Supplemental Appendixes for

Managed Distribution Policies in Closed-End Funds and Shareholder Activism

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Online Appendix A: Model Details

Here we present a more detailed version of the stylized though formal model from the text, intended to capture the contest for control of the capital (net assets) in a closed-end funds and whose aim is to provide empirical predictions.

A.1 *Preliminaries*

The closed-end fund (CEF) owns an asset whose date-t market value (net asset value or NAV) is C_t and which provides a continuous dividend stream $\Delta\times C_t$. All market valuations are performed on a risk-adjusted basis and interest rates are normalized to zero.[1] For capital-markets to be in equilibrium, it must be that the asset depreciates at a rate of Δ per unit time (i.e., $C_{t+\tau} = C_t\, e^{-\tau\Delta}$) so that

$$C_t = \text{PV(dividends)} = \int \Delta\times C_{t+\tau}\ d\tau = \Delta\times C_t \int e^{-\tau\Delta}\ d\tau\,. \qquad (1)$$

By law, the dividend Δ must be distributed to shareholders by the CEF, net of any fees. Consider now a CEF with the following attributes: Shareholders receive an additional liquidating dividend of $\delta \geq 0$, the manager has the ability to enhance the asset's growth by an additional rate of $\alpha \leq \Delta$, and the manager charges a fee of k times the NAV (i.e., $k \times C_t$). The variable, $\Delta+\delta$, can be viewed as a managed distribution policy (MDP). If these conditions are maintained in perpetuity, the total value of the asset, including the contribution of active management and without deducting fees, is

$$V_t = \text{PV(dividends)} = \int (\Delta+\delta)C_{t+\tau}\ d\tau = C_t \times (\Delta+\delta)/(\Delta-\alpha+\delta). \qquad (2)$$

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[1] These assumptions allow us to abstract from asset performance uncertainty which is not particularly germane to the points we wish to make.

Through the stream of fees, the manager effectively owns a share of V_t. Assuming that these policies are constant through time and there is no threat of liquidation, the market value of the manager's share is

$$M_t = \int kC_{t+\tau}\ d\tau = kC_t \int e^{-\tau(\Delta-\alpha+\delta)}\ d\tau = C_t \times k/(\Delta-\alpha+\delta), \tag{3}$$

so the shareholders' value is

$$P_t = V_t - M_t = C_t \times (\Delta-k+\delta)/(\Delta-\alpha+\delta). \tag{4}$$

Consequently, the CEF premium is given by

$$prem_t = P_t / C_t - 1 = (\alpha-k)/(\Delta-\alpha+\delta). \tag{5}$$

If $k - \alpha > 0$ then a permanent increase in δ will lead to an increase in P_t and in the premium, as well as a decrease in M_t. Thus, whenever the CEF is at a discount, a liquidating dividend can serve as a method of transferring ownership from the fund manager to the shareholders, thereby shrinking the discount. This simple comparative static illustrates the wealth transfer induced by an MDP.[2] What the simple calculation does not answer is why a manager of a CEF would agree to a wealth transfer via an MDP, and how the market's anticipation of such an event affects the price of the CEF before the MDP is adopted. We turn to address these questions.

A.2 *Modeling Shareholder Activism*

Suppose that $k - \alpha > 0$, meaning that in the absence of a policy change, the fund would trade at a discount according to Eq. (5).[3] We are now going to consider the possibility of shareholder action: Forced liquidation by an activist shareholder, together with the possibility of a response by management via a change in the liquidating dividend. For tractability, we'll

[2] Pontiff (2006) notes that dividends reduce the duration of an asset, thus reducing the holding costs for a potential arbitrageur. In our setting, the same effect is at work in reducing the value of the manager's position.

[3] Because they IPO at a premium, from the point of view of investors, it must be that $k - \alpha_t < 0$ for an IPO taking place at date t. Here, we only consider funds that are seasoned, so that the value contributed by the management has settled to some kind of a steady state, α, which is assumed to be below the fees charged.

assume the following timeline: there are five key dates, denoted by t = 0,1,2,3, and 4. While we continue to assume that dividends and fees are paid continuously, for the sake of analytic tractability, we assume that no payoffs are made between dates 0 and 4 (and that this is reflected in the NAV of the underlying asset). This is tantamount to assuming that the flow of payoffs from the asset under management between the date of a preemptive MDP announcement and a proxy battle is small relative to the total asset value.

