# Learning about activism skill*

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# Learning about activism skill

**Abstract**

We propose a model in which an investor is uncertain about her activism skill and learns about it over time by engaging in activism. At the core of the model is a dynamic value of learning: every undertaken activism campaign leads to a gain due to learning about activism skill. Using data on 3,597 activism campaigns undertaken by 650 hedge funds, we document several empirical facts that are consistent with the learning mechanism. Hedge funds are more likely to stop engaging in activism if they are less experienced or following poor campaign performance. Campaign take-up rates decline in fund experience, and increase in past performance. The learning mechanism predicts that target-firm shareholders prefer to be targeted by more experienced activists rather than inexperienced ones; we estimate the experience premium to be 5%.

**Keywords:** Activism, skill, learning, value creation, distribution of activism, campaign performance, experience premium.

**JEL Classification Numbers:** D83, G23, L11.

# I Introduction

Shareholder activism is an important source of external corporate governance, influencing firm policies and strategic direction (Gillan and Starks, 2007). Activist hedge funds—a large class of activist investors—play a central role in this activity. They specialize in acquiring stakes in underperforming firms and seeking to influence governance and corporate policies. A large empirical literature shows that hedge fund activism is associated with positive valuation effects and improvements in firm performance (e.g., Brav, Jiang, Partnoy and Thomas, 2008; Clifford, 2008; Klein and Zur, 2009; Boyson and Mooradian, 2011; Becht, Franks, Grant and Wagner, 2017).[1]

What are the drivers of activist investor success? Boyson, Ma and Mooradian (2022) suggest that activist investors' prior work experience helps explain their actions and engagement outcomes. Albuquerque, Fos and Schroth (2022) show that more experienced activists (as measured by the number of past campaigns) receive a more positive market response to campaign announcements. While these results point to the importance of experience, they do not address how activists assess their own effectiveness when deciding whether to initiate or continue campaigns. Do activists know ex ante how their prior experience helps drive success, or do they become increasingly knowledgeable with each campaign they take about the industry, its processes, and how their skills fit in? The later possibility suggests a dynamic aspect of activist investor ability and value creation potential that is the object of study of this paper.

We begin by documenting a salient empirical fact: exit from activism declines sharply with fund experience. Nearly 40% of activist hedge funds in our sample conduct only one campaign, identified by a single Schedule 13D filing. Among the funds that remain active, approximately 28% exit after their second campaign, and a further 23% exit after their third (see Panel C of Figure 1). As a result, roughly

[1] See also the survey papers by Denes, Karpoff and McWilliams (2017) and Fiorillo and Pellegrino (2024).

two thirds of activists conduct three or fewer campaigns over their lifetimes. This pattern contrasts with the substantial right tail of the distribution: about 20% of activists engage in at least seven campaigns during the sample period. Taken together, these facts are inconsistent with an exit probability that is constant with respect to experience.

To account for these facts, we propose a dynamic model in which activist investors are uncertain about their own ability and learn about their skill over time by engaging in activist campaigns. The model builds on the seminal work of Jovanovic (1979) and Holmström (1999). What makes the model dynamic, and drives the time series of an activist's decision to take on a new campaign or exit the industry, is the activist's evolving posterior belief about her skill, which is updated based on observed campaign outcomes. In the model, the activist's expected skill evolves according to the average performance from past campaigns, and the posterior variance of skill is inversely related to the number of past campaigns, or the investor's experience.

When considering whether to take up a specific campaign, the activist evaluates the static trade-off between the expected return from the engagement and the campaign cost, plus a new term associated with the dynamic learning mechanism. This new term is the increase in value that the activist can obtain going forward from having learned about his skill from said campaign. This term decreases under plausible parameters with the number of engagements that the investor has done, giving rise to four testable predictions.

Consider the model's predictions for exit rates. First, conditional on high skill, exit probabilities decline with experience: more experienced investors are more certain about their ability and, when perceived skill is high, are less likely to exit. Simulations show that the model generates exit rates that decrease with activist experience. Second, conditional on experience, exit probabilities decline with skill, since higher-skill activists perceive higher expected returns from future campaigns. Accordingly, conditional on fund experience, poorer past campaign performance increases the likelihood

of exit, with the most recent campaign acting as the exit trigger.

Next, consider the predictions for campaign take-up probabilities. Our third prediction is that, conditional on perceived skill, the take-up rate is higher for less experienced investors. In the model, an inexperienced activist may initiate campaigns whose expected returns are below the campaign cost because of a high dynamic learning effect, while experienced activists behave more selectively as the dynamic learning effect declines. The final prediction is that conditional on experience, take-up probabilities increase with the investor's expected skill. An activist with higher expected skill thinks it can extract more value from every engagement and is thus more likely to take up an engagement, all else equal.

These predictions differ sharply from those of a model in which investors know their skill. Under complete information, exit does not occur, and campaign take-up is independent of past performance and experience. This benchmark clarifies that our results are driven by learning about activism skill. Our predictions also differ from those in models of learning-by-doing. These models predict that expected campaign returns net of costs increase with experience as activists become increasingly better with each campaign they take. Such models can also generate declining exit rates. However, they imply that take-up rates increase with experience, a prediction that is inconsistent with our evidence.

We assess the model predictions empirically using a dataset constructed from Brav, Jiang and Li (2021) with activist hedge fund campaigns from 1994 through 2016. This dataset includes the date of filing of the Schedule 13D and the campaign completion date –which are important so we can obtain the return on the target firm's stock over the campaign period– the campaign outcome, and a hedge fund identifier, which we use to track the fund's activity over time. Fund performance is measured using the Buy-and-Hold return on a target firm's stock from 30 days prior to the Schedule 13D filing date until the day the activist terminates the campaign (i.e., Campaign return). A fund is defined as exiting the activism industry at the

termination of its final observed campaign. Using these data, we present two sets of results that are consistent with the learning mechanism.

Supporting the first prediction, a model simulation can generate the striking quantitative pattern documented in Figure 1 where about two thirds of activists conduct three or fewer campaigns in total in their careers. Moreover, we show that fund performance is a driver of the decision to leave the activism industry. The average (median) Campaign return in the first engagement is 4.59% (0.50%) for exiting funds and 12.12% (9.34%) for continuing funds. We estimate Cox proportional hazards models for a fund's exit from engaging in activism to formally evaluate the relationship between a fund's campaign performance and exit decision. We find that funds are more likely to exit the activism industry following worse performance or following an unsuccessful campaign. These findings are consistent with the second prediction of the model.

The second set of results describes the relationship between fund experience and campaign take-up rates. Specifically, we estimate a linear regression model based on a panel of fund-month observations. We measure experience as the number of Schedule 13D filings up to the month in consideration. Whereas the cross-sectional relationship between fund experience and take-up rate is positive, we find a robust *negative* relationship based on within-fund variation, which utilizes fund fixed effects to absorb time-invariant, cross-sectional variation in variables. Thus, consistently with the third prediction, when the fund accumulates more experience, it becomes more selective in initiating a new campaign.

We also find that conditional on experience, past campaign performance exhibits a positive and significant relationship with the take up rate. The relationship is positive and significant in both pooled and within-fund models. This result is consistent with the fourth prediction. Overall, our empirical findings are broadly consistent with predictions stemming from the model.

The learning mechanism has several implications for value creation in activism.

While activists benefit from the dynamic value of learning, target-firm shareholders do not. As a result, an inexperienced activist may undertake a campaign with low expected returns because of its informational value, creating a wedge between the private and public returns to activism. This wedge constitutes an externality. To our knowledge, this paper is the first to identify and formalize this externality in shareholder activism. Accordingly, shareholders prefer more experienced activists, who place greater weight on expected campaign returns and less on learning when selecting targets. Consistent with this implication, we estimate an ex post experience premium of 5%.

A second implication of our findings is that activists do not appear to be learning about the cost of conducting campaigns. If activists were instead learning about their costs and revised those costs upward, they would become more selective and undertake only campaigns with higher expected returns. In that case, exit would on average be preceded by unusually high campaign returns. The relevance of this distinction is that learning about costs would not generate a negative externality for target-firm shareholders, conditional on campaign initiation. By contrast, when activists learn about value-creation skill, shareholders—who receive the full gains from successful activism—also bear the cost of activists' learning, in the form of lower expected returns during the learning phase.

Finally, we assess the contribution of inexperienced activists to value creation and industry concentration. We document a trade-off between campaign returns and concentration in the activism industry. As the sample is restricted to campaigns undertaken by more experienced activists, campaign returns increase, but the Herfindahl–Hirschman Index based on the number of campaigns also rises, indicating greater concentration. Thus, while shareholders benefit from being targeted by more experienced activists, campaign activity becomes more concentrated when confined to a smaller set of experienced investors.

This paper contributes to several strands of the corporate governance literature.

First, it contributes to literature that studies value creation by activist hedge funds. Starting with Brav, Jiang, Partnoy and Thomas (2008), the literature has documented robust positive stock market reactions to announcements of activism campaigns by hedge funds. Moreover, several studies have shown positive changes in targets' operating performance and profitability. This paper is the first to show that value creation by activist hedge funds depends on their experience, that it results in a negative externality to target shareholders, and that the experience premium is quantitatively large to matter for shareholders.

To the best of our knowledge, this is also the first study of the industrial organization of the shareholder activism industry. We document several novel facts. Funds that experience poor campaign performance are less likely to take up new campaigns and more likely to exit the industry. Moreover, funds with more experience are more selective in picking targets, and relatively more likely to stay in the industry provided they have good past performance. The later observation gives rise to a decaying exit rate in experience. These stylized facts imply that the composition of activist hedge fund industry is dynamic and that the frequency of target selection process varies across activists, based on their experience. Thus, our second contribution to the literature on activist hedge funds stems from the results on campaign take-up rates and funds' decisions to exit industry.

One of our findings is a positively skewed distribution of activism engagements. Similar skewness arises in several related settings. In a learning model of firm dynamics, Jovanovic (1982) shows that learning about productivity generates a right-skewed firm size distribution. Models of industry superstars also produce skewed outcomes, as markets reward talent in an increasing and convex manner (Rosen, 1981; MacDonald, 1988). In venture capital, Ewens, Nanda and Rhodes-Kropf (2018) describe a "spray-and-pray" strategy in which investors make many small initial investments before concentrating capital in a subset of firms that reveal higher expected returns. Models of learning-by-doing likewise generate skewed size distributions (Arrow, 1962;

Irwin and Klenow, 1994), but they also imply that take-up rates increase with experience, a prediction we do not find in the data. Finally, Ericson and Pakes (1995) generate skewness through active exploration, whereby firms' productivity evolves endogenously in response to investment.

Several papers document learning about skill across different settings in financial markets. Pástor, Taylor and Veronesi (2008) show that learning about profitability shapes the IPO decision: high realized profitability raises expected profitability, triggering the IPO, while also signaling a subsequent decline as expectations converge from below. Getmansky, Lee and Lo (2015) document that hedge funds tend to exit early and after poor performance, while fund-manager retention is more sensitive to performance early in managers' careers, consistent with learning about managerial ability (Chevalier and Ellison, 1999). Related evidence from venture capital shows that early success predicts subsequent investment behavior and outcomes, both within and across industries (Gompers, Kovner, Lerner and Scharfstein, 2006; Nanda, Samila and Sorenson, 2020; Aragon, Li and Lindsey, 2023). Models of investor learning have also been used to explain stock market participation (Campanale, 2011). These studies establish the importance of learning about skill, but they do not examine shareholder activism or its implications for target-firm shareholders. Our contribution is to show that learning about activism skill shapes entry, exit, and campaign selection, and generates an experience-based externality borne by target firms.

# II The distribution of activism campaigns

We motivate the paper with Figure 1, which displays the distribution of the number of engagements per activist fund. An activism engagement is defined as the event corresponding to the filing of a Schedule 13D with the SEC. The sample includes all such filings initiated between March 1994 and December 2016. Further details on the construction of the dataset are provided in Section IV. For each activist investor, we

count the total number of engagements and, in Panel A, plot the fraction of funds corresponding to each total number of activism campaigns over the full sample period. The figure shows that nearly 40% of activist funds undertake only one engagement during the sample period, and approximately 66% engage in three or fewer campaigns before exiting the industry. These patterns indicate that a large fraction of funds exit the activism industry after only a limited number of campaigns.

[Insert Figure 1 here]

To ensure that the result is not driven by funds that enter the sample late, and thus may not have had sufficient time to engage in multiple campaigns, Panel B excludes funds that filed a Schedule 13D for the first time between 2012 and 2016. In other words, we drop funds whose first campaign in the sample was after 2012 (i.e., these funds are less than five years old at the end of the sample period). The results remain qualitatively unchanged: a large fraction of funds undertake only one campaign, and the vast majority engage in no more than three before exiting activism.[2]

The large fraction of funds that exit the industry after only a few campaigns contrasts sharply with the relatively large share that conduct many engagements. For instance, approximately 20% of funds in our sample undertake 7 or more campaigns. These patterns are inconsistent with a constant exit probability across all funds. To see this, suppose that the probability of proceeding to the next engagement after each completed campaign is 0.6 (which corresponds exactly to the continuation probability at the leftmost point in Panel A). Under this assumption, the probability of conducting seven or more engagements is $0.6^6 = 0.047$, roughly one quarter of the observed frequency. This calculation highlights that a proportional exit process cannot generate the pronounced right-skewness in the empirical distribution of activism experience. Instead, matching the data requires an exit rate that declines with the

[2]We also verify that the entry rate is quite stable over the entire sample period (see the Appendix). Thus, the distributional pattern identified above is unlikely to be caused by abnormal patterns in entry rates in our sample.

number of past campaigns. Panel C of Figure 1 plots exit rates conditional on survival. It confirms that observed exit rates indeed decline with experience. In the next section, we develop a model of learning about activism skill that captures these dynamics and yields additional testable implications.

# III Model of learning about activism skill

We consider a risk-neutral, infinitely lived activist investor who discounts future cash flows with a factor $\beta < 1$. In each period, the investor undertakes at most one activism campaign and decides whether to remain in the industry or exit permanently.

The investor is endowed with a fixed but unknown level of skill. Skill is defined as the expected excess return, denoted by $\mu$, that the investor can generate from a campaign. The investor does not know the true value of $\mu$ but is assumed to know all other model parameters. The realized return from campaign $n$ is given by

$$r_n = \mu + \epsilon_n,$$

where $\epsilon_n \sim N(0, \sigma^2)$ represents an idiosyncratic shock. Hence, campaign outcomes reflect both the investor's underlying skill and a random component of luck. All returns are measured in excess of the appropriate benchmark.

The investor learns about $\mu$ over time by optimally filtering out the luck component following standard Bayesian updating (e.g., Jovanovic 1982). Let the history of realized campaign returns after $n \geq 1$ campaigns be denoted by $h_n = \{r_1, r_2, \ldots, r_n\}$,[3] with $h_0$, the information set prior to any activism campaign, being the null set. At time 0, when considering entry into the industry, the investor's prior belief about skill

[3]For simplicity, we assume that each campaign lasts for a single period. If campaigns span multiple periods, learning occurs only upon campaign completion, and the investor must track the remaining duration of each ongoing engagement.

is

$$\tilde{\mu} \mid h_0 \sim N(m, \delta^2). \tag{1}$$

Starting from the prior, the investor updates her belief about $\mu$ based on observed returns. After $n \geq 1$ campaigns, the posterior belief is normally distributed with mean and variance given by:

$$\mathbb{E}[\tilde{\mu} \mid h_n] = \mathbb{E}[\tilde{\mu} \mid h_{n-1}] + \frac{\delta^2}{n\delta^2 + \sigma^2}\big(r_n - \mathbb{E}[\tilde{\mu} \mid h_{n-1}]\big), \tag{2}$$

$$\text{var}[\tilde{\mu} \mid h_n] = \frac{\delta^2\sigma^2}{n\delta^2 + \sigma^2}. \tag{3}$$

Iterating equation (2) yields

$$\mathbb{E}[\tilde{\mu} \mid h_n] = \frac{\sigma^2}{n\delta^2 + \sigma^2}\, m + \frac{n\delta^2}{n\delta^2 + \sigma^2}\, \bar{r}_n,$$

where $\bar{r}_n$ denotes the sample mean of realized campaign returns. Thus, the investor's posterior mean skill is a weighted average of the prior mean and average past performance, with the weight on the latter increasing with the number of campaigns. From equation (2), it follows that $\lim_{n\to\infty} \mathbb{E}[\tilde{\mu} \mid h_n] = \mu$ almost surely, and from equation (3), posterior uncertainty about skill converges to zero as $n \to \infty$.

Given the investor's posterior distribution of skill, the conditional mean and variance of the next campaign's return are:[4]

$$\mathbb{E}[r_{n+1} \mid h_n] = \mathbb{E}[\tilde{\mu} \mid h_n], \tag{4}$$

$$\text{var}[r_{n+1} \mid h_n] = \text{var}[\tilde{\mu} \mid h_n] + \sigma^2. \tag{5}$$

Activism entails both fixed and variable costs. Each period, the investor incurs a fixed operating cost $f$, which must be paid regardless of whether a campaign is

[4]These are the investor's subjective beliefs about future performance. Because all information is publicly available, the market shares the same beliefs if it has the same prior.

undertaken. If the present value of remaining active falls below this fixed cost, the investor exits the industry. In addition, each potential campaign involves a campaign-specific cost $c$. The cost $c$ is a random draw from a cumulative distribution function $G$, independent across campaigns and of all other shocks. The investor observes the realization of $c$ before deciding whether to initiate the campaign. Narrowly interpreted, $c$ represents the direct cost of affecting firm value—such as engaging with management or conducting a proxy fight (e.g., Gantchev, 2013; Back, Collin-Dufresne, Fos, Li and Ljungqvist, 2018). More broadly, it can also be viewed as encompassing reputational or financing penalties associated with an unsuccessful campaign.

Let $V(n, \mathbb{E}[\tilde{\mu} \mid h_n])$ denote the investor's value of from the activism industry. This value depends on two state variables: the number of completed campaigns, $n$ (i.e., the investor's activism experience), and the current expected skill level, $\mathbb{E}[\tilde{\mu} \mid h_n]$. If the investor exits (or has already exited) the industry, the value is zero. Otherwise, it equals the expected continuation value from potential future campaigns, net of the fixed operating cost $f$:[5]

$$V(n, \mathbb{E}[\tilde{\mu} \mid h_n]) = \max\left\{0,\ \mathbb{E}_c\left[\tilde{V}(n, \mathbb{E}[\tilde{\mu} \mid h_n], c)\right] - f\right\}. \tag{6}$$

The expectation $\mathbb{E}_c[\cdot]$ is taken with respect to the random campaign cost $c$.

If the investor chooses to remain active, the investor observes the realization of the next campaign cost $c$ and decides whether to initiate such campaign. The corresponding value function is

$$\begin{aligned}\tilde{V}\left(n, E[\tilde{\mu}|h_n], c\right) = \max\{&\mathbb{E}[\tilde{\mu}|h_n] - c + \beta\mathbb{E}_{r_{n+1}}\left[V\left(n+1, \mathbb{E}[\tilde{\mu}|h_{n+1}]\right)\right];\\ &\beta V(n, \mathbb{E}[\tilde{\mu}|h_n])\}.\end{aligned} \tag{7}$$

The expectation $\mathbb{E}_{r_{n+1}}[\cdot]$ is taken with respect to the investor's subjective distribution

[5]The model assumes that the investor has sufficient financial capacity to absorb interim losses. Realized campaign returns may be low, but they affect the exit decision only through their impact on the investor's assessment of skill.

of returns, as defined in equations (4) and (5).

Before any engagement, an inexperienced investor enters the industry only if the entry condition $V(0, m) > 0$ is satisfied.

## III.1 Model solution when $\mu$ is known

When skill $\mu$ is known, the investor's problem in equations (6) and (7) simplifies to

$$U(\mu) = \max\left\{0,\ \mathbb{E}_c[\tilde{U}(c)] - f\right\}, \tag{8}$$

$$\tilde{U}(c) = \max\left\{\mu - c + \beta U(\mu),\ \beta U(\mu)\right\}, \tag{9}$$

where $U(\mu)$ denotes the value of activism under full knowledge of $\mu$. Equation (9) implies that the investor undertakes a campaign if and only if the campaign cost is below the expected return (i.e., $c \leq \mu$), rendering the problem static. In this case,

$$\tilde{U}(c) = \mathbb{1}_{\{\mu > c\}}(\mu - c) + \beta U(\mu).$$

Substituting this expression into equation (8) yields

$$U(\mu) = \begin{cases} \dfrac{1}{1-\beta}\left[\int_{\underline{c}}^{\mu}(\mu - c)\, dG(c) - f\right], & \text{if } \int_{\underline{c}}^{\mu}(\mu - c)\, dG(c) - f > 0, \\ 0, & \text{otherwise.} \end{cases} \tag{10}$$

The term $\int_{\underline{c}}^{\mu}(\mu - c)\, dG(c) - f$ represents the expected per-period net value of activism. When this quantity is positive, the investor earns this expected value in perpetuity, discounted by $(1-\beta)^{-1}$. It is straightforward to show that $\int_{\underline{c}}^{\mu}(\mu - c)\, dG(c) - f$ is increasing in $\mu$, and that a unique cutoff level $\mu^*$ exists such that

$$\int_{\underline{c}}^{\mu^*}(\mu^* - c)\, dG(c) - f = 0.$$

The following proposition summarizes the main results for the complete-information benchmark.

**Proposition 1.** *An investor with sufficiently high skill, $\mu > \mu^*$, enters the activism industry, undertakes every campaign whose cost satisfies $c \leq \mu$, and never exits. An investor with $\mu \leq \mu^*$ never enters the industry. Under complete information, the probability of undertaking a campaign, $p = G(\mu)$, is constant over time and independent of experience or past performance.*

The results that, when $\mu$ is known, there is no exit and that the engagement take-up probability is constant predict, against the evidence above, that activists with only one engagement would be rare in large samples. This point can be made formally. Because the cost $c$ is assumed i.i.d., the number of campaigns by an activist investor over a sample of $T$ periods follows a binomial distribution, $X \sim \text{Binomial}(T, p)$. Thus, $P(X = n) = \binom{T}{n}(1-p)^{T-n}p^n$. We then have that:

**Corollary 1.** *Let $p^* = G(\mu^*)$. In a sufficiently large sample, investors with exactly one campaign are less frequent than those with two campaigns. Formally, for any sample size satisfying $T > 2/p^* - 1$, we have $P(X = 2) > P(X = 1)$ for any investor with $\mu > \mu^*$, and hence for the population of investors that ever entered the activism industry.*

This corollary highlights a key implication of the complete-information benchmark: when skill is known and campaign opportunities are independent, activists with only a single engagement should be rare in sufficiently long samples. Once an investor with $\mu > \mu^*$ enters, it remains active and undertakes campaigns whenever costs are favorable. The resulting binomial structure implies that observing exactly one engagement is a low-probability event, even in moderately sized samples. For example, with a monthly take-up rate of 4%—as in our data—the condition $P(X = 2) > P(X = 1)$ holds after just four years. Consequently, the high prevalence

of single-engagement activists in Figure 1 cannot be reconciled with a model of known skill and i.i.d. campaign costs.[6]

## III.2 Model solution when $\mu$ is unknown

Under incomplete information, the investor learns about her skill over time, rendering the problem dynamic. Because closed-form solutions for the value function and decision rules are not available, we solve the model numerically. The computational algorithm is described in Appendix A. The model is calibrated so that one period corresponds to one year, consistent with the average campaign duration of 268 work days reported in Table 1 for completed campaigns. The prior mean $m$ is set to 4.81%, the simple average of campaign returns for all completed campaigns (panel D of Table 1). The prior variance of returns, $\delta^2 + \sigma^2$, is set to the square of 36.6% –the standard deviation of all campaign returns, also reported in panel D. Lacking direct estimates of return variation due to skill, we make the conservative assumption that 15% of the total return variance reflects the skill component ($\delta$), with the rest attributed to noise ($\sigma$). The discount factor is set to $\beta = 0.95$, corresponding to a 5% annual risk-adjusted discount rate. The cost parameters are calibrated to match two conditional moments of the empirical distribution of the total number of engagements by fund: the proportion of funds with only one campaign and that with more than seven engagements before exiting. Assuming the campaign-specific cost $c$ to be uniformly distributed over $[0, \bar{c}]$, we let the fixed operating cost $f = 0.025$ and $\bar{c} = 0.25$.

The key dynamic feature of the model is that initiating a new campaign provides an additional benefit: the opportunity to learn about one's skill. From equation (7), a new campaign is started if and only if

$$\underbrace{\mathbb{E}[\tilde{\mu} \mid h_n] - c}_{\text{static trade off}} + \underbrace{\beta \mathbb{E}_{r_{n+1}}[V(n+1, \mathbb{E}[\tilde{\mu} \mid h_{n+1}]) - \beta\, V(n, \mathbb{E}[\tilde{\mu} \mid h_n])]}_{\text{dynamic learning effect}} \geq 0. \tag{11}$$

[6] Allowing for exogenous attrition under known skill can improve fit, but matching the data would require exit rates to decline with experience.

The static trade off is the benefit the activist gets from creating shareholder value net of the cost of running a campaign. When there is learning, even when the static trade off is marginal (i.e., when $\mathbb{E}[\tilde{\mu} \mid h_n] - c$ is close to zero or even negative), the investor may still undertake the campaign if the dynamic learning effect is sufficiently large. The dynamic learning term captures the increase in the value of activism arising from the informational benefit of an additional campaign, which is larger the less experienced is the investor. Importantly, the dynamic learning effect is a private benefit to the activist whereas the expected return from value creation is a benefit that accrues to all target firm shareholders. We return to the implications of this distinction in subsection VI.1.

[Insert Figure 2 here]

Figure 2 displays the value function when $\mu$ is unknown, $V(n, x)$, across different experience levels $n$, together with the complete-information benchmark $U(x)$, both plotted as functions of perceived skill $x$. The figure shows that $V(n, x) > U(x)$, particularly for low values of $n$. When skill is uncertain, the option value contained in each campaign has an additional component, the dynamic learning effect, beyond the static surplus. The value of learning is associated with the possibility that true skill exceeds current expectations. This value is greatest early in the activist's career, when few campaigns have been completed and uncertainty about skill remains high, implying $V(n, x) \geq V(n', x)$ for $n < n'$. Consequently, the exit cutoff—defined as the point at which the value function equals zero—is lower under uncertainty than under full information. As experience accumulates and beliefs about skill become more precise, this cutoff rises, reflecting the declining value of learning.

### III.2.1 Engagement take-up probabilities

Figure 3 plots the probability of initiating a new campaign as a function of expected skill, $\mathbb{E}[\tilde{\mu} \mid h_n]$, holding experience $n$ fixed, and also the probability of taking a new

campaign when $\mu$ is known. These probabilities are computed over the distribution of campaign costs, $G(c)$, and shown only for combinations of $n$ and $\mathbb{E}[\tilde{\mu} \mid h_n]$, or $\mu$, at which the investor remains active in the industry. Conditional on experience, the probability of undertaking a new campaign increases with expected skill. This pattern primarily reflects the cash-flow effect in the static trade off: higher expected skill increases the probability that campaign returns will exceed costs. For each experience level, there exists a threshold skill level beyond which the probability of initiating a new campaign equals one and no longer depends on skill.

Figure 3 shows that, conditional on expected skill, the take-up probability decreases with experience and is lowest when $\mu$ is known. Less experienced investors possess a greater value of learning, which encourages campaign initiation even when expected returns are small. The learning effect diminishes at high perceived skill levels, where the take-up probability converges to one across all experience levels because the investor invariably initiates a new campaign when expected net returns are sufficiently high.

[Insert Figure 3 here]

The next statement summarizes this discussion.

**Prediction 1.** Take-up probabilities (weakly) increase with expected skill, $\mathbb{E}[\tilde{\mu} \mid h_n]$, conditional on experience $n$, and (weakly) decrease with experience, conditional on expected skill.

Empirically, this prediction implies that regressions exploiting within-fund variation should exhibit a negative relationship between experience and campaign take-up, even if cross-sectional correlations are positive. This pattern contrasts with the complete-information benchmark, in which take-up decisions are independent of experience and past performance. It also distinguishes our framework from learning-by-doing models, in which experience raises expected returns or lowers costs and therefore predicts increasing take-up rates with experience.

### III.2.2 Exit probabilities

Consider Figure 4, which plots the probability of exit as a function of expected skill, $\mathbb{E}[\tilde{\mu} \mid h_n]$, for a fixed experience level $n$, together with the exit probability under complete information. When $\mu$ is unknown, the probability of exit in the next period declines with expected skill. This probability equals the likelihood that the activist initiates a new campaign multiplied by the probability of exiting after updating beliefs about skill. The decline is driven by the latter component: higher expected skill mitigates the impact of adverse belief updating following a potential poor campaign outcome. Because beliefs are updated after each campaign, exit decisions are driven primarily by the most recent campaign outcome, conditional on prior expected skill and experience (see equation 7).[7]

[Insert Figure 4 here]

Conditional on skill, exit probabilities are increasing with experience at low skill levels, but decreasing with experience at high skill levels. The intuition for this non-monotonic pattern is that more experience gives the investor a more precise signal of own skill: at low skill levels a more experienced investor exits more frequently, just as at high skill levels a more experienced investor exits less frequently.

In summary:

**Prediction 2.** The exit probability (weakly) decreases with expected skill, conditional on investor experience, with exit decisions primarily driven by the most recent campaign outcome given past expected skill and experience. For sufficiently high expected skill, the exit probability also (weakly) decreases with experience, conditional on expected skill.

These predictions for exit probabilities stand in sharp contrast to those from the model with known $\mu$, where the probability of exit is zero for any value $\mu \geq \mu^*$ as

[7] In the model, campaign outcomes affect exit decisions solely through belief updating about skill. In practice, poor performance may have additional consequences—such as investor redemptions or funding constraints—that operate through similar channels but are not explicitly modeled.

shown in Proposition 1. Moreover, the predicted decline in exit rates with the total number of completed campaigns aligns closely with the pattern observed in Figure 1. We turn to this point next.

### III.2.3 Distribution of engagements

We document in Section II a large inequality in the total number of campaigns by activist funds: while almost 40% of activist investors exit after only one campaign, a large fraction of funds complete several engagements before exiting. Next, we analyze the distribution of total campaigns per fund predicted by the model's numerical solution. We conduct two exercises. In the first exercise, we assume that all activists have the same $\mu = m$, meaning that skill is ex-ante identical across all funds. Perceived skill becomes heterogeneous ex-post as activists experience different campaign return histories. In the second exercise, we allow also for ex-ante skill heterogeneity: each activist fund is assigned a different $\mu$, which is drawn randomly from the distribution in (1). For both exercises, we simulate campaign returns and exit decisions for 1,000 potential activists over 100 periods.

Both panels of Figure 5 display the distribution of the number of engagements per activist fund. That is, like Figure 1 but with simulated data. Panel A is for the case in which activist skill is ex-ante identical. Recall that we chose the model parameters $f$ and $\bar{c}$ to match the empirical proportions of investors leaving only after the first campaign and of investors undertaking at least 7 campaigns before exiting. The figure shows that the resulting distribution of the number of campaigns per fund has a shape similar to the empirical one throughout: it is right-skewed and is consistent with exit rates that diminish with the total number of campaigns per activist fund.

[Insert Figure 5 here]

Next, we explore how this distribution may change if investors' skill were heterogeneous ex-ante, as suggested in the work of Boyson et al. (2022). Panel B of

Figure 5 plots the distribution of total engagements by activist fund simulated in the second exercise. In this case, the model still reproduces the large fraction of early exiters, while generating even more skewness on the right of the distribution.[8] For instance, if no activist is predicted to have more than 73 campaigns under ex-ante identical skill assumption (Panel A), at least 6% of all activists are predicted to reach 100 campaigns assuming ex-ante heterogeneous skill (Panel B). Taken together, these results indicate that ex-ante heterogeneity is not necessary to reproduce the shape of the distribution of the number of engagements by fund, but it can help match quantitatively the degree of skewness in the data.

Ex-ante skill heterogeneity is also likely to matter empirically with regards to the role of learning. Suppose instead that all investors begin with identical skill levels, $\mu$, and that this is common knowledge. In that case, observing the experiences of other investors would provide information about the common skill level. A cross-section of past activism campaigns would then yield an increasingly precise estimate of $\mu$ as the sample size grows. In the limit, investors would behave as if $\mu$ were known, and no one would exit the sample. Hence, if learning about skill drives the dynamics of investor activism, some degree of ex-ante heterogeneity is necessary to rationalize the empirically observed positively skewed distribution of campaigns.

To provide additional intuition about how the model can account for the distribution of the number engagements, note that $\mathbb{E}[\tilde{\mu}|h_n]$ follows a martingale. That is, if $z_n = \mathbb{E}[\tilde{\mu}|h_n]$, then from the law of iterated expectations $\mathbb{E}[z_n|h_{n-j}] = z_{n-j}$ for $j > 0$. This result implies that sequences of values $\mathbb{E}[\tilde{\mu}|h_n]$ will tend to diverge, i.e., changes in expectations will induce permanent shifts in the conditional expectations of $\mu$. Intuitively, the activist investor responds to good (bad) news by revising her expected skill upwards (downwards), as well as the probabilities of taking up new engagements in any period or of staying in the industry now and in the future.[9]

[8] In Panel B of Figure 5, the distribution appears truncated on the right hand side because the number of engagements per fund is capped above by the number of simulated periods, $T < 100$.

[9] Jovanovic (1982) offers a similar explanation for the empirical distribution of firm size within an industry.

# IV Data

We start our sample construction from the data base of activist hedge fund campaigns used in Brav et al. (2021).[10] These data include activist hedge fund engagements initiated between March 1994 and December 2016 and are collected at the hedge fund management company level. We retrieve 3,965 engagements for which the *Permno* number of the target firm is available. The data include the Schedule 13D filing date, exit date, campaign outcome, and target company name. We match target firms to CRSP. Our final sample consists of the 3,597 Schedule 13D filings for which target prices are available until the date the activist exits the engagement. Appendix B contains a table with the definitions of all variables used in this study.

Table 1 presents descriptive statistics for the variables in the data set. Panel A shows statistics for all engagements. Because some engagements may not have been completed by the end of the sample, in panel A we report announcement returns rather than campaign returns. The average (median) Announcement return, which is measured as the buy-and-hold cumulative return between dates -30 and +30 around the Schedule 13D filing, is 5.07% (3.19%). The average (median) size of target firms is $981.53 ($158) million. Whereas a typical target is not a large cap firm, some hedge funds target large firms. We use information in the database regarding the campaign exit date. If a campaign exit date is unavailable, we set the exit at the end of two years, i.e. 520 workdays, since the filing date. Based on this definition, 95% (3,416) of campaigns in the data have been completed by December of 2016.

[Insert Table 1 here ]

Panel B reports statistics for exited engagements only. The average campaign lasts 268 workdays. One third of those completed engagements are classified as successful by Brav et al. (2021). For completed engagements, we can report both Campaign

[10] Collection of these data follows the same process as Brav et al. (2008). We thank Wei Jiang for sharing the data.

returns and Announcement returns. The average Announcement return is 5.30% across completed engagements. The Campaign return considers the performance over the full investment period, and equals the buy-and-hold cumulative return between day -30 and the activists hedge fund's exit. The average Campaign return is 8.30% with a standard deviation of 46.8%. That is, on average the Announcement return represents about 64% of the total campaign return.

Panel C summarizes engagement characteristics at the hedge fund level. The distribution of the number of engagements, total or completed, per hedge fund in the data is heavily skewed to the right (mean 5.32, median 2.0 for completed engagements), as suggested already in Figure 1.[11] Success rate per fund is about one third of the average number of completed engagements, with an average of 1.72 successful exits across funds. Success per fund is right skewed, with a median of one successful engagement per fund. The average (median) number of days between two campaigns is 275 (126).

Panel C also displays the average fund stock market performance around Schedule 13D filing announcements. The target firm's average Announcement return is 4.79%, with a standard deviation of 23.10%. Weighted by the target size, the average Announcement return by fund is somewhat smaller: 2.73%.

Panel D restricts the sample to 631 hedge funds completing at least one engagement. The average campaign duration is slightly shorter than one year: 240 workdays. Average duration of the longest campaign for each fund is 346 workdays. The average of Campaign return reported in panel D is almost the same as the average of Announcement return per fund reported in panel C, if slightly more volatile. At the fund level, the correlation coefficient between average Announcement returns and Campaign returns is 0.56 (untabulated). This high correlation indicates that, on average, at the fund level, the price reaction to the engagement announcement

[11]Note that it is possible that a hedge fund manager closes a hedge fund and starts a new one. Since we have no way of tracking hedge funds managers, we evaluate experience for hedge funds and not hedge fund managers.

incorporates a significant share of the total return at the hedge fund's exit.

# V Results

## V.1 Descriptive results

We start by analyzing the returns to activism at the beginning of an activist's life and until exit. Table 2 presents descriptive statistics of fund performance conditional on the number of campaigns taken by the activist and the decision to leave the activism industry. Fund performance is measured using Campaign returns.[12]

[Insert Table 2 here]

Panel A reports the results for the first engagement as observed in the sample. Columns (1) through (3) show statistics for the 253 funds that exit after the completion of the first campaign. Columns (4) through (6) show statistics for the 397 funds that continue after the completion of their first campaign. Columns (7) and (8) compare means and medians of the two groups of funds. The evidence in panel A shows that the exiting funds experience worse first campaign performance than continuing funds. The average (median) Campaign return is 4.59% (0.50%) for exiting funds and 12.80% (9.64%) for continuing funds. The difference of means (medians) is significant at 5% (10%) level.

Panel B reports statistics for the second engagement. We take the sample of 397 funds that continue after their first engagement and split the sample into the 109 funds that exit after their second campaign and the 288 that continue to the third campaign. Similarly to the evidence for the first engagement, we find that exiting funds experience worse campaign performance than funds that stay in the industry. The average Campaign return for the exiting funds in their second campaign is 3.71%

[12]Internet Appendix table I.1 reports results for alternative market-based measures of campaign returns.

(median 1.98%) versus 10.52% (median 6.70%) for continuing funds. Panel C reports similar statistics for the third campaign. The results are qualitatively similar: exiting funds perform worse than continuing funds in their third campaign. Overall, the evidence in Table 2 shows that fund performance is a likely driver of the decision to continue activism engagements. These findings are consistent with Prediction 2 presented above.

The table also shows that exit rates decline with the number of engagements. After the first campaign, 38.9% (i.e., 253/650) of funds exit the activism industry; after the second campaign, 27.5% (i.e., 109/397) of funds do so; and after the third campaign, 23.4% (i.e., 67/288) of funds exit. This finding is also consistent with Prediction 2 above.

## V.2 Exit behavior in activism

In this section, we formally evaluate the relationship between a fund's campaign performance and its exit decision. Specifically, we estimate Cox proportional hazards models for a fund's exit from engaging in activism. The unit of observation is fund-campaign. A fund is considered to have exited the activism industry if it does not file a Schedule 13D within one year following the completion of its last campaign and makes no subsequent filings during the sample period. Specifically, the dependent variable equals one for the fund's last engagement, or zero otherwise. Performance is measured using Average and Latest Campaign returns as suggested by the model. Average Campaign returns is the average of Campaign returns for all previously completed engagements. Latest Campaign returns is the campaign return for the latest campaign. All specifications include year fixed effects. In order to have the measurement of past campaign performance, the sample is restricted to engagements initiated or still active after completion of the first engagement.

Table 3 reports the results. The results in columns (1) and (2) indicate that funds are more likely to exit the activism industry following a poor-performance campaign.

That is, conditional on past average performance, the latest campaign performance drives exit decisions, which is consistent with the model. Economically, the estimate of -0.546 in column (2) implies that an increase in the last campaign performance of one sample standard deviation is associated, on average, with a 22% decrease in the hazard rate of exiting the activism industry before the next campaign.

[Insert Table 3 here ]

In column (3), the model includes a fund's Success rate, which is the total number of successful exits divided by the total number of campaign exits to date by the activist hedge fund. We find that funds with higher success rates are less likely to exit the activism industry. For an estimated coefficient of -0.335, a one sample standard deviation increase in the success rate implies, on average, a 10% drop in the exit hazard rate. Furthermore, we find that controlling for Success rate does not substantially change the relation between Latest Campaign return and exit.

## V.3 Campaign take-up rates

In this section, we study the relationship between fund experience and campaign take-up rates. We estimate a linear regression model based on a panel of fund-month observations. We measure experience as the number of Schedule 13D filings up to the month in consideration. Table 4 contains the results.

[Insert Table 4 here ]

In panel A, column (1) reports estimates of the pooled regression model. We find that more experienced funds are more likely to initiate a campaign. In column (2), we report estimates of the "between" model, which utilizes cross-sectional variation in fund experience and take-up rate. The estimates confirm a positive and significant relationship, suggesting that funds with more experience are more likely to start a new campaign in a given month.

In column (3), we report estimates of the "within" model, which utilizes within-fund variation because fund fixed effects absorb time-invariant variation in variables. Using within-fund variation, we find a negative and significant relationship between experience and the take-up rate. The estimated coefficient of -0.002 implies an average decrease of 28% in the probability of taking up a new engagement in the next month for an increase in the fund's number of Schedule 13D filings to date of one within standard deviation. The within fund results indicate that when the fund accumulates more experience, it becomes more selective in initiating a new campaign, consistent with Prediction 1 above. The difference in signs in the between- and within-fund estimates is central: learning-by-doing predicts a positive within-fund effect of experience, whereas learning about fixed skill predicts the opposite.

In columns (4) through (6), we restrict the sample to months following the completion of the first campaign, which allows us to include Campaign returns as explanatory variable. Average Campaign returns positively and significantly predict new campaign initiation in both pooled and within-fund specifications, conditional on experience. Latest Campaign return is also positively related to campaign initiation in the pooled model, though only marginally significant at the 10% level. The coefficient on experience exhibits the same sign pattern as in columns (1) through (3): in the within-fund specification, greater experience is associated with lower take-up rates, conditional on past performance. These findings are consistent with Prediction 1.

In Panel B, we augment the specifications in Panel A by including Success rate. Success rate is positively and significantly related to campaign take-up across all three models. The coefficients on experience and campaign returns retain the same sign patterns as in Panel A. These results indicate that the Success rate provides an independent signal of fund skill beyond experience.

# VI Implications

In this section, we discuss the implications of learning about skill for value creation in activism.

## VI.1 Experience premium

In the model, an activist undertakes a campaign when the expected campaign return net of activism costs—the static trade-off—plus the value of learning is positive. The learning component generates an externality. All else equal, target-firm shareholders would prefer a more experienced activist, who places greater weight on expected campaign returns when selecting targets—the component that matters for shareholders—rather than on the dynamic learning benefit, which accrues privately to the activist. We refer to the price associated with this externality as the experience premium.

The experience premium can be defined by comparing two activists who derive the same total value from a given target but differ in experience. Holding other factors fixed, the difference in their expected skill equals the difference in their learning values and represents the maximum amount a target-firm shareholder would be willing to pay to attract the more experienced activist. A positive experience premium therefore requires that more experienced activists—who have a lower value of learning—also have higher expected skill on average. This condition is natural in equilibrium; otherwise, such activists would have exited the industry.

Put differently, activists who ultimately exit after learning that they are low skill—often following a sequence of unsuccessful campaigns—generate little, if any, value for target firms during the learning phase. While we focus on the implications of this externality for target-firm shareholders, it may also affect management and other stakeholders. To our knowledge, this paper is the first to identify and formalize

this externality in shareholder activism.[13]

It is not our goal to produce an estimate of the experience premium in this paper, which is an ex ante measure of the value of experience. We offer an ex-post premium, the difference in realized campaign returns across activists with different experience levels.[14] Specifically, the ex-post premium is calculated as the difference in average returns between activists with at most $n$ and at least $n+1$ completed campaigns. Table 5 presents the results for various $n$ for the difference in mean returns and the difference in median returns, and Figure 6 summarizes the time series of the ex post premium.[15]

[Insert Table 5 here]

[Insert Figure 6 here ]

Consider, as an example, Panel D in Table 5. The average (median) campaign return is 10.69% (8.04%) for the group of 83 funds that have taken at least 10 campaigns, and 4.72% (1.88%) for the group of 545 funds that have taken not more than 9 campaigns. The difference in campaign returns is 5.97% and statistically significant at the 1% level. Figure 6 shows that the ex post premium is always positive for $n \leq 10$ and ranges between from 2.04% to 6.91%, with an unconditional mean of 5%. For all experience levels above 2, the premium is significantly positive.

[13]The externality may also be non-pecuniary. For example, management may incur costs defending against less experienced activists, or activists may expend resources persuading outside investors to provide capital during the learning phase.

[14]An ex ante calculation of the experience premium would require, for example, constructing an appropriate set of counterfactual activists with greater experience than the activist targeting the firm and accounting for dynamic survivorship bias in realized returns.

[15]Internet Appendix table I.2 reports results for alternative market-based measures of campaign returns.

## VI.2 Learning about value creation versus learning about costs of engagement

In our model, activists learn about their skill—that is, their ability to create value—from the outcomes of past campaigns. The implications for target shareholders and management would differ markedly if activists instead knew their own skill but had to learn about their *costs* of engaging in activism. In that case, an activist's decision to remain in or exit the industry would depend on private assessments of whether such costs are prohibitively high. If these costs are uncorrelated with skill, exit decisions would have no bearing on the expected campaign returns of surviving funds and would therefore impose no externality on the shareholders of potential target firms, at least conditional on taking up a campaign. Hence, whether activists in practice learn about their ability to create value or about their costs of conducting campaigns—two central dimensions of activism—has opposite implications for target shareholders.

Our findings are consistent with the hypothesis that activists learn gradually about their ability to create value. If activists were instead learning about their cost of running a campaign, their decision to exit the industry would not be driven by poor campaign performance, as the evidence strongly suggests. Instead, an activist that realizes the cost may be higher than previously expected will become more selective and take only deals with higher expected returns. Hence, on average, exit is preceded by higher campaign returns. If on the other hand the activist's cost expectation is revised downwards, the activist will not exit and becomes less selective, leading to lower average campaign returns.

The consequence is that shareholders of targeted firms must bear a negative externality, in the form of low campaign returns by unskilled activists still learning about their own skill. From a welfare perspective, activism doesn't only carry benefits to funds and target firms but also social costs associated to fund entry and exit dynamics. From a theoretical perspective, it is still not clear whether these costs of learning are an intrinsically necessary condition of the discovery of value creation by activism.

### VI.3 Competition in the activism industry

Previous sections show a novel negative externality of learning about activism skills. In this subsection, however, we highlight potential benefits from activists learning about skill. Specifically, we evaluate the contribution of inexperienced activists to overall value creation and to the competitiveness of the activism industry. The left vertical axis in Figure 7 shows the average and median campaign returns across all activist hedge funds in our sample, conditional on a minimum number of campaigns undertaken. In other words, as we move along the horizontal axis, we exclude campaigns by activists with lower levels of experience. The right vertical axis in the figure reports the Herfindahl–Hirschman Index (HHI) for the distribution of the total number of campaigns conducted by activist hedge funds that meet this threshold criterion.

[Insert Figure 7 here]

Figure 7 illustrates a trade-off between value creation and the competitiveness of the activist industry. As we restrict the sample to campaigns undertaken by more experienced activists, we observe both higher campaign returns and a higher HHI (less competitive environment). In other words, while shareholders benefit by being targeted by more experienced activists, the activist industry becomes less competitive as campaign activity gets more concentrated among the most experienced activist funds.

## VII Additional results

### VII.1 Learning and target size

It could be argued that activists with better past performance target larger firms and undertake larger campaigns. Indeed, acquiring a given ownership stake—such as the 5% threshold triggering a Schedule 13D—requires larger dollar investments for larger

firms. Whereas this is not a prediction of the model, which implicitly assumes a unit investment per campaign, we test whether continuing and exiting funds target firms with similar market capitalization.

Table 6 reports target-firm market capitalization by engagement number. For the first campaign, mean target size is similar for funds that exit and those that continue, while the median target-firm market capitalization is $43 million lower for continuing funds. After two engagements, the mean target size for funds that exit increases sharply but remains statistically indistinguishable from that of continuing funds. In contrast, and as before, the median target size is $93 million lower for continuing funds. A similar pattern holds for the third engagement (note that the untabulated difference in means in column 4 for continuing funds $891.1-416.8 = 474.3$ is statistically insignificant with a $p-$value of 0.26).

[Insert Table 6 here]

Overall, mean and median target size remain relatively stable for continuing funds, whereas exiting funds tend to exit after targeting larger firms. This evidence is consistent with the model's assumption that learning primarily affects campaign take-up rather than deal size.[16]

## VII.2 Experience and activist busyness

In the model, activists take one campaign at a time. However, investor skill may manifest itself in the number of campaigns that an activist takes concurrently, i.e., how busy they are. On the one hand, inexperienced activists may want to become busier to learn faster about their skill. On the other hand, experienced activists may find more opportunities for engagement. The former would lead to a more negative

[16]The evidence for private equity suggests that good performance is often associated with larger follow-on investments (Kaplan and Schoar, 2005). Having said that, Ewens et al. (2018) describe strategies, such as spray-and-pray where small investments are made on a large number of companies, which imply that experienced investors do not always go for larger deals.

relation between take-up rates and experience, whereas the later would predict the reverse. Table I.3 in the Internet Appendix reports results on take-up rates and investor busyness. To describe busyness, we split the sample into months in which funds are engaged in at least one campaign (Panel A), defined as busy funds, and months in which funds are not engaged in any campaign (Panel B), when they are considering entering another campaign. The structure of each panel is similar to the structure used in panel A of Table 4. The results indicate that qualitative drivers of take-up rates are similar for busy and not busy funds and mimic those in Table 4, suggesting that the model does not miss on a significant dimension when restricting activists to a maximum one campaign per period. Quantitatively, busy funds appear less responsive to experience, suggesting that the second effect above may be stronger. The table also shows that for busy funds, take-up rates are more sensitive to past performance.

## VII.3 Learning and target operating performance

The model does not prescribe how target returns during a campaign relate to actual operational changes that occur while the campaign is taking place. However, it is to be expected that value creation is associated with such changes. Table 7 below reports results of changes in ROA for target firms from the year prior to the start of an activist campaign to the year after.

[Insert Table 7 here]

The table shows that the ROA growth of companies targeted by exiting activist funds is lower than that of continuing activist funds on average (with statistical significance only for the first and second campaigns in the sample by each activist). This evidence suggests that the negative externality from activist learning discussed above may have consequences at the level of operating performance, as less experienced

funds that exit have weaker ROA performance than funds with similar experience that continue.

# VIII Conclusion

This paper develops a dynamic model in which activist investors learn about their skill through experience. Each campaign has option value, reflecting both expected value creation net of campaign costs and the informational value of learning, which we term a dynamic learning effect.

Our findings indicate that learning about skill plays a central role in shaping the dynamics of shareholder activism. Less experienced activists are less selective in campaign initiation and more likely to exit following poor performance. This process generates an externality for target-firm shareholders, who bear the cost of activists' learning through lower expected returns during the learning phase. The resulting experience premium favors engagements by more experienced activists.

These findings have implications for understanding value creation in shareholder activism. Future research may examine how institutional settings, coordination among activists, or policy environments affect the speed and efficiency of learning. **ES: How so?** More broadly, activism may depend not only on which campaigns are initiated but also on when campaigns are terminated; studying skill in campaign termination and its implications for returns and skewness remains an important direction for future work.

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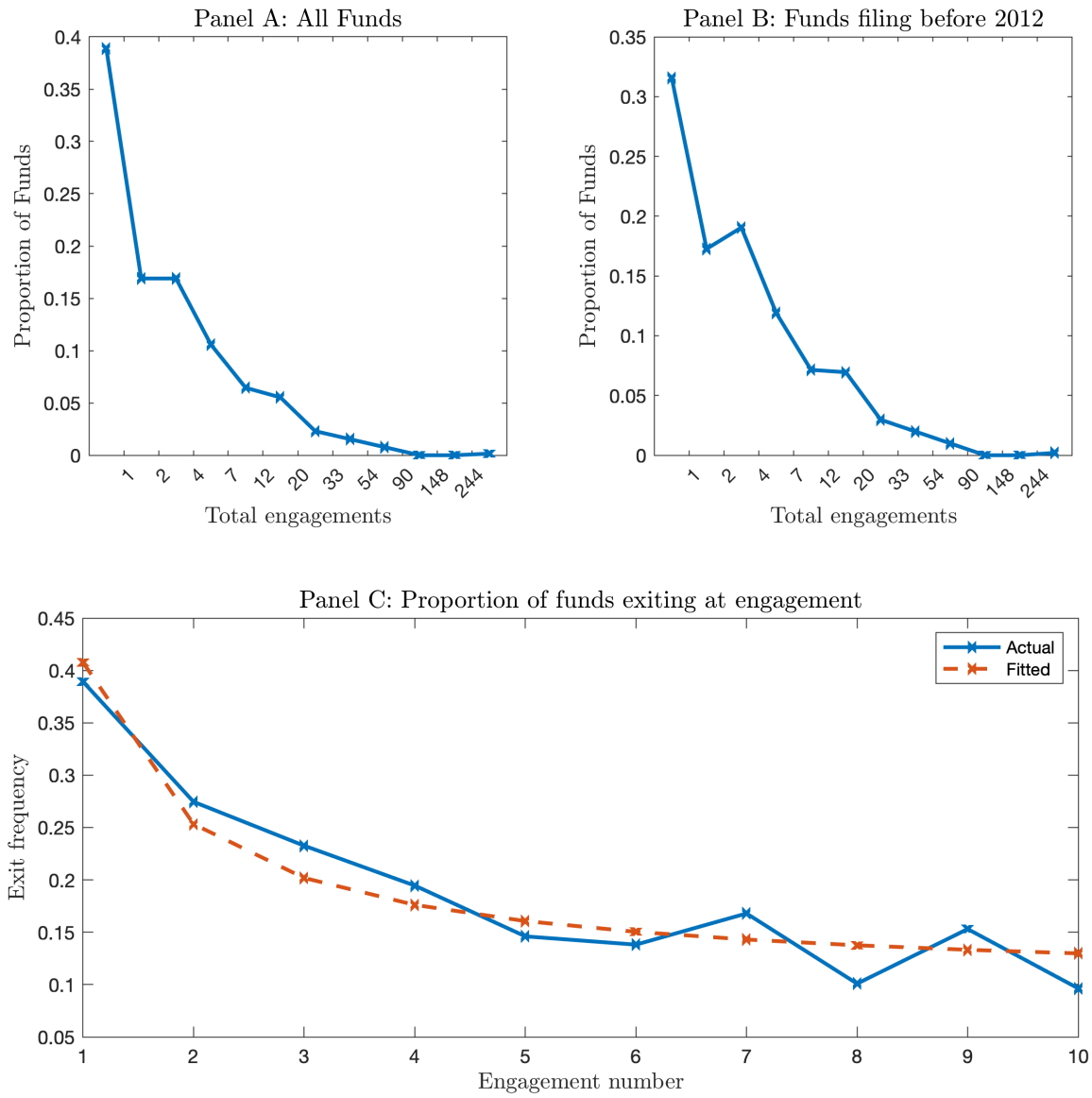



**Figure 1: Exit rates by activist hedge funds.** Panels A and B plot the proportion of funds corresponding to each total number of activist campaigns over the full sample period, with the horizontal axis representing the number of engagements. Panel A includes all activist hedge funds that filed a Schedule 13D with the SEC; this group consists of 650 funds whose targets are matched to CRSP and Compustat. Panel B restricts the sample to those funds that filed a Schedule 13D before 2012 and were therefore at least five years old by the end of the sample period, yielding 504 funds. Panel C plots the proportion of funds exiting activism after a given number of engagements, conditional on surviving from the previous engagement. The fitted exit-frequency curve is given by $0.099 + \frac{0.309}{\text{Engagement number}}$. The data cover all activist campaigns initiated between March 1994 and December 2016, as identified by Brav et al. (2021).

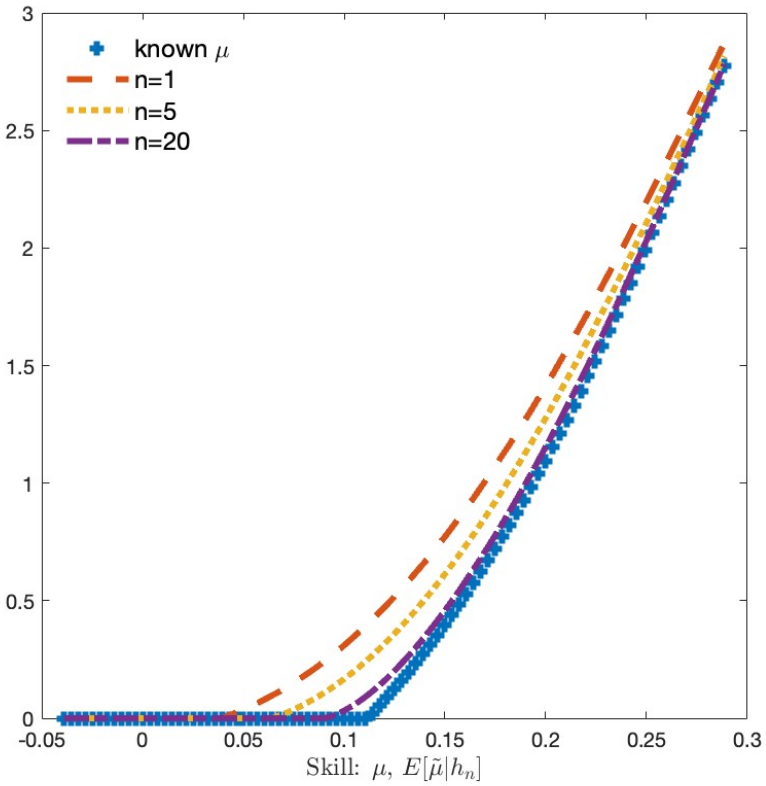



**Figure 2: Value functions $U(x)$ and $V(n,x)$.** The line described with '+' represents the activist's lifetime value $U(x)$ when $\mu$ is known, and the other lines represent the activist's lifetime value $V(n,x)$ when $\mu$ is unknown at different levels of experience, $n = 1, 5, 20$. Parameter values: $m = 0.0481$, $\delta = 0.1418$, $\sigma = 0.3374$, $\beta = 0.95$, $f = 0.025$, $c$ is uniform in $[0, 0.25]$, $\mu^* = 0.1118$.

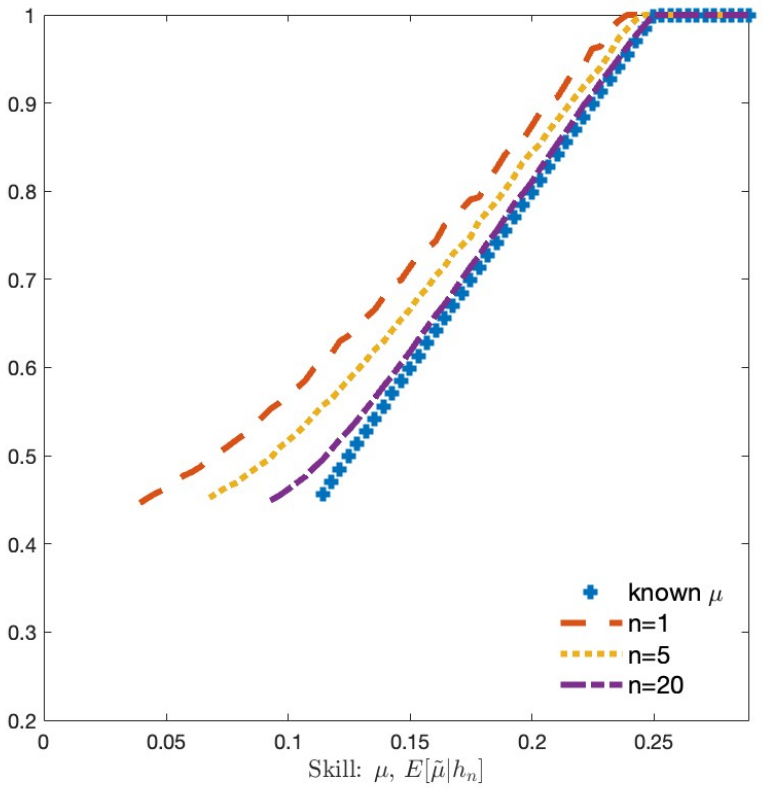



**Figure 3: Probability of taking on a new campaign.** The line described with '+' represents the activist's probability of taking on a new campaign when $\mu$ is known, and the other lines represent the activist's probability of taking on a new campaign when $\mu$ is unknown at different levels of experience, $n = 1, 5, 20$. Parameter values: $m = 0.0481$, $\delta = 0.1418$, $\sigma = 0.3374$, $\beta = 0.95$, $f = 0.025$, $c$ is uniform in $[0, 0.25]$, $\mu^* = 0.1118$.

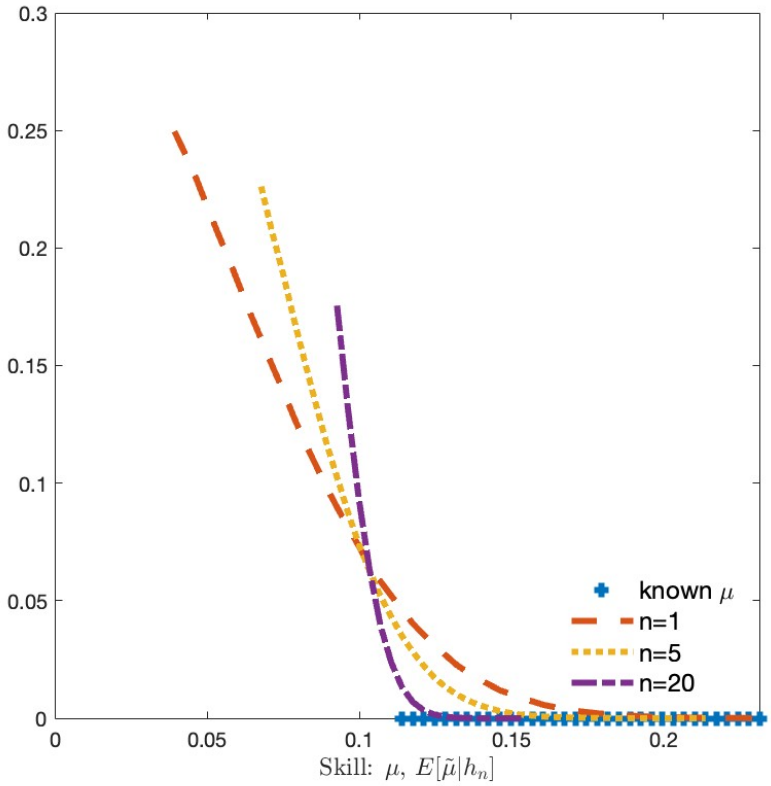



**Figure 4: Probability of exit by a fund.** The line described with '+' represents the activist's probability of exit when $\mu$ is known, and the other lines represent the activist's probability of exit when $\mu$ is unknown at different levels of experience, $n = 1, 5, 20$. Parameter values: $m = 0.0481$, $\delta = 0.1418$, $\sigma = 0.3374$, $\beta = 0.95$, $f = 0.025$, $c$ is uniform in $[0, 0.25]$, $\mu^* = 0.1118$.

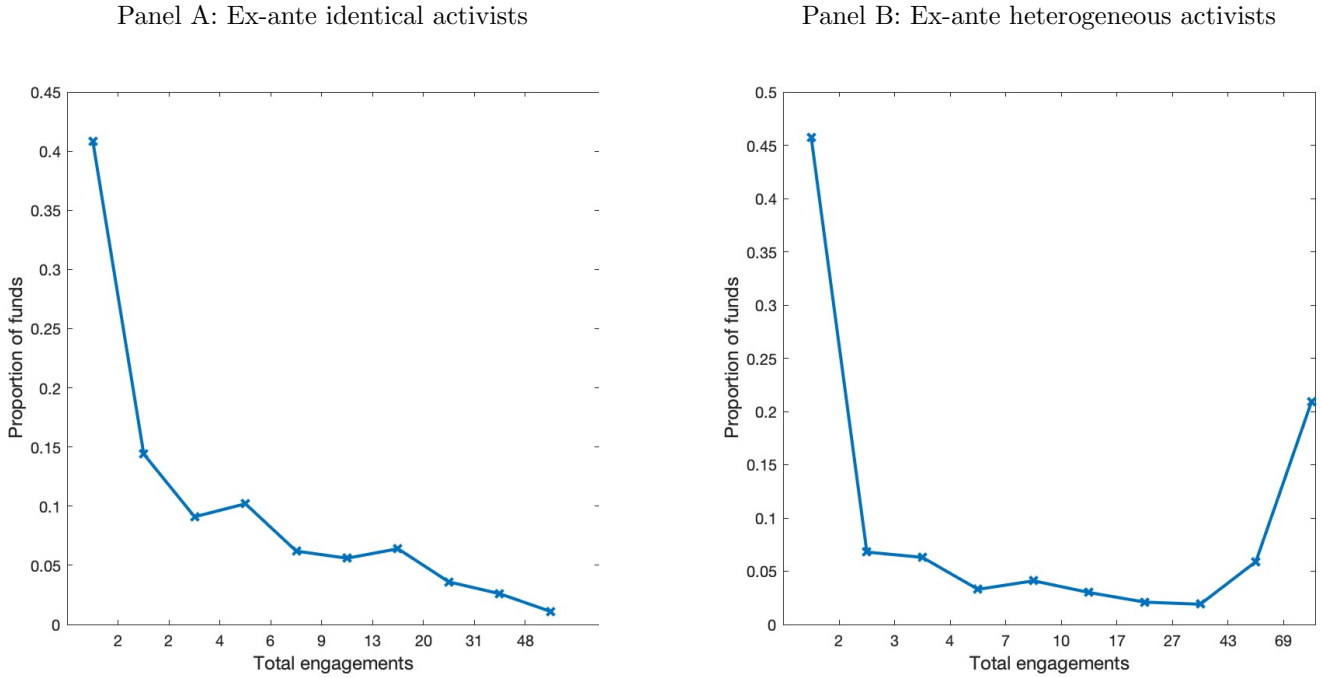



**Figure 5: Fraction of activists with given number of campaigns.** Simulation over 100 periods or until exit of 1,000 activists, without replacement upon exit or new entrants. Panel A has all activists sharing the same $\mu = m = 0.0481$. Panel B has activists entering with a randomized $\mu$ according to the distribution in (1). Parameter values: $\delta = 0.1418$, $\sigma = 0.3374$, $\beta = 0.95$, $f = 0.025$, $c$ is uniform in $[0, 0.25]$, $\mu^* = 0.1118$.

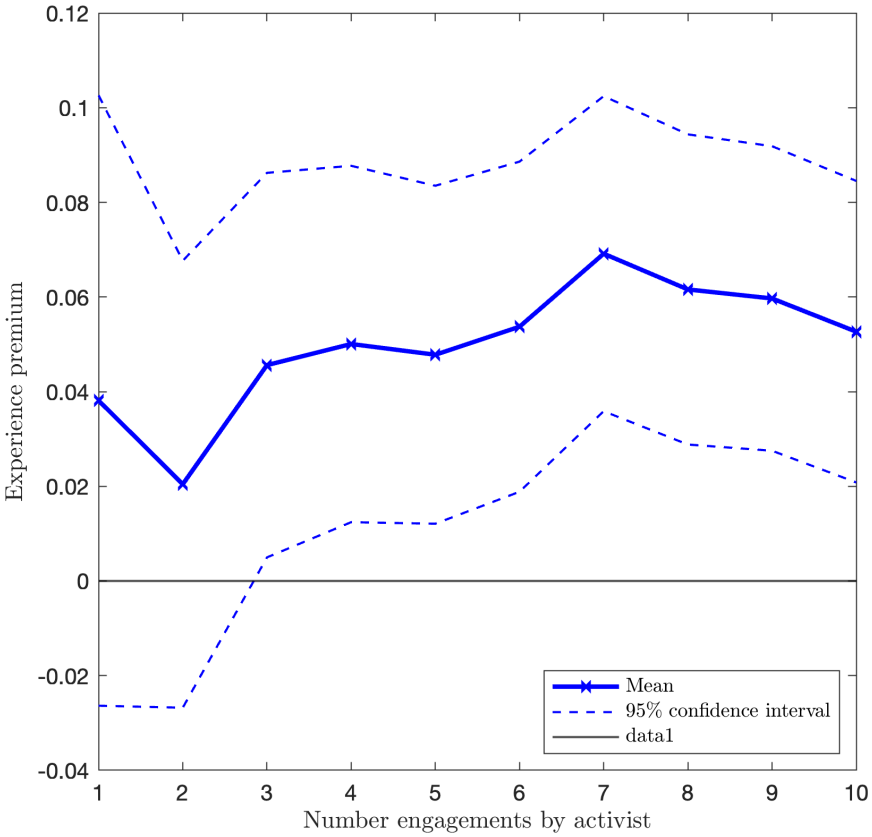



**Figure 6: The experience premium.** This figure plots the difference in expected campaign returns between activists with at most $n$ and at least $n + 1$ completed campaigns.

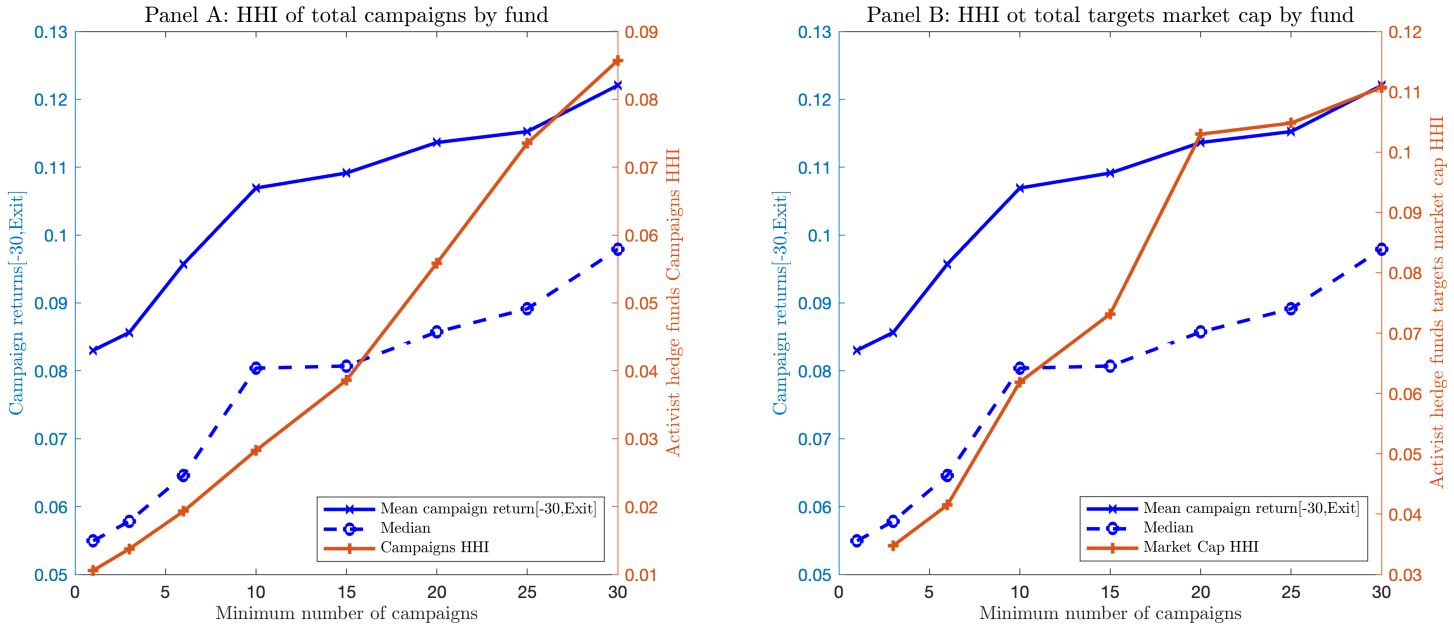



**Figure 7: Campaign returns and market concentration for different hedge fund groups.** Panels A and B plot, on the left vertical axis, the average (solid blue line) and median (dashed blue line) buy-and-hold return on the target firm's share price, measured from day –30 relative to the Schedule 13D filing announcement through the hedge fund's exit from the campaign (Campaign return$[-30, \text{Exit}]$). These returns are computed across all campaigns by funds that completed at least a given minimum number of campaigns during the sample period, which is plotted on the horizontal axis. Panel A also displays, on the right vertical axis, the Herfindahl–Hirschman Index (HHI) for the distribution of the total number of campaigns conducted by funds meeting this threshold (red line). In Panel B, the right vertical axis reports the HHI based on the aggregate market capitalization of all targets of campaigns undertaken by such funds. The data include all activist campaigns initiated between March 1994 and December 2016, as identified by Brav et al. (2021).

**Table 1: Summary statistics.**
This table summarizes the main outcome variables for all activist campaigns in the data set by Brav et al. (2021), which includes all the Schedule 13D filings with the SEC by activist hedge funds between March of 1994 and December of 2016. All variables are defined in Table B.1.

| | Mean | St. Dev. | p25 | Median | p75 |
|---|---|---|---|---|---|
| **Panel A:** All engagements (N = 3,597) | | | | | |
| Announcement returns | 5.07% | 28.15% | -10.20% | 3.19% | 18.44% |
| Completed engagement | 0.95 | 0.22 | 1.00 | 1.00 | 1.00 |
| Market capitalization (USD M) | 981.53 | 3,697.44 | 56.34 | 158.21 | 567.01 |
| Days since previous filing | 329.40 | 618.14 | 31.00 | 109.00 | 334.00 |
| **Panel B:** Exited engagements only (N = 3,416) | | | | | |
| Announcement returns | 5.30% | 27.87% | -9.87% | 3.34% | 18.60% |
| Campaign returns | 8.30% | 46.80% | -24.84% | 5.49% | 37.04% |
| Campaign duration | 267.77 | 192.67 | 88.00 | 233.00 | 520.00 |
| Successful exit | 0.33 | 0.47 | 0.00 | 0.00 | 1.00 |
| **Panel C:** All activist hedge funds (N = 650) | | | | | |
| Engaged frequency (monthly) | 0.40 | 0.18 | 0.25 | 0.40 | 0.52 |
| Number of engagements | 5.60 | 13.47 | 1.00 | 2.00 | 5.00 |
| Number of completed engagements | 5.32 | 12.78 | 1.00 | 2.00 | 5.00 |
| Number of successful exits | 1.72 | 3.67 | 0.00 | 1.00 | 2.00 |
| Take-up frequency (monthly) | 0.04 | 0.04 | 0.02 | 0.03 | 0.05 |
| Days between filings (mean) | 274.98 | 399.28 | 0.00 | 126.20 | 414.50 |
| Announcement returns: | | | | | |
| Simple average | 4.79% | 23.10% | -6.80% | 3.50% | 14.81% |
| Target size-weighted average | 2.73% | 20.55% | -2.52% | 0.68% | 5.51% |
| **Panel D:** All activist hedge funds completing at least one engagement (N = 631) | | | | | |
| Average campaign duration | 239.43 | 145.37 | 117.83 | 228.00 | 331.75 |
| Maximum campaign duration | 345.67 | 190.18 | 152.00 | 420.00 | 522.00 |
| Campaign returns: | | | | | |
| Simple average | 5.24% | 36.27% | -15.35% | 4.54% | 23.05% |
| Target size-weighted average | 2.57% | 32.29% | -7.33% | 0.47% | 10.70% |

**Table 2: Campaign returns at each engagement.**
This table summarizes the distribution of buy-and-hold returns on target firms' stock from 30 days prior to the 13D filing date until the day the activist terminates the campaign (Campaign return). Data on Schedule 13D filings by activist hedge funds between March 1994 and December 2016, as well as campaign exit dates, are from Brav et al. (2021). Standard errors for mean-difference tests are reported in parentheses, while Pearson $\chi^2$ statistics for median-difference tests are shown in brackets. Estimates marked with ***, **, or * indicate one-tailed $p$-values below 0.01, 0.05, or 0.1, respectively, under the alternative hypothesis that the subsample mean or median exceeds the full-sample value. Daily share prices of target firms are obtained from CRSP.

| | | | | | | | Differences of | |
|---|---|---|---|---|---|---|---|---|
| | Mean | St. Dev. | Median | Mean | St. Dev. | Median | Means | Medians |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| **Panel A:** First engagement | | | | | | | | |
| | 253 Exiting Funds | | | 397 Continuing Funds | | | | |
| Campaign returns | 4.59% | 48.52% | 0.50% | 12.80% | 50.82% | 9.64% | 8.20%** | 9.14%* |
| | | | | | | | ( 3.98%) | [ 1.87] |
| **Panel B:** Second engagement | | | | | | | | |
| | 109 Exiting Funds | | | 288 Continuing Funds | | | | |
| Campaign returns | 3.71% | 44.79% | 1.98% | 10.52% | 49.45% | 6.70% | 6.81%* | 4.72% |
| | | | | | | | ( 5.19%) | [ 0.28] |
| **Panel C:** Third engagement | | | | | | | | |
| | 67 Exiting Funds | | | 221 Continuing Funds | | | | |
| Campaign returns | -7.03% | 44.19% | -1.92% | 11.85% | 48.66% | 11.67% | 18.88%*** | 13.60%** |
| | | | | | | | ( 6.31%) | [ 4.38] |

**Table 3: Hedge fund exit.**
This table shows estimates of Cox proportional hazards models for a fund's exit from engaging in shareholder activism. The unit of observation is fund-campaign. A fund is defined as exiting the activism industry at the termination of its final observed campaign. If that campaign ends within one year of the end of the calendar sample period, the fund is treated as still active. The panel includes all engagements by all Activist Hedge Funds between March of 1994 and December of 2016. It is constructed using all Schedule 13D filings and outcomes in Brav et al. (2021). Daily target firm's share price are from CRSP. The dependent variable equals one for the fund's last engagement, or zero otherwise. Standard errors are shown inside parentheses under each estimated coefficient. Estimates followed by ***,**, or * are significantly different from 0 with 0.99, 0.95 or 0.90 confidence. The sample includes only engagements initiated or still active after completion of the first engagement. Average (Latest) Campaign returns is the buy-and-hold return on the target firm's stock from 30 days prior to the Schedule 13D filing date to the engagement's exit date for all (only the last) completed engagements. All specifications include year fixed effects. Standard errors are computed assuming within fund clustering.

| Dependent variable: 1 if last engagement, 0 otherwise | (1) | (2) | (3) |
|---|---|---|---|
| Campaign returns: | | | |
| Average | -0.373 | 0.139 | 0.153 |
| | (0.235) | (0.309) | (0.304) |
| Latest | | -0.546*** | -0.532*** |
| | | (0.210) | (0.208) |
| Success rate | | | -0.335* |
| | | | (0.172) |
| N | 2,589 | 2,589 | 2,589 |

**Table 4: Hedge fund engagement take-up rates.**
This table shows estimates of linear probability panel regressions of the initiation of a new campaign by an activist hedge fund on a given month on the fund's filing experience and the buy-and-hold returns achieved in its previous completed campaigns. Standard errors are shown inside parentheses under each estimated coefficient. Estimates followed by $***, **$, or $*$ are significantly different from 0 with 0.99, 0.95 or 0.90 confidence. Data include all the Schedule 13D filings with the SEC by Activist Hedge Funds March of 1994 and December of 2016, compiled by Brav et al. (2021). Daily target firm's share price are from CRSP. The dependent variable equals one every month in which the fund starts a new activist campaign, or zero otherwise. For columns 1 to 3, the time series for each fund starts on the month after its first Schedule 13D filing and ends on the earliest date between one year after the last recorded exit or the end of the sample period. For columns 4 to 6, the time series starts on the month after the fund has completed its first engagement. Experience is a count of the number of filings until the month prior to each observation. Average Campaign returns is the average buy-and-hold return on the target firm's stock from 30 days prior to the 13D filing date to the engagement's exit date for all exited engagements before the given month. Latest Campaign returns is the buy-and-hold return for the previously completed campaign only. The Success rate is defined as the ratio of successful exits to the total number of completed campaigns to date by the activist hedge fund. Columns 1 and 4 report estimates based on pooled regressions. Columns 2 and 5 report a between funds estimator and columns 3 and 6 a within fund estimator. All regressions include calendar month fixed effects.

| Dependent variable: 1 if start new campaign, 0 otherwise | | | | | | |
|---|---|---|---|---|---|---|
| Estimator: | Pooled | Between | Within | Pooled | Between | Within |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| **Panel A:** Filing Experience and Past performance | | | | | | |
| Experience | 0.002*** | 0.005*** | -0.002*** | 0.002*** | 0.005*** | -0.002*** |
| | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) |
| Average Campaign returns | | | | 0.010* | 0.008 | 0.057*** |
| | | | | (0.005) | (0.006) | (0.011) |
| Latest Campaign returns | | | | 0.007* | -0.004 | 0.001 |
| | | | | (0.004) | (0.005) | (0.005) |
| Constant | 0.040*** | 0.003 | 0.069*** | 0.041*** | -0.161 | 0.071*** |
| | (0.003) | (0.100) | (0.003) | (0.004) | (0.156) | (0.004) |
| N | 46,404 | 46,404 | 46,404 | 37,929 | 37,929 | 37,929 |
| $R^2$ | 0.028 | 0.651 | 0.005 | 0.033 | 0.660 | 0.007 |

*(Continues)*

**Table 4:** Continued.

| Dependent variable: 1 if start new campaign, 0 otherwise<br>Estimator: | Pooled<br>(1) | Between<br>(2) | Within<br>(3) | Pooled<br>(4) | Between<br>(5) | Within<br>(6) |
|---|---|---|---|---|---|---|
| **Panel B:** Filing Experience, Completion Success and Past performance | | | | | | |
| Experience | 0.002*** | 0.005*** | -0.002*** | 0.002*** | 0.005*** | -0.002*** |
| | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) |
| Success rate | 0.010*** | 0.005* | 0.026*** | 0.010*** | 0.005* | 0.025*** |
| | (0.003) | (0.003) | (0.008) | (0.003) | (0.003) | (0.008) |
| Average Campaign returns | | | | 0.010* | 0.008 | 0.056*** |
| | | | | (0.005) | (0.006) | (0.011) |
| Latest Campaign returns | | | | 0.007* | -0.005 | 0.001 |
| | | | | (0.004) | (0.005) | (0.005) |
| Constant | 0.038*** | -0.138 | 0.067*** | 0.037*** | -0.142 | 0.063*** |
| | (0.004) | (0.156) | (0.005) | (0.004) | (0.156) | (0.005) |
| N | 37,929 | 37,929 | 37,929 | 37,929 | 37,929 | 37,929 |
| $R^2$ | 0.032 | 0.660 | 0.006 | 0.033 | 0.662 | 0.008 |

**Table 5: Campaign returns conditional on hedge funds' total number of engagements.**

This table reports buy-and-hold returns on the target firm's stock from 30 days prior to the 13D filing date through the exit date of the engagement, conditional on the total number of engagements completed by each fund. The table compares mean and median buy-and-hold returns for all exited engagements by funds with at least $x$ ($b$) to at most $x-1$ ($a$) completed engagements. Standard errors for mean-difference tests are shown in parentheses, while Pearson $\chi^2$ statistics for median-difference tests appear in brackets. Estimates marked with ***, **, or * indicate one-tailed $p$-values less than 0.01, 0.05, or 0.1, respectively, where the alternative hypothesis is that the subsample mean or median exceeds (is below) the full-sample value when the difference is positive (negative).

| Engagements per Fund | Number of Funds (1) | Number of Engagements (2) | Mean (3) | Median (4) |
|---|---|---|---|---|
| **Panel A** | | | | |
| ($a$) 1 only | 234 | 234 | 4.75% | 0.04% |
| ($b$) 2 or more | 394 | 3,182 | 8.56% | 5.70% |
| ($b-a$) Diff. in Campaign returns | | | 3.81% | 5.66% |
| Standard error / Pearson $\chi^2$ | | | (3.10%) | [1.17] |
| **Panel B** | | | | |
| ($a$) 2 or fewer | 341 | 437 | 6.52% | 3.76% |
| ($b$) 3 or more | 287 | 2,979 | 8.56% | 5.78% |
| ($b-a$) Diff. in Campaign returns | | | 2.04% | 2.03% |
| Standard error / Pearson $\chi^2$ | | | (2.41%) | [0.95] |
| **Panel C** | | | | |
| ($a$) 5 or fewer | 478 | 908 | 4.79% | 2.93% |
| ($b$) 6 or more | 150 | 2,507 | 9.57% | 6.46% |
| ($b-a$) Diff. in Campaign returns | | | 4.78%*** | 3.53%*** |
| Standard error / Pearson $\chi^2$ | | | (1.82%) | [4.21] |
| **Panel D** | | | | |
| ($a$) 9 or fewer | 545 | 1,368 | 4.72% | 1.88% |
| ($b$) 10 or more | 83 | 2,048 | 10.69% | 8.04% |
| ($b-a$) Diff. in Campaign returns | | | 5.97%*** | 6.16%*** |
| Standard error / Pearson $\chi^2$ | | | (1.64%) | [10.32] |
| **Panel E** | | | | |
| ($a$) 19 or fewer | 594 | 2,011 | 6.16% | 3.52% |
| ($b$) 20 or more | 34 | 1,405 | 11.36% | 8.57% |
| ($b-a$) Diff. in Campaign returns | | | 5.20%*** | 5.05%*** |
| Standard error / Pearson $\chi^2$ | | | (1.61%) | [7.54] |

**Table 6: Target's market capitalization at each engagement**

This table summarizes the distribution of the target firm's market capitaliztion (in USD Millions) by engagement number. Data on Schedule 13D filings by activist hedge funds between March 1994 and December 2016, as well as campaign exit dates, are from Brav et al. (2021). Standard errors for mean-difference tests are reported in parentheses, while Pearson $\chi^2$ statistics for median-difference tests are shown in brackets. Estimates marked with ***, **, or * indicate one-tailed $p$-values below 0.01, 0.05, or 0.1, respectively, under the alternative hypothesis that the subsample mean or median exceeds the full-sample value. Daily share prices of target firms are obtained from CRSP.

| | | | | | | | Differences of | |
|---|---|---|---|---|---|---|---|---|
| | Mean | St. Dev. | Median | Mean | St. Dev. | Median | Means | Medians |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| **Panel A:** First engagement | | | | | | | | |
| | 247 Exiting Funds | | | 381 Continuing Funds | | | | |
| Target Market Capitalization | 480.11 | 1,465.95 | 150.77 | 417.76 | 1,331.23 | 107.62 | -62.35 | -43.14** |
| | | | | | | | ( 115.55) | [ 3.53] |
| **Panel B:** Second engagement | | | | | | | | |
| | 107 Exiting Funds | | | 275 Continuing Funds | | | | |
| Target Market Capitalization | 732.60 | 1,673.91 | 187.90 | 416.83 | 1,073.77 | 94.77 | -315.77 | -93.13*** |
| | | | | | | | ( 174.30) | [ 9.46] |
| **Panel C:** Third engagement | | | | | | | | |
| | 67 Exiting Funds | | | 219 Continuing Funds | | | | |
| Target Market Capitalization | 624.28 | 1,294.65 | 148.44 | 891.10 | 6,919.58 | 88.34 | 266.83 | -60.10** |
| | | | | | | | ( 493.61) | [ 4.39] |

**Table 7: Changes in Target's ROA at each engagement**

This table summarizes the distribution of changes in target firms' ROA by activists' engagement number. Change in ROA is measured from the year before to the year after engagement initiation year. Data on Schedule 13D filings by activist hedge funds between March 1994 and December 2016, as well as campaign exit dates, are from Brav et al. (2021). Standard errors for mean-difference tests are reported in parentheses, while Pearson $\chi^2$ statistics for median-difference tests are shown in brackets. Estimates marked with ***, **, or * indicate one-tailed $p$-values below 0.01, 0.05, or 0.1, respectively, under the alternative hypothesis that the subsample mean or median exceeds the full-sample value. Daily share prices of target firms are obtained from CRSP.

| | | | | | | | Differences of | |
|---|---|---|---|---|---|---|---|---|
| | Mean | St. Dev. | Median | Mean | St. Dev. | Median | Means | Medians |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| **Panel A:** First engagement | | | | | | | | |
| | 124 Exiting Funds | | | 235 Continuing Funds | | | | |
| Change in ROA | -2.92% | 11.79% | -0.69% | 0.06% | 12.68% | -0.31% | 2.98%** | 0.38% |
| | | | | | | | ( 1.34%) | [ 1.15] |
| **Panel B:** Second engagement | | | | | | | | |
| | 56 Exiting Funds | | | 172 Continuing Funds | | | | |
| Change in ROA | -3.35% | 13.25% | -0.87% | 1.23% | 34.25% | -0.09% | 4.58%* | 0.78% |
| | | | | | | | ( 3.16%) | [ 0.85] |
| **Panel C:** Third engagement | | | | | | | | |
| | 32 Exiting Funds | | | 135 Continuing Funds | | | | |
| Change in ROA | -2.95% | 12.65% | -0.51% | -2.15% | 17.73% | -1.14% | 0.80% | -0.63% |
| | | | | | | | ( 2.71%) | [ 0.19] |

# APPENDIX

## A Numerical algorithm to solve the model when $\mu$ is unknown

To numerically solve for $V(n, \mathbb{E}[\tilde{\mu}|h_n])$, note from equation (3) that the conditional variance of mean returns decreases with $n$ and approaches 0 as $n \to \infty$. We assume that for $n > N$, with $N$ large, $V(n, x) = V(n+1, x)$. That is, the change in the updating rule that results from having done one more campaign does not yield any change in value, holding $x$ constant.

Next, we discretize the variable $\mathbb{E}[\tilde{\mu}|h_n]$, so we evaluate $V(N, x)$ over a discrete grid. Then, choose $N$ large, set $V^0(N, x) = U(x)$, and construct the sequence $\{V^i(N, x)\}_{i \geq 0}$ by iterating over

$$V^i(N, x) = \max\left\{0; \mathbb{E}c\left[\tilde{V}^{i-1}(N, x, \tilde{c})\right] - f\right\}, \tag{A.1}$$

$$\tilde{V}^{i-1}(N, x, c) = \max\left\{x - c + \beta \mathbb{E}_{r_{N+1}}\left(V^{i-1}(N, \mathbb{E}[\tilde{\mu}|h_{N+1}])\right); \beta V^i(N, x)\right\} \tag{A.2}$$

Take $V(N, x) = \lim_{i \to \infty} V^i(N, x)$.

Continue backwards to obtain $V(n, x)$, for $n < N$ and $x = \mathbb{E}[\tilde{\mu}|h_n]$, as the nonlinear solution to

$$V(n, x) = \max\left\{0; \mathbb{E}_c\left[\tilde{V}(n, x, \tilde{c})\right] - f\right\}, \tag{A.3}$$

$$\tilde{V}(n, x, c) = \max\left\{x - c + \beta \mathbb{E} r_{n+1}\left(V(n+1, \mathbb{E}[\tilde{\mu}|h_{n+1}])\right); \beta V(n, x)\right\}. \tag{A.4}$$

The above system of equations also gives the activist value prior to the first campaign by setting $n = 0$ and $\mathbb{E}[\tilde{\mu}|\text{no prior campaign}] = m$.

# B Variable definitions

**Table B.1: Variables definitions**

**Panel A:** Schedule 13D filing and Activist campaign data. These data include all the Schedule 13D filings with the SEC by activist hedge funds between March of 1994 and December of 2016, as well as the outcomes of each campaign.

| Variable name | Description |
|---|---|
| Campaign duration | Workdays between the 13D filing date and the day the Activist Hedge Fund exited the campaign. Set to 520 workdays for filings made before January of 2014 if the exit date is not available. |
| Completed engagement | Equals one if the Activist Hedge Fund exited the engagement before December of 2016. |
| Fund exit | Equals one for the fund's last engagement, or zero otherwise. A fund is defined as exiting the activism industry at the termination of its final observed campaign. If that campaign ends within one year of the end of the calendar sample period, the fund is treated as still active. |
| Engaged | Equals one if the fund is engaged in at least one campaign, and zero otherwise. |
| Engaged frequency | Total number of months the hedge fund is engaged in at least one activist campaign divided by the total number of months the activist hedge fund is active. |
| Experience | Total number of filings to date by the activist hedge fund. |
| Schedule 13D filing month | Equals one each month an Activist Hedge Fund files a new Schedule 13D with the SEC, and zero otherwise. |
| Successful exit | Equals one if the campaign is classified as successful by Brav et al. (2021). |
| Success rate | Total number of successful exits divided by the total number of campaign exists to date by the activist hedge fund. |
| Take-up frequency | Total number of 13D filings divided by the total number of months the Activist Hedge Fund is active. An Activist Hedge Fund is active from the first month after the first filing until twelve months after the exit of its last campaign. |

*(Continues)*

**Panel B:** Target firm data (from CRSP). The CAPM $\alpha$ and $\beta$ are estimated for each target using OLS regressions of monthly returns in excess of the risk free rate on the excess market return on the same month and over the 60-month window preceding day -30 of the Schedule 13D filing announcement. The factor loadings for the Fama-French 3-factor model are estimated for each target using OLS regressions of monthly returns in excess of the risk free rate on the three risk factors on the same month and over the 60-month window preceding day -30. Monthly risk-free rates and risk factors come from Kenneth French's website.

| Variable name | Description |
|---|---|
| Announcement returns | Buy-and-hold return on the target firm's share price between days -30 and +30 of the Schedule 13D filing announcement. |
| Announcement returns, CAPM-adjusted | Buy-and-hold return on the target firm's share price between days -30 and +30 of the Schedule 13D filing announcement in excess of the expected return predicted by a CAPM model over the same period. |
| Announcement returns, FF3-adjusted | Buy-and-hold return on the target firm's share price between days -30 and +30 of the Schedule 13D filing announcement in excess of the expected return predicted by a Fama-French 3-factor model over the same period. |
| Campaign returns | Buy-and-hold return on the target firm's share price between days -30 from the Schedule 13D filing announcement and the day the hedge fund exited the activist campaign. |
| Campaign returns, CAPM-adjusted | Buy-and-hold return on the target firm's share price between days -30 from the Schedule 13D filing announcement and the campaign exit date in excess of the expected return predicted by a CAPM model over the same period. |
| Campaign returns, FF3-adjusted | Buy-and-hold return on the target firm's share price between days -30 from the Schedule 13D filing announcement and the campaign exit date in excess of the expected return predicted by a Fama-French 3-factor model over the same period. |
| Market capitalization | Average market capitalization of the target firm's stock on the week preceding the Schedule 13D announcement. |

# Online Appendices for "Learning about activism skill"

**Table I.1: Market-adjusted Buy-and-hold returns at each engagement.**
This table summarizes the distribution of Market-adjusted buy-and-hold returns on target firms' stock from 30 days prior to the 13D filing date until the day the activist terminates the campaign (Campaign return$[-30, \text{Exit}]$). Data on Schedule 13D filings by activist hedge funds between March 1994 and December 2016, as well as campaign exit dates, are from Brav et al. (2021). Standard errors for mean-difference tests are reported in parentheses, while Pearson $\chi^2$ statistics for median-difference tests are shown in brackets. Estimates marked with $^{***}$, $^{**}$, or $^{*}$ indicate one-tailed $p$-values below 0.01, 0.05, or 0.1, respectively, under the alternative hypothesis that the subsample mean or median exceeds the full-sample value. Daily share prices of target firms are obtained from CRSP.

| | Mean (1) | St. Dev. (2) | Median (3) | Mean (4) | St. Dev. (5) | Median (6) | Differences of Means (7) | Differences of Medians (8) |
|---|---|---|---|---|---|---|---|---|
| **Panel A:** First engagement | | | | | | | | |
| | 253 Exiting Funds | | | 397 Continuing Funds | | | | |
| Campaign returns | -4.73% | 41.64% | -3.77% | 1.24% | 44.38% | 0.00% | 5.97%$^{**}$ | 3.77%$^{**}$ |
| | | | | | | | (3.44%) | [4.05] |
| **Panel B:** Second engagement | | | | | | | | |
| | 109 Exiting Funds | | | 288 Continuing Funds | | | | |
| Campaign returns | -2.78% | 40.15% | -3.49% | -0.62% | 43.96% | 0.11% | 2.16% | 3.60% |
| | | | | | | | (4.64%) | [0.22] |
| **Panel C:** Third engagement | | | | | | | | |
| | 67 Exiting Funds | | | 221 Continuing Funds | | | | |
| Campaign returnst | -13.54% | 38.76% | -10.97% | -0.04% | 43.84% | 0.96% | 13.50%$^{***}$ | 11.94%$^{**}$ |
| | | | | | | | (5.58%) | [4.38] |

**Table I.2: Market-adjusted campaign returns conditional on hedge funds' total number of engagements.**

This table reports buy-and-hold market-adjusted returns on the target firm's stock from 30 days prior to the 13D filing date through the exit date of the engagement, conditional on the total number of engagements completed by each fund. The table compares mean and median buy-and-hold returns for all exited engagements by funds with at least $x$ ($b$) to at most $x-1$ ($a$) completed engagements. Standard errors for mean-difference tests are shown in parentheses, while Pearson $\chi^2$ statistics for median-difference tests appear in brackets. Estimates marked with $^{***}$, $^{**}$, or $^{*}$ indicate one-tailed $p$-values less than 0.01, 0.05, or 0.1, respectively, where the alternative hypothesis is that the subsample mean or median exceeds (is below) the full-sample value when the difference is positive (negative).

| Engagements per Fund | Number of Funds | Number of Engagements | Mean | Median |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| **Panel A** | | | | |
| ($a$) 1 only | 234 | 234 | -4.29% | -3.63% |
| ($b$) 2 or more | 394 | 3,182 | -1.20% | -1.43% |
| ($b-a$) Difference | | | 3.09% | 2.21% |
| Standard error / Pearson $\chi^2$ | | | ( 2.82%) | [ 0.46] |
| **Panel B** | | | | |
| ($a$) 2 or fewer | 341 | 437 | -1.74% | -1.05% |
| ($b$) 3 or more | 287 | 2,979 | -1.36% | -1.64% |
| ($b-a$) Difference | | | 0.38% | -0.59% |
| Standard error / Pearson $\chi^2$ | | | ( 2.09%) | [ 0.02] |
| **Panel C** | | | | |
| ($a$) 5 or fewer | 478 | 909 | -3.48% | -2.46% |
| ($b$) 6 or more | 150 | 2,507 | -0.66% | -1.22% |
| ($b-a$) Difference | | | 2.82%$^{**}$ | 1.24% |
| Standard error / Pearson $\chi^2$ | | | ( 1.59%) | [ 0.66] |
| **Panel D** | | | | |
| ($a$) 9 or fewer | 545 | 1,368 | -3.79% | -3.19% |
| ($b$) 10 or more | 83 | 2,048 | 0.19% | -0.79% |
| ($b-a$) Difference | | | 3.98%$^{***}$ | 2.40%$^{*}$ |
| Standard error / Pearson $\chi^2$ | | | ( 1.43%) | [ 2.36] |
| **Panel E** | | | | |
| ($a$) 19 or fewer | 594 | 2,011 | -3.05% | -2.42% |
| ($b$) 20 or more | 34 | 1,405 | 0.94% | -0.73% |
| ($b-a$) Difference | | | 3.99%$^{***}$ | 1.69% |
| Standard error / Pearson $\chi^2$ | | | ( 1.40%) | [ 1.32] |

**Table I.3: Hedge fund engagement take-up and busyness.**
This table shows estimates of linear probability panel regressions of the initiation of a new campaign by an activist hedge fund on a given month on the fund's filing experience and the buy-and-hold returns achieved in its previous completed campaigns. Standard errors are shown inside parentheses under each estimated coefficient. Estimates followed by $***, **$, or $*$ are significantly different from 0 with 0.99, 0.95 or 0.90 confidence. Data include all the Schedule 13D filings with the SEC by Activist Hedge Funds March of 1994 and December of 2016, compiled by Brav et al. (2021). Daily target firm's share price are from CRSP. The dependent variable equals one every month in which the fund starts a new activist campaign, or zero otherwise. For columns 1 to 3, the time series for each fund starts on the month after its first Schedule 13D filing and ends on the earliest date between one year after the last recorded exit or the end of the sample period. For columns 4 to 6, the time series starts on the month after the fund has completed its first engagement. Experience is a count of the number of filings until the month prior to each observation. Average Campaign returns is the average buy-and-hold return on the target firm's stock from 30 days prior to the 13D filing date to the engagement's exit date for all exited engagements before the given month. Columns 1 and 4 report estimates based on pooled regressions. Columns 2 and 5 report a between funds estimator and columns 3 and 6 a within fund estimator. All regressions include calendar month fixed effects.

| Dependent variable: 1 if start new campaign, 0 otherwise | | | | | | |
|---|---|---|---|---|---|---|
| Estimator: | Pooled | Between | Within | Pooled | Between | Within |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| **Panel A:** Months in which the fund is engaged in other activist campaigns | | | | | | |
| Experience | 0.003*** | 0.006*** | -0.001*** | 0.003*** | 0.006*** | -0.002*** |
| | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) |
| Average Campaign returns | | | | 0.024*** | 0.004 | 0.075*** |
| | | | | (0.008) | (0.004) | (0.015) |
| Constant | 0.055*** | 0.062 | 0.090*** | 0.063*** | 0.01 | 0.107*** |
| | (0.006) | (0.041) | (0.006) | (0.007) | (0.009) | (0.008) |
| N | 24,728 | 24,728 | 24,728 | 17,140 | 17,140 | 17,140 |
| $R^2$ | 0.037 | 0.561 | 0.004 | 0.040 | 0.526 | 0.007 |
| **Panel B:** Months in which the fund has no other active engagements | | | | | | |
| Experience | 0.000*** | 0.001*** | -0.004*** | 0.000*** | 0.001*** | -0.004*** |
| | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) |
| Average Campaign returns | | | | 0.008** | 0.006* | 0.025*** |
| | | | | (0.003) | (0.003) | (0.009) |
| Constant | 0.031*** | 0.002 | 0.050*** | 0.030*** | -0.018 | 0.048*** |
| | (0.004) | (0.050) | (0.004) | (0.004) | (0.050) | (0.004) |
| N | 21,676 | 21,676 | 21,676 | 20,789 | 20,789 | 20,789 |
| $R^2$ | 0.001 | 0.076 | 0.006 | 0.001 | 0.086 | 0.006 |