correct proxy for the firm's potential for value improvement is not the abnormal return during the previous 12 months, a fixed time window before the switch, but it is the abnormal return since the time of the filing of the 13G. It is possible that while at the time of the 13G filing a passive strategy is the best option for the hedge fund, a negative abnormal return since then could increase the expected benefits from the intervention, making a change of strategy the optimal choice. To address this concern, I split the sample into the holdings with a positive and with a negative industry-adjusted abnormal return since the filing of the 13G. Columns 4 and 5 of Table 6 show that LOSS retains its statistical as well as its economic significance in both subsamples.

Overall, the findings of this section are consistent with the loss having an effect on the switch to activism that is distinct from the prior poor relative performance of the firm.

TABLE 6

Alternative Explanation: Underperformance

Table 6 reports the estimates of the probability of switching to activism. The dependent variable is the SWITCH dummy. Columns 1 and 2 restrict the sample to the holdings with negative and positive abnormal return, respectively. Column 3 uses, among all the hedge funds' holdings that remain passive, the single position that has the closest abnormal return. Columns 4 and 5 restrict the sample to the holdings with negative and positive abnormal returns since the filing of the Schedule 13G, respectively. All regressions include quarter and hedge fund fixed effects. Observations are at the hedge fund-firm-quarter level. Standard errors clustered by quarter and hedge fund are reported under the coefficients. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	Ab. Return < 0	Ab. Return ≥ 0	One-to-One Matching	Ab. Return 13G < 0	Ab. Return 13G ≥ 0
Variable	1	2	3	4	5
LOSS	0.012***	0.011**	0.146**	0.013***	0.013**
	(0.004)	(0.005)	(0.060)	(0.004)	(0.005)
M&A_TARGET	0.077***	0.137***	0.493***	0.071***	0.137***
	(0.023)	(0.040)	(0.107)	(0.021)	(0.038)
LIQUIDITY	0.002***	−0.000	0.017	0.002**	0.001
	(0.001)	(0.001)	(0.014)	(0.001)	(0.001)
INST	−0.030***	−0.011	−0.349**	−0.030***	−0.010
	(0.011)	(0.011)	(0.135)	(0.010)	(0.011)
Q	−0.003*	0.001	0.003	−0.003*	−0.000
	(0.002)	(0.001)	(0.029)	(0.002)	(0.001)
DIVIDEND_YIELD	−0.001	−0.003**	−0.024	−0.002*	−0.003**
	(0.001)	(0.001)	(0.020)	(0.001)	(0.001)
ROA	−0.028**	−0.015	−0.183	−0.035***	−0.006
	(0.012)	(0.013)	(0.162)	(0.012)	(0.013)
LEVERAGE	0.015*	−0.007	0.139	0.010	−0.008
	(0.008)	(0.011)	(0.108)	(0.008)	(0.011)
CASH	−0.006	−0.019**	−0.199	−0.016	−0.002
	(0.013)	(0.010)	(0.136)	(0.012)	(0.010)
Intercept	Yes	Yes	Yes	Yes	Yes
Quarter FE	Yes	Yes	Yes	Yes	Yes
Hedge fund FE	Yes	Yes	Yes	Yes	Yes
No. of obs.	14,421	6,519	866	14,664	8,700
R^2	0.129	0.130	0.218	0.114	0.174

2. Compensation

Hedge fund managers' fees are linked to the absolute returns that funds generate. The management fee is typically 2% of AUM, while the incentive fee is 20% of fund profits. Another concern is that the switch to activism could be driven by these compensation incentives. In this regard, it is important to stress that the loss I analyze in this paper, and with respect to which I find a sharp discontinuity in the probability of switching, is specific to a particular hedge fund's passive position, and it is not the loss at the overall fund level, which is relevant for compensation. Nevertheless, in this section, I explore whether hedge funds' compensation incentives drive the results.

To account for time-varying factors at the hedge fund level, including the overall fund return, which is linked to compensation, I first include hedge fund by quarter fixed effects. The loss at the overall fund level could create higher incentives to switch possibly because of non-linear features of the compensation structure. Column 1 of Table 7 includes the interacted fixed effects and shows that the coefficient on LOSS is unchanged if compared to the baseline results.

Next, to control directly for the overall hedge fund performance and for fund-specific characteristics, I match my sample with the Hedge Fund Research (HFR)

TABLE 7

Alternative Explanation: Compensation

Table 7 reports the estimates of the probability of switching to activism. The dependent variable is the SWITCH dummy. Column 1 includes hedge fund by quarter fixed effects. Column 2 includes the dummy variable HF_LOSS, that is equal to 1 if the overall hedge fund performance over the previous 12 months is negative, and 0 otherwise. Column 3 includes fund characteristics from Hedge Fund Research as control variables. LOCKUP is a dummy variable equal to 1 if the hedge fund has a lockup period, and 0 otherwise. HWM is a dummy variable equal to 1 if the hedge fund has a high-water mark, and 0 otherwise. HR is a dummy variable equal to 1 if the hedge fund has a hurdle rate, and 0 otherwise. AUM is the log of the hedge fund's assets under management. Standard errors clustered by quarter and hedge fund are reported under the coefficients. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Variable	1	2	3
LOSS	0.010***	0.011**	0.014***
	(0.003)	(0.005)	(0.004)
UNDERPERFORMANCE	0.007***	0.008**	0.008**
	(0.002)	(0.004)	(0.004)
M&A_TARGET	0.081***	0.068**	0.051***
	(0.017)	(0.028)	(0.020)
LIQUIDITY	0.001***	0.002*	0.001
	(0.000)	(0.001)	(0.001)
INST	−0.014**	−0.029**	−0.061***
	(0.007)	(0.012)	(0.020)
Q	−0.001	−0.001	−0.000
	(0.001)	(0.002)	(0.002)
DIVIDEND_YIELD	−0.002***	−0.001*	−0.003***
	(0.001)	(0.001)	(0.001)
ROA	−0.023***	−0.005	0.007
	(0.008)	(0.013)	(0.017)
LEVERAGE	0.006	0.010	0.012
	(0.005)	(0.009)	(0.011)
CASH	−0.010	−0.013	−0.018
	(0.008)	(0.013)	(0.014)
HF_LOSS		−0.001	0.001
		(0.005)	(0.006)
LOCKUP			0.023***
			(0.008)
HWM			−0.007
			(0.015)
HR			−0.006
			(0.010)
AUM			0.003**
			(0.002)
Intercept	Yes	Yes	Yes
Quarter FE	No	Yes	Yes
Hedge fund FE	No	Yes	No
HF × quarter FE	Yes	No	No
No. of obs.	25,917	10,360	9,691
R^2	0.109	0.126	0.033

data set. The hedge fund's overall performance is computed over the previous 12 months. I then compute the dummy variable HF_LOSS, which is equal to 1 if this performance is negative, and 0 otherwise. The results reported in Column 2 show that the effect of LOSS is unchanged.

Finally, the switch could also depend on fund-specific characteristics such as the high-water mark, hurdle rate, and lockup. The high-water mark is a provision that allows funds to collect their performance fees only if the net asset value exceeds the previous maximum. The hurdle rate is a provision that allows funds to collect their performance fees only if the fund returns exceed a predetermined rate. The lockup period is a provision that prevents investors from withdrawing their capital

before the predetermined date. HFR reports data at the individual fund level. I construct the measures at the management company level by looking at whether at least one fund has that specific characteristic. HR is a dummy variable that equals 1 if the hedge fund has a hurdle rate, and 0 otherwise. HWM is a dummy variable equal to 1 if the hedge fund has a high-water mark, and 0 otherwise. LOCKUP is a dummy variable equal to 1 if the hedge fund has a lockup period, and 0 otherwise. AUM is the log of the hedge fund's assets under management. The results reported in column 3 of Table 7 show that hedge funds with a lockup provision are 2.3 percentage points more likely to switch to activism. One interpretation of this result is that hedge funds that have lockups are more likely to switch because, since investors cannot withdraw their capital for a predetermined period of time, the hedge funds do not incur the risk of being forced to sell the position before completing the campaign. More importantly, the effect of the loss at the level of the individual passive holding is still statistically as well as economically significant even if, after matching my sample with the Hedge Fund Research data set, the sample size is much smaller.

3. Real Option

Hedge funds could file passive 13Gs with the intention of eventually switching afterward. This option to engage with the management and the flexibility over the timing of this decision can be valuable to hedge funds. This section investigates whether the hedge funds' switching behavior is consistent with passive holdings being real options to engage with the management.

Undertaking an activism campaign is expensive (Gantchev (2013)), thus hedge funds could, as a first step, buy a 5% stake in particular firms and file the passive 13G. Then, they could wait and learn more about the firm, and only eventually switch to the active 13D and move to the next stage of becoming activists and engaging with the management. The timing of this decision is important and different factors may affect it.

To test the real option hypothesis, I employ a duration analysis using a hazard model. By using this model, I compute how different factors affect the probability of switching (exercising the option) at time t, conditional on the option not having been exercised before. In my data, the quarter of the filing date of the 13G is counted as the beginning of a new passive position, while the position ends when the hedge fund switches to the 13D filing (the option is exercised) or when the hedge fund exits (i.e., when the percentage ownership in the target firm drops below 5%). The time-varying covariates, measured at the end of the previous quarter, include the loss and underperformance dummies as well as the controls included in the main results. Real option theory suggests that higher uncertainty increases the value of the option to delay an investment. I include the stock's volatility to test whether it affects the switching behavior. If hedge funds file the passive 13G with the intention of eventually switching afterward, an increase in the volatility of the stock returns should increase the value of this real option to engage with the management, thus delaying the switch.

Table 8 reports the estimates of a Cox proportional hazard model. Columns 1–3 include only the LOSS variable, only the UNDERPERFORMANCE variable, and both variables, respectively. Column 4 also includes VOLATILITY, measured

TABLE 8

Alternative Explanation: Real Option

Table 8 reports coefficient estimates from a Cox proportional hazard model regression. The dependent variable is the SWITCH dummy that equals 1 in the quarter in which the hedge fund switch to activism and 0 otherwise. VOLATILITY is the standard deviation of returns during the prior 12 months. Observations are at the hedge fund-firm-quarter level. Standard errors clustered by hedge fund are reported under the coefficients. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Variable	1	2	3	4	5
LOSS	0.612***		0.413***	0.416***	0.448***
	(0.113)		(0.124)	(0.118)	(0.129)
UNDERPERFORMANCE		0.721***	0.551***	0.550***	0.547***
		(0.108)	(0.120)	(0.119)	(0.122)
VOLATILITY				−0.510	−2.305
				(5.149)	(5.732)
M&A_TARGET					0.601**
					(0.283)
INST					−0.531
					(0.324)
LIQUIDITY					0.070**
					(0.034)
Q					−0.002
					(0.060)
DIVIDEND_YIELD					−0.082
					(0.055)
ROA					−0.410
					(0.452)
LEVERAGE					0.747***
					(0.261)
CASH					−0.715*
					(0.410)
No. of obs.	28,902	28,902	28,902	28,902	25,780
Pseudo R^2	0.006	0.007	0.009	0.009	0.018

as the standard deviation of the daily returns during the prior 12 months, and column 5 shows the results, including all the other controls. The results show that the coefficient on VOLATILITY is never statistically significant. More importantly, I continue to find a strong positive relationship between the likelihood of switching and LOSS in all model specifications. Column 5, which includes all controls, shows that the coefficient on LOSS is positive and statistically significant and indicates that a hedge fund that is sitting on a paper loss is $e^{0.448} \approx 1.57$ times more likely to switch to activism compared to a hedge fund that is sitting on a paper gain.

The effect of the loss survives in the hazard analysis, and its economic significance is consistent with the baseline results. However, the volatility does not affect the switching behavior, and this is not consistent with the passive holdings being real options to engage with the management. From the results of the hazard analysis, it seems that hedge funds are unlikely to file a 13G with the intention of eventually switching afterward. One explanation of these results is that if hedge funds have the intention of eventually engaging with the management, they could buy stakes just below 5%, that do not trigger any specific disclosure requirement, and then increase the percentage ownership only marginally and file the 13D if they decide to intervene. This alternative strategy would generate similar benefits without creating the legal risks related to filing the 13G misstating the true activist intentions.

4. Taxes

Hedge funds' propensity to switch when sitting on a paper loss is at odds with optimal tax planning. As suggested by prior literature, when taxes play a role in investors' behavior, they increase the probability that tax-sensitive investors will sell losing stakes in order to realize the associated tax benefits (Odean (1998), Grinblatt and Keloharju (2001), and Starks, Yong, and Zheng (2006)). Thus, to reduce their tax bill, hedge funds should realize their losses instead of switching to activism. Therefore, if present, any effect from tax-based incentives runs counter to the effect I document in this paper.[15]

5. Robustness

In this section, I subject the main results to a variety of robustness tests.

First, I control for the holding period return. In particular, I control for the continuous variable (RET), and I split the holding period return into negative and positive values. RET^{-} is the minimum between the holding period return and 0. RET^{+} is the maximum between the holding period return and 0. The coefficients on these variables provide insights about whether the switch to activism also depends on the size of the loss or gain, and whether there is a change in slope for positive and negative values. I control for the holding period by including the time (number of quarters) since the filing of the 13G (HOLDING_PERIOD), by including a set of indicators for the hedge fund's holding period, one for every quarter since the filing of the 13G, and by considering the subsample of positions where the holding period is less and more than 4 quarters, respectively.

Table 9 presents the results. Consistent with cognitive dissonance, in all model specifications, the LOSS dummy retains its economic and statistical significance. In column 1, the coefficient on the LOSS dummy is similar to the baseline results while the coefficient on the holding period return (RET) continuous variable is economically small and statistically not significant. The results are unchanged in column 2, which also controls for the holding period fixed effects. Columns 3–5 split the holding period return into negative and positive values. Consistent with the baseline results, Column 3 reveals that sitting on a loss, even a small one, increases the probability of switching by 0.8% with respect to the zero-loss level. In the loss region, the probability of switching increases with the magnitude of losses. Having a holding period return of −10% further increases the probability of switching by 0.24% for a total of 1.04%. It is interesting to note that in the gain region, the relationship between the holding period return and the probability of switching is positive, even if slightly. A holding period return of 10% increases the probability of switching by 0.10%. This effect survives (is stronger) for holding periods less than 4 quarters (column 4) while it disappears for longer holding periods (column 5). Therefore, the probability of switching jumps at the zero-loss level. A holding period return of −10% increases the probability of switching by 1.04% with respect to the zero-loss level. While cognitive dissonance only speaks to the returns in the

[15]Odean (1998) suggests that "sophisticated investors could reconcile tax-loss selling with her aversion to realize losses through a tax-swaps." This swap would entail selling the losing stock and purchasing another stock with similar characteristics. At any rate, the loss-motivated switching to activism is at odds with optimal tax planning.

TABLE 9

Robustness: Holding Period Return

Table 9 reports the estimates of the probability of switching to activism. The dependent variable is the SWITCH dummy. Columns 1 and 2 include the hedge fund holding period return (RET). Columns 3–5 include the holding period return split into negative and positive values. RET^- is the minimum between the holding period return and 0. RET^+ is the maximum between the holding period return and 0. HOLDING_PERIOD is defined as the time since the filing of the 13G (number of quarters). Columns 4 and 5 restrict the sample to the quarterly positions whose holding period is less or equal to 4 quarters and more than 4 quarters, respectively. All regressions include quarter and hedge fund fixed effects. Column 2 also includes the holding period fixed effects. Observations are at the hedge fund-firm-quarter level. Standard errors clustered by quarter and hedge fund are reported under the coefficients. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Variable				HOLDING_PERIOD ≤ 4 Quarters	HOLDING_PERIOD > 4 Quarters
	1	2	3	4	5
LOSS	0.013***	0.013***	0.008**	0.008*	0.009**
	(0.003)	(0.003)	(0.003)	(0.005)	(0.004)
RET	0.005	0.005			
	(0.003)	(0.003)			
RET^-			−0.024**	−0.076***	0.003
			(0.010)	(0.017)	(0.010)
RET^+			0.010**	0.049***	−0.000
			(0.004)	(0.012)	(0.003)
UNDERPERFORMANCE	0.008***	0.008***	0.007***	0.009***	0.007**
	(0.002)	(0.002)	(0.002)	(0.003)	(0.003)
HOLDING_PERIOD	0.000**		0.000	−0.005***	0.001**
	(0.000)		(0.000)	(0.002)	(0.000)
Intercept	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes
Quarter FE	Yes	Yes	Yes	Yes	Yes
Hedge fund FE	Yes	Yes	Yes	Yes	Yes
HP FE	No	Yes	No	No	No
No. of obs.	25,917	25,917	25,917	11,669	14,248
R^2	0.110	0.112	0.111	0.134	0.172

loss region, the probability of switching slightly increases with a positive holding period return of 10%, albeit the economic significance is very small (0.10%). Clearly, in terms of economic significance, the presence (or absence) of the loss plays a critical role.

Second, following Brav et al. (2008) that exclude risk arbitrage from their sample of activism events, I re-estimate the main results excluding the holdings where the firms received a takeover bid during the previous 12 months. The results reported in column 1 of Table 10 are qualitatively similar. Column 2 of Table 10 considers only the switches where the hedge funds declare a specific objective. LOSS is still statistically significant. Consistent with the results in Table 2, which shows that when hedge funds are suffering losses, they are less likely to state a specific reason for the switch and instead raise multiple issues, the economic significance of the loss, excluding the campaigns where the hedge fund does not declare a specific reason, is lower.

Third, I consider alternative matching criteria. Column 3 of Table 10 reports the results considering only the positions that remain passive during the same quarter of the switch as control group. Column 4 matches the switches to the quarterly passive positions that in the following quarter are sold (i.e., the hedge

TABLE 10

Robustness: Subsamples and Alternative Control Groups

Table 10 reports the estimates of the probability of switching to activism. Column 1 excludes the positions in firms that received a takeover bid in the previous 12 months. Column 2 excludes the switches where the hedge fund does not declare a specific reason for the switch. The control group used in column 3 considers only the positions that stay passive during the same quarter of the switch. The control group used in column 4 considers the passive positions that in the following quarter are sold (the hedge fund ownership drops below 5%). All regressions include quarter and hedge fund fixed effects. The final rows of each column report the number of observations and R^2. Observations are at the hedge fund-firm-quarter level. Standard errors clustered by quarter and hedge fund are reported under the coefficients. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Variable	No Mergers	Only Declared Objective	Positions That Remain Passive During the Same *Q* of the Switch	Positions That Exit
	1	2	3	4
LOSS	0.011***	0.004**	0.112***	0.049***
	(0.003)	(0.002)	(0.023)	(0.016)
UNDERPERFORMANCE	0.007***	0.002	0.059***	0.047***
	(0.002)	(0.001)	(0.020)	(0.011)
M&A_TARGET		0.077***	0.435***	0.157***
		(0.016)	(0.079)	(0.043)
LIQUIDITY	0.001**	0.001*	0.015***	0.008***
	(0.001)	(0.000)	(0.005)	(0.002)
INST	−0.023***	−0.007*	−0.093*	−0.133***
	(0.008)	(0.005)	(0.053)	(0.033)
Q	−0.001	−0.000	−0.007	−0.004
	(0.001)	(0.001)	(0.009)	(0.004)
DIVIDEND_YIELD	−0.001***	−0.001	−0.008	−0.007*
	(0.001)	(0.000)	(0.007)	(0.004)
ROA	−0.021**	−0.012**	−0.153**	−0.044
	(0.008)	(0.006)	(0.060)	(0.034)
LEVERAGE	0.007	0.003	0.045	0.016
	(0.005)	(0.003)	(0.046)	(0.027)
CASH	−0.009	−0.008*	−0.039	−0.037
	(0.008)	(0.005)	(0.065)	(0.032)
Intercept	Yes	Yes	Yes	Yes
Quarter FE	Yes	Yes	Yes	Yes
Hedge fund FE	Yes	Yes	Yes	Yes
No. of obs.	25,244	25,666	2,199	3,838
R^2	0.103	0.088	0.247	0.253

fund ownership drops below 5%). Table 10 shows that LOSS retains its explanatory power using both these alternative matching criteria.

Finally, I check the robustness of the main results by using alternative proxies for the target firms' abnormal returns. I re-estimate the main regressions by using the Fama–French 12 industries portfolios, the characteristics-based benchmarks of Daniel, Grinblatt, Titman, and Wermers (1997) and the CRSP value-weighted index. The results, not tabulated, are qualitatively similar.

V. Consequences of Loss-Driven Activism

The results of the first part of this paper show that when hedge funds suffer losses on passive holdings, they are more likely to switch to activism. The loss generates a psychological pain that hedge funds attempt to reduce by blaming the management and switching to an activism that however is not well motivated. In this section, I investigate the consequences of this loss-driven activism.

A. Loss-Driven Switches

A natural question is whether there is any difference between the consequences of the switches likely motivated by the loss and the other switches. If the psychological costs of the loss are a trigger of not well-motivated switches, one would expect to see a less effective activism.

To explore the differential effect of loss-driven activism, I consider the sample of switches to activism, and I run multivariate regressions at the switch level where the dependent variables are the target firms' announcement returns and the change in operating performance. The key variable of interest is the LOSS dummy. A negative (positive) coefficient would indicate that if the switch happens when the hedge fund is sitting on a paper loss, the target firm performance is lower (higher) compared to the switches that happen when the hedge fund is sitting on a paper gain.

Columns 1 and 2 of Table 11 present the estimates of multivariate models where the dependent variables are the raw buy-and-hold returns (BHRs) and the Fama–French 48 industries buy-and-hold abnormal returns (BHARs). I compute the target firms' returns around the switch in the time window that starts 20 trading days before, and ends 20 trading days after the filing date. All specifications include the stated objective of the campaign (as defined in Table 2) and industry fixed effects. Despite the small sample size, the results show that the switches that happen when the hedge funds are sitting on a loss have significantly lower announcement returns. Relative to campaigns that happen when the hedge funds are sitting on a gain, the BHRs and the BHARs around the switch are 6.1 and 6.4 percentage points lower, respectively.

I find similar results for the change in operating performance. Columns 3 and 4 of Table 11 present the estimates of the models where the dependent variable is the change in ROA and industry-adjusted ROA measured the year after activism, relative to the year before activism.[16] The results show that the change in ROA and industry-adjusted ROA of the target firms of the switches that are likely motivated by the loss is 4.6 percentage points lower if compared to the change in ROA of the firms that are the targets of activism resulting from switches happening when the hedge funds are sitting on a paper gain. In untabulated results, I do not find statistically significant results for the change in research and development (R&D) investment and for the probability of being a takeover target during the 12 months after the switch.

To gain further insights into the short- and long-term performance of the firms targeted by loss-driven activism, I run calendar-time portfolio regressions. The dependent variable is the average monthly portfolio return minus the risk-free rate. I regress the portfolio returns on the monthly Fama–French 3 factors along with the momentum factor. The monthly windows indicate when a stock is in the portfolio with respect to the month of the switch. ALPHA is the estimated intercept term (abnormal return), while SMB, SMB, HML, and MOM indicate the respective loading on the factors.

[16]When the ROA the year after activism is not available, I consider the ROA at the end of the year of activism.

TABLE 11

Consequences: Loss-Driven Switches

Table 11 reports OLS regression estimates where the dependent variable is a measure of the consequences of the switch. The dependent variables of columns 1 and 2 are the raw Buy-and-Hold Returns (BHRs) and the Fama–French 48 industries Buy-and-Hold Abnormal Returns (BHARs) of the target firm around the switch, respectively. The returns are computed in the time window that starts 20 trading days before and ends 20 trading days after the filing date. The dependent variables of columns 3 and 4 are the change in ROA and industry-adjusted ROA measured the year after activism, relative to the year before the year of activism (year *t*). Observations are at the switch level. All specifications include the stated objective of the campaign (as defined in Table 2), and industry fixed effects. Standard errors clustered by hedge fund are reported under the coefficients. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	BHR (−20,+20)	BHAR (−20,+20)	$ROA_{t+1} - ROA_{t-1}$	Adjusted ROA_{t+1} − Adjusted ROA_{t-1}
Variable	1	2	3	4
LOSS	−0.061**	−0.064**	−0.046**	−0.046**
	(0.028)	(0.027)	(0.019)	(0.019)
M&A_TARGET	0.040	0.075*	−0.026	−0.009
	(0.048)	(0.042)	(0.039)	(0.041)
LEVERAGE	−0.006	−0.035	0.064*	0.054
	(0.053)	(0.050)	(0.038)	(0.039)
SIZE	−0.028***	−0.025**	−0.010	−0.012
	(0.011)	(0.010)	(0.007)	(0.008)
ROA	−0.076	−0.086	−0.367***	−0.357***
	(0.079)	(0.075)	(0.104)	(0.104)
INST	0.083	0.080	0.109**	0.116**
	(0.061)	(0.052)	(0.053)	(0.052)
LIQUIDITY	0.003	0.003	−0.000	0.002
	(0.006)	(0.007)	(0.004)	(0.005)
Q	0.012	0.005	0.001	0.002
	(0.021)	(0.021)	(0.012)	(0.014)
DIVIDEND_YIELD	0.004	0.003	0.005	0.006
	(0.007)	(0.007)	(0.004)	(0.004)
CASH	−0.057	−0.065	−0.065	−0.047
	(0.065)	(0.063)	(0.072)	(0.076)
Intercept	Yes	Yes	Yes	Yes
Objective FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
No. of obs.	498	498	419	419
R^2	0.140	0.153	0.295	0.292

Table 12 presents the results. Consistent with the results in Table 11, I find that in the month of the switch, the abnormal return of the switches that happens when the hedge fund is sitting on a paper gain is equal to 4.6%. However, the abnormal returns for the loss-driven switches are only 0.2%, and they are not statistically significant at conventional levels. In the subsequent months, for both types of switches, the abnormal returns are close to 0 and statistically indistinguishable from 0. These results suggest that loss-driven activism leads to lower quality activism if compared to economically well-motivated activism, and the market is able to distinguish the 2 types of activism in the short term.

B. Causal Impact of Activism

The literature on activism provides evidence that is consistent with hedge fund activism having real effects on the target firms. In particular, activism campaigns improve the target firms' operating performance and innovation efficiency (Brav et al. (2015), (2018)). Boyson et al. (2017) show that activism creates value by increasing the likelihood of a takeover offer.

TABLE 12

Consequences: Calendar-Time Portfolio Regressions

Table 12 reports regression estimates from calendar time portfolio regressions. The first 3 columns focus on the switches where the hedge fund is sitting on a paper gain. The last 3 columns focus on the switches where the hedge fund is sitting on a paper loss. The dependent variable is the monthly portfolio return in excess of the risk-free rate. The explanatory variables are the monthly Fama–French-Momentum 4-factors. The window indicates when a stock is added to the portfolio relative to the month of the switch and the holding period in months. ALPHA is the estimated regression intercept (abnormal return). Mkt-Rf, SMB, HML, and MOM are the estimates of the factor loadings on the Fama–French 3 factors and the Carhart momentum factor. Robust standard errors are reported under the coefficients. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	LOSS = 0			LOSS = 1		
Variable	Month Switch	[+1,+12]	[+1,+24]	Month Switch	[+1,+12]	[+1,+24]
ALPHA	0.046***	−0.009	−0.007	0.002	0.004	0.002
	(0.011)	(0.006)	(0.005)	(0.014)	(0.005)	(0.004)
Mkt-Rf	0.991***	0.675***	0.688***	0.672**	1.020***	1.034***
	(0.361)	(0.193)	(0.164)	(0.319)	(0.161)	(0.110)
SMB	1.221**	0.726***	0.761***	0.908**	0.964***	1.047***
	(0.531)	(0.159)	(0.140)	(0.420)	(0.172)	(0.125)
HML	−0.045	0.304	0.393**	−0.081	0.470**	0.488***
	(0.516)	(0.261)	(0.196)	(0.533)	(0.191)	(0.154)
MOM	−0.473	−0.174	−0.163*	−0.201	−0.394**	−0.278**
	(0.368)	(0.141)	(0.093)	(0.322)	(0.166)	(0.114)
Adjusted R^2	0.237	0.213	0.280	0.063	0.417	0.529
No. of obs.	132	256	263	172	274	284

To address endogeneity, prior literature used the switch directly. Specifically, the switch has been used to differentiate the hedge funds' stock-picking ability from the treatment effect of activism (Brav et al. (2015), (2018), Aslan and Kumar (2016), and Boyson et al. (2017)).[17] However, the switch does not happen randomly (Brav et al. (2015)) and it likely depends on latent variables (Aslan and Kumar (2016)). As explained by Brav et al. (2015), the tests that use the switch directly do not identify the population average treatment effect (i.e., the causal effects of activism as if "hedge fund activists were randomly assigned to target firms"), but rather identify the treatment effect on the treated (i.e., they answer the question "would the same changes have occurred at the target firms without the hedge funds' efforts?").

Using the loss as an instrument for the decision to switch, the empirical framework of this paper allows to add insights to the first aspect of the causal impact of activism (i.e., the average treatment effect). In particular, it allows to exploit the discontinuous jump in the probability of switching around the zero-loss level in a fuzzy RDD framework (Dittmar, Duchin, and Zhang (2020)). The key identifying assumption is that there are no other discontinuous differences around the zero-loss level that directly affect the measures of firm performance (outcome variables). This means that the positions that are just above the zero-loss level are similar to the positions that are just below, except for the propensity to switch to activism. To test the validity of the identifying assumption, I run a series of separate regressions where the dependent variables are firm characteristics and outcome variables, measured in the previous year, while the key independent variable is the

[17]More details about the use of the switch in prior literature are reported in Appendix C of the Supplementary Material.

TABLE 13

Preexisting Differences in Firm Characteristics

Table 13 reports the preexisting differences in firm characteristics between the treatment group (LOSS = 1) and the control group (LOSS = 0). In all regressions, the sample is limited to positions with a holding period return of ±10% around 0. The dependent variables are firm characteristics and outcome variables measured in the previous year. Observations are at the hedge fund-firm-year level. All specifications include year and firm fixed effects. Standard errors clustered by firm are reported under the coefficients. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Variable	UNDERPERFORMANCE 1	M&A_TARGET 2	LEVERAGE 3	SIZE 4	ROA 5	INST 6
LOSS	−0.052	−0.011	−0.007	0.007	−0.010	0.015
	(0.066)	(0.021)	(0.015)	(0.064)	(0.019)	(0.014)
HOLDING_PERIOD_RETURN	−1.413*	−0.117	0.063	0.640	−0.087	0.077
	(0.850)	(0.218)	(0.219)	(0.859)	(0.239)	(0.193)
HOLDING_PERIOD_ RETURN × LOSS	−0.731	0.250	−0.144	0.055	0.106	0.167
	(1.329)	(0.452)	(0.305)	(1.261)	(0.334)	(0.320)
Intercept	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
No. of obs.	3,273	3,273	2,793	3,272	2,794	3,273
R^2	0.709	0.748	0.933	0.967	0.903	0.878

Variable	LIQUIDITY 7	*Q* 8	DIVIDEND_YIELD 9	CASH 10	RND 11
LOSS	0.208	0.026	0.022	0.011	0.004
	(0.166)	(0.090)	(0.146)	(0.013)	(0.015)
HOLDING_PERIOD_RETURN	2.338	1.275	−1.943	0.238	−0.044
	(2.842)	(1.492)	(1.893)	(0.187)	(0.158)
HOLDING_PERIOD_RETURN × LOSS	0.194	−0.674	2.622	−0.094	0.031
	(4.728)	(2.142)	(3.233)	(0.297)	(0.324)
Intercept	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes
No. of obs.	3,273	2,804	2,812	2,804	2,611
R^2	0.878	0.891	0.862	0.956	0.947

LOSS dummy. The results, reported in Table 13, show that controlling for the linear holding period return, the coefficient on the LOSS dummy is never statistically significant, meaning that there are no other discontinuous preexisting differences between the treatment and control positions, thus supporting the validity of the identifying assumption.

Table 14 reports the results of the fuzzy RDD. The outcome variables are the change in operating performance and the change in research and development (R&D) investment, both measured the year after activism, relative to the year before the year of activism, and the probability of receiving a takeover bid over the year after activism. Columns 1–3 report the estimates of 2-stage least squares (2SLS) regressions where the SWITCH is instrumented by the LOSS dummy. Columns 4–6 report the estimates of reduced form regressions where the LOSS dummy is used directly. Observations at the hedge fund-firm-year level are restricted to those having a holding period return within ±10% around 0. All regressions include year, industry, and hedge fund fixed effects.

Across all the regressions, the coefficients on the SWITCH dummy instrumented by the LOSS dummy as well as the LOSS dummy when used directly are statistically insignificant at conventional levels. One explanation of these results is

TABLE 14

Consequences: Causal Impact of Activism (Average Treatment Effect)

Table 14 reports the analyses of the causal impact of activism. In all regressions, the sample is limited to positions with a holding period return of ±10% around 0. Columns 1–3 report the estimates of 2SLS regressions where the SWITCH is instrumented by the LOSS dummy. Columns 4–6 report the estimates of reduced form regressions where the LOSS dummy is used directly. The dependent variables are the change in ROA and the change in R&D investment measured the year after activism, relative to the year before the year of activism, and the $TARGET_{t+1}$ dummy which is equal to 1 if the firm receives a takeover bid during the following year, 0 otherwise. Observations are at the hedge fund-firm-year level. All specifications include hedge fund, year, and industry fixed effects. Standard errors clustered by firm are reported under the coefficients. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	2SLS Regressions			Reduced Form Regressions		
Variable	$ROA_{t+1} - ROA_{t-1}$	$RND_{t+1} - RND_{t-1}$	$Target_{t+1}$	$ROA_{t+1} - ROA_{t-1}$	$RND_{t+1} - RND_{t-1}$	$Target_{t+1}$
	1	2	3	4	5	6
LOSS				−0.001	0.001	−0.010
				(0.019)	(0.010)	(0.020)
SWITCH (instrumented)	−0.032	0.024	−0.305			
	(0.505)	(0.277)	(0.547)			
HOLDING_PERIOD_RETURN	0.721	0.153	0.491	0.703	0.166	0.298
	(0.555)	(0.118)	(0.323)	(0.587)	(0.132)	(0.233)
HOLDING_PERIOD_RETURN × LOSS	−0.675	−0.262	−0.795	−0.652	−0.280*	−0.522
	(0.731)	(0.247)	(0.707)	(0.657)	(0.163)	(0.401)
UNDERPERFORMANCE	−0.015	0.003	0.007	−0.015	0.003	0.006
	(0.015)	(0.007)	(0.012)	(0.016)	(0.008)	(0.012)
M&A_TARGET	−0.063	0.017	0.026	−0.066	0.019	−0.019
	(0.054)	(0.021)	(0.089)	(0.043)	(0.012)	(0.041)
LEVERAGE	−0.010	−0.002	0.024	−0.010	−0.002	0.027
	(0.035)	(0.019)	(0.034)	(0.035)	(0.018)	(0.034)
SIZE	0.015*	−0.004	0.006	0.015*	−0.003	0.006
	(0.008)	(0.003)	(0.007)	(0.008)	(0.003)	(0.007)
ROA	−0.245**	−0.013	0.016	−0.246**	−0.012	0.014
	(0.102)	(0.044)	(0.041)	(0.105)	(0.045)	(0.042)
INST	0.011	−0.018	0.002	0.011	−0.019	0.008
	(0.040)	(0.020)	(0.037)	(0.040)	(0.020)	(0.036)
LIQUIDITY	−0.006	0.003	−0.004	−0.006	0.003	−0.004
	(0.005)	(0.002)	(0.003)	(0.006)	(0.002)	(0.003)
Q	−0.018	−0.006	−0.007	−0.018	−0.006	−0.005
	(0.015)	(0.005)	(0.006)	(0.015)	(0.005)	(0.005)
DIVIDEND_YIELD	0.002	−0.000	−0.007	0.002	−0.000	−0.006
	(0.003)	(0.001)	(0.004)	(0.003)	(0.001)	(0.004)
CASH	0.222	−0.074***	0.007	0.221	−0.074***	0.003
	(0.174)	(0.026)	(0.034)	(0.184)	(0.027)	(0.035)
Intercept	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Hedge fund FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
No. of obs.	2,586	2,592	2,786	2,586	2,592	2,786

related to the level of effectiveness of activism that can vary significantly depending on the characteristics of the target firms and of the hedge funds. Only a limited number of firms can benefit from activism. For a significant number of firms, activism will likely be ineffective. For others, it could even be detrimental by distracting efforts and resources. Even for the subset of firms that can potentially benefit from activism, not all hedge funds have the skills to be successful. Therefore, what my results suggest is that activism does not seem to significantly affect the performance of the average firm (average treatment effect).

The tests that use the switch directly identify the ability of hedge funds to select the targets that can benefit from an activism campaign and bring about change in the same firms. As Brav, Jiang, and Kim (2015) point out "the selection of targets where the hedge funds can have the biggest effect is an important part of the activists' investment strategy." On the other hand, the RDD analysis identifies a targeting decision that is plausibly more exogenous and thus not the result of a cost–benefit analysis based on pure economic considerations. However, these results should be interpreted with caution as the lack of statistical power could simply be due to the small sample size in the small bandwidth around the zero-loss level.

VI. Discussion and Conclusion

This paper investigates how hedge funds react to losses on their passive holdings. When hedge funds suffer a loss in a particular holding, the probability that they switch to become activists in the same position jumps discontinuously. These results are consistent with cognitive dissonance. The loss generates psychological costs and hedge fund managers reduce these costs by blaming the firm's management and starting campaigns that however are not well motivated. They switch to activism but without having a clear plan in mind. The psychological effect of the loss is distinct from the effect of economic factors such as the target firms' underperformance. Ex post, the announcement returns and the change in operating performance of the firms that are targeted when hedge funds are suffering a loss are significantly lower if compared to the firms that are targeted while hedge funds are sitting on a gain.

My paper contributes to the behavioral finance literature that studies the behavior of agents taking actions that depend on reference points. Existing studies show that retail investors, professional traders, and mutual fund managers see the purchase price as a reference point, and this affects their trading decisions (Odean (1998), Locke and Mann (2005), and Frazzini (2006)). Lu, Ray, and Teo (2016) claim that inattentive hedge fund managers are more prone to the disposition effect. My findings show that an overlooked consequence of unrealized losses is to trigger an active engagement with the firm. This broadens the scope of what the disposition effect is about beyond trading decisions.

My results help to disentangle among the theories that have been put forward to explain the disposition effect. They suggest that the experience of gains and losses generates a cognitive response that depends on what actions investors can take. Most investors do not engage in activism. Hedge funds, however, have the expertise and the resources to take an active stance and raise their voice. When they experience a loss on a passive position they can, and they do switch to activism.

The early literature on the disposition effect focused on preferences over returns. Shefrin and Statman (1985) claim that the underlying mechanism of this behavior is the particular shape of the prospect theory value function that is convex in the loss region, concave in the gain region, and has a kink at the origin (Kahneman and Tversky (1979), Tversky and Kahneman (1992)). It generates a disutility from losses that is disproportionately higher compared to the utility from gains of similar magnitude, and this is why investors are reluctant to realize losses. In Barberis and Xiong's (2012) model of realization utility, investors derive utility

and disutility directly from realizing gains and losses, respectively. While my results do not speak directly to theories of preferences over returns, they are consistent with realization utility being driven, in the loss domain, by cognitive dissonance.

I also add to the hedge fund activism literature. This paper shows that the switch is also a psychological choice, not only an economic one. The activism campaigns motivated by paper losses are more likely to be unfocused on specific issues and result in worse firm performance when compared to well-motivated activism. Furthermore, prior studies in the hedge fund activism literature (Brav et al. (2015), (2018), Aslan and Kumar (2016), and Boyson et al. (2017)) used the switch directly as a source of identification to study the treatment effect (treatment effect on the treated) of activism over a passive investment. My results suggest that using the loss as an instrument, activism does not significantly affect the performance of the average firm.

Supplementary Material

To view supplementary material for this article, please visit http://doi.org/10.1017/S0022109024000127.

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