***t* = 0:** The CEF management inherits a fund with parameters k, Δ, and α. It can then change δ (the baseline liquidation policy) such that $\delta_0 \geq 0$. The CEF's market value is set to reflect the subsequent possibility of a hostile attempt to liquidate the fund or force the management to change its policies.[4]

***t* = 1 assumptions:** A single activist can decide to pay $\chi_1 \times C_1$ to initiate an attack and acquire γ shares of the fund, up to a limit of $\bar{\gamma} \leq 1$. The proportional cost, $\chi_1 \in [0, \bar{\chi}_1]$, is distributed uniformly and revealed to the activist at date 1 prior to deciding whether or not to initiate an attack; χ_1 represents the cost of information acquisition, opportunity costs, and setting up the minimal necessary infrastructure in preparation for a decision on whether to initiate a proxy fight.[5]

***t* = 2 assumptions:** The manager can react to the attack (should it take place) by selecting a liquidation dividend, δ_2, to maximize the value of his or her contingent cash flows.[6] If an attack

[4] The requirement that $\delta_0 \geq 0$ follows from the fact that δ is a liquidating dividend and that, by law, the fund cannot retain payouts or realized capital gains from its underlying assets.
[5] We assume that the probability of initiating an attack is one-half if the NPV of doing so is zero.
[6] One can also consider a lump-sum liquidation of the fund or a decrease in the management fee. If α is sufficiently small and the manager discounts his undiversfiable CEF cash flows at a rate sufficiently greater than the market rate of 0, then one can show that the manager will find it optimal to transfer value to shareholders exclusively via a flow of liquidation dividend (i.e., δ>0). The intuition is as follows: If the manager discounts cash flow at a rate higher than the market, then he or she will always prefer to transfer to shareholders a long- rather than a short-duration cash

does not take place, then the CEF policies determined at date 0 are made permanent and no further attack can take place.

***t* = 3 assumptions:** The activist decides whether to proceed with a proxy fight. Initiating a proxy fight entails an expenditure of $\chi_3 C_3$ where C_3 is the value of the asset at date-3, and $\chi_3 \in [0, \bar{\chi}_3]$ is revealed to the attacker at date-3 prior to determining whether or not to initiate a proxy fight. From the point of view of dates earlier than date-3, $\tilde{\chi}_3$ is distributed uniformly. If the attacker backs down, the fund continues indefinitely under the policies determined at date-2.

***t* = 4 assumptions:** The shareholders vote to liquidate the fund (if a proxy fight was initiated at date-3) and receive a liquidating dividend of $\left(1-\tilde{F}\right)C_4$, where C_4 is the value of the asset at date-4, or continue with the fund indefinitely under the policies adopted by the management at date-2. The liquidation cost, F is known to the shareholders prior to voting, but it is uniformly distributed on $[0, \bar{F}]$ (with $\bar{F} \leq 1$) from the point of view of dates prior to date-4. We make the following assumptions about the parameters:

$$\frac{\bar{\chi}_3}{\bar{\gamma}} < \bar{F} < \frac{2\bar{\chi}_3}{\bar{\gamma}}. \qquad (6)$$

This set of inequalities ensures that the probabilities of initiating a proxy fight and the subsequent probability of liquidation are interior.

While the model is not fully dynamic, in that we only budget for a single opportunity at activism, our sense is that the economic tradeoffs can be equally well illustrated in our simpler

flow, when the two flows have the same present value. Thus, when transferring wealth to shareholders, the manager prefers a liquidating dividend to a lump-sum payment or to a cut in fees (assuming all three transfer the same value from the manager to shareholders). When α is large, this intuition breaks down because a liquidating dividend is more inefficient than a fee reduction, as it both shifts ownership *and* reduces the overall value the manager brings to the asset through active management. CEFs do not exhibit a change in management fee subsequent to the adoption of an MDP, nor are they prone to unforced large-scale redemption of capital. Thus, by electing to only model the transfer of value through a liquidation dividend we are not sacrificing a great deal of realism.

setting. We solve the model via backward induction. We summarize the results below, leaving the detailed derivation and proofs to an online Appendix.

***t* = 4:** Using the expression for P_t in (4), with the policy δ_2, the shareholders liquidate the fund if and only if the proceeds from liquidation exceed the continuation value of the fund; i.e., if and only if $1 - F \geq \frac{\Delta - k + \delta_2}{\Delta - \alpha + \delta_2}$, where δ_2 is determined at date 2. Notice that shareholders will never liquidate a fund unless $k > \alpha$, which is assumed. Moreover, liquidation takes place if and only if the realized cost is less than the CEF discount, $\frac{k - \alpha}{\Delta - \alpha + \delta_2}$ (assuming the CEF is continued). Thus, the probability of liquidation before F is revealed is

$$P_\ell(\delta_2) = \left[\frac{1}{\bar{F}}\left(\frac{k - \alpha}{\Delta - \alpha + \delta_2}\right), 1\right]^{-}. \quad (7)$$

Where $[a, b]^{-}$ is the smaller of a and b. If the discount is higher than $\bar{F}$ then liquidation takes place for certain. Because $k > \alpha$, there is no finite value of δ_2 that can rule out liquidation in case of a shareholder vote.

***t* = 3:** The activist will proceed with a proxy fight if the present value of such a fight, as calculated by the activist, is higher than the present value of accepting the policies adopted by the manager at date-2. A proxy fight will therefore take place if and only if

$$\gamma P_\ell(\delta_2) \times E[\text{proceeds from liquidation}|\text{the fund is liquidated}] +$$
$$\gamma\big(1 - P_\ell(\delta_2)\big) \times \text{CEF continuation value} - \chi_3 C_3 > \gamma \times \text{CEF continuation value},$$

Where C_3 is the date-3 NAV. The first term on the left side of the inequality is the benefit to the activist from liquidation, weighed by the probability that shareholders vote for liquidation; the second term is the weighted benefit in case of a failed vote. The third term is the activist's cost of proceeding with a proxy battle. The right side of the inequality is the benefit to the activist from taking no action. Conditional on liquidation, the liquidation cost is distributed uniformly between

0 and $\frac{k-\alpha}{\Delta-\alpha+\delta_2}$, with an expected value of $\frac{1}{2}\frac{k-\alpha}{\Delta-\alpha+\delta_2}$. Thus, the expected proceeds from liquidation, conditional on liquidation, are given by $\left(1-\frac{1}{2}\frac{k-\alpha}{\Delta-\alpha+\delta_2}\right)C_3$. Plugging in, a proxy fight will take place if and only if,

$$\frac{\gamma}{2}P_\ell(\delta_2)\left(\frac{k-\alpha}{\Delta-\alpha+\delta_2}\right) > \chi_3. \tag{8}$$

If $\overline{\chi}_3$ is sufficiently low, a proxy fight will take place for sure. Moreover, because $P_\ell(\delta_2) > 0$ and $k > \alpha$, there is no finite δ_2 that rules out a proxy fight. We note that the inequality in (8) can be recast in terms of the discount of the fund, should it be allowed to continue without a contest, as $\gamma P_\ell(\delta_2)Disc > 2\chi_3$. I.e., an attack takes place if the future discount and probability of liquidation are sufficiently high. Both of these quantities, however, are endogenous and determined by the management's choice of δ_2. Before χ_3 is revealed, the probability of a proxy fight can be calculated from (8) as

$$P_{\wp}(\delta_2) = \left[\frac{\gamma}{2\overline{\chi}_3}P_\ell(\delta_2)\left(\frac{k-\alpha}{\Delta-\alpha+\delta_2}\right), 1\right]^{-}. \tag{9}$$

The second inequality in (6) implies that the likelihood of drawing a high χ_3 (cost of initiating a proxy fight) is high enough to guarantee that $P_{\wp}(\delta_2) \le P_\ell(\delta_2)$.

<u>t = 2:</u> The manager sets δ_2 by maximizing the value of his cash flows as follows

$$\max_{\delta\ge 0}\left\{\frac{k}{\Delta-\alpha+\delta}\left[1-P_{\wp}(\delta)P_\ell(\delta)\right]\right\}. \tag{10}$$

The term in the square bracket equals the probability of not having the fund liquidated (one less the probability of a proxy battle *and* subsequent liquidation). The total payoffs to the manager in the event of liquidation is zero because we assume no payoffs are made until date 4.

Proposition 1: At the optimum, $P_\ell(\delta_2), P_{\wp}(\delta_2) < 1$. Let $\xi(\gamma) \equiv \left(\frac{\bar{\chi}_3 \bar{F}^2}{2\gamma}\right)^{1/3}$ and $\eta(\gamma) \equiv \frac{k-\alpha}{\Delta-\alpha}\frac{1}{\xi(\gamma)}$.

Then

$$\delta_2 = [(\eta(\gamma) - 1)(\Delta - \alpha), 0]^+, \quad (11)$$

where $[a, b]^+$ is the larger of a and b. If $\eta(\gamma) \geq 1$ then $P_{\wp}(\delta_2)P_\ell(\delta_2) = \frac{1}{4}$. Finally, the CEF discount at date 2 is

$$D_2 = \begin{cases} \xi(\gamma)\eta(\gamma)\left(1 - \frac{1}{8}\eta(\gamma)^3\right) & \text{if } \eta(\gamma) \leq 1 \\ \frac{7}{8}\xi(\gamma) & \text{otherwise.} \end{cases} \quad (12)$$

The parameter η is a measure of the strength of the MDP response to an activist's attack; from the activist's point of view, it measures the benefit of liquidation relative to the cost of a proxy fight. The parameter $\xi(\gamma)$ is a measure of the costly frictions preventing liquidation, and is therefore related to the discount subsequent to an optimal MDP response. The optimal MDP response to an initial attack is increasing in k-α and the holdings of the attacker (i.e., γ), while it is decreasing in the costs of initiating a proxy fight, in the cost of liquidation, and in the mandatory level of dividends, Δ.[7] Eq. (12) can be interpreted to say that the management reduces the discount to the point where it is in line with the liquidation frictions ($\xi(\gamma)$ can be viewed as proportional to a harmonic mean of $\bar{\chi}_3$ and $\bar{F}$, the frictions preventing liquidation). One can also see that, given an interior solution for the MDP (i.e., $\eta \geq 1$), the discount is *not* a function of the managerial expenses (i.e., k), asset payoffs (i.e., Δ), or managerial ability – this is because, as is evident from (11), the optimal MDP acts to offset the negative impact of k on shareholders and the positive impacts of Δ and α. We refer to $\bar{\xi}$ and $\bar{\eta}$ whenever $\gamma = \bar{\gamma}$.

[7] Johnson et al. (2006) found no instance of MDPs in the bond funds they examined. The large values of $\bar{F}$ and Δ in bond CEFs (see Cherkes et al. (2009)) may explain the relative absence of MDPs in this category of funds.

***t* = 1:** The prospective attacker anticipates the manager's reaction (i.e., δ_2), and decides whether to pay χ_1 and initiate an attack by acquiring γ shares. Assuming shares are acquired, γ can be between 0 and $\bar{\gamma}$, the maximum ownership allowed before the SEC requires disclosure of intent (e.g., 5%). The activist maximizes the following objective function:

$$A_1(\gamma) = \gamma P_{\wp}(\delta_2) P_{\ell}(\delta_2) \times E[\text{proceeds from liquidation} \mid \text{the fund is liquidated}] +$$

$$\gamma\left(1 - P_{\wp}(\delta_2) P_{\ell}(\delta_2)\right) \times \text{CEF continuation value} - \chi_1 C_1 - \frac{P_{\wp}(\delta_2)^2 \bar{\chi}_3}{2} C_1 - \gamma P_1.$$

P_1 is the price of a share bought, while C_1 is the NAV per share at date-1. The price is 'pre-attack', reflecting the fact that the activist's 'attack' is not observed prior to the purchase of shares, and thus the value of the CEF doesn't reflect that an attack has occurred until *after* the shares are purchased (i.e., at date 2).[8] The expected cost of a proxy-battle being initiated at date-3 is $\frac{P_{\wp}(\delta^*)^2 \bar{\chi}_3}{2}$ (the probability of a proxy-battle being initiated times the expected cost conditional on initiation). Using (11), one can write $A_1(\gamma)$ as,

$$A_1(\gamma) = \begin{cases} \left(\gamma\left(1 - \frac{P_1}{C_1}\right) - \chi_1 - \frac{15\gamma}{16}\xi(\gamma)\right) C_1 & \text{if } \delta_2 = \delta^* \\ \left(\gamma\left(1 - \frac{P_1}{C_1}\right) - \chi_1 - \xi(\gamma)\eta(\gamma)\left(1 - \frac{1}{16}\eta(\gamma)^3\right)\right) C_1 & \text{if } \delta_2 = 0 \end{cases}. \tag{13}$$

In either case, $A_1(\gamma)$ is convex in γ, meaning that its maximum in $[0, \bar{\gamma}]$ is at a corner. Setting $\bar{\xi} \equiv \left(\frac{\bar{\chi}_3 \bar{F}^2}{2\bar{\gamma}}\right)^{1/3}$ and $\bar{\eta} \equiv \frac{k-\alpha}{\Delta-\alpha}\frac{1}{\bar{\xi}}$:

$$\gamma^* = \begin{cases} \bar{\gamma}, & \text{if } \bar{\eta} \le 1 \text{ and } \bar{\gamma}\left(1 - \frac{P_1}{C_1}\right) - \bar{\gamma}\bar{\xi}\bar{\eta}\left(1 - \frac{1}{16}\bar{\eta}^3\right) > \chi_1, \\ \bar{\gamma}, & \text{if } \bar{\eta} \ge 1 \text{ and } \bar{\gamma}\left(1 - \frac{P_1}{C_1}\right) - \frac{15\bar{\gamma}}{16}\bar{\xi} > \chi_1, \\ 0, & \text{otherwise.} \end{cases} \tag{14}$$

[8] Naturally, the P_1 incorporates the market's anticipation of a possible attack. This is analyzed in the $t = 0$ case.

One can now revisit Eq. (11) of Proposition 1 and substitute $\bar{\gamma}$ for γ in the various expressions.

Corollary to Proposition 1:

$$\delta_2 = [(\bar{\eta} - 1)(\Delta - \alpha), 0]^+, \tag{15}$$

and the CEF discount at date 2 is

$$D_2 = \begin{cases} \bar{\xi}\bar{\eta}\left(1 - \frac{1}{8}\bar{\eta}^3\right) & \text{if } \bar{\eta} \leq 1 \\ \frac{7}{8}\bar{\xi} & \text{otherwise.} \end{cases} \tag{16}$$

In examining (14), it is important to note that if P_1 is sufficiently high, the activist will not initiate an 'attack' even if $\chi_1 = 0$. This is a crucial difference from the activist's date-3 decision which always depends on the realized cost of a proxy battle. If $\chi_3 = 0$ at date-3 then initiating a proxy battle is a free valuable option for the activist, and a proxy battle will take place. On the other hand, if $\chi_1 = 0$ at date-1, then initiating an attack is not costless *in expectations* as long as $\bar{\chi}_3 > 0$. In particular, because market participants free-ride on the activist who pays the future costs of a proxy battle, and this is reflected in P_1, the manager can set an initial MDP policy to rule out an attack. Next, we analyze this in greater detail.

***t* = 0:** Let $P_a(\delta_0)$ be the probability that an activist will acquire shares at date 1. The manager's objective function, as a function of the liquidation policy, δ_0, is given by:

$$M_0(\delta_0) = \frac{k\big(1 - P_a(\delta_0)\big)}{\Delta - \alpha + \delta_0} + \frac{kP_a(\delta_0)\left(1 - P_{\wp}(\delta_2)P_{\ell}(\delta_2)\right)}{\Delta - \alpha + \delta_2}$$

If there is no attack at date-1, the manager's capitalized fees are given by the first term. If there is an attack, then the manager's value function corresponds to the expression in (10). The following result describes the optimal policy at date-0.

Proposition 2: Let $\bar{\kappa} \equiv \frac{8\bar{\chi}_1}{\bar{\gamma}\bar{\xi}}$. The optimal liquidation dividend policy is given by

$$\delta_0 = \begin{cases} \frac{\bar{\eta}^3}{16-\bar{\eta}^3}(\Delta - \alpha) & \text{if } \bar{\eta} \leq 1 \text{ and } \bar{\kappa} \leq \bar{\eta}^4 \\ \left(\frac{16}{15}\bar{\eta} - 1\right)(\Delta - \alpha) & \text{if } \bar{\eta} \geq 1 \text{ and } \bar{\kappa} \leq 1 \\ 0 & \text{otherwise.} \end{cases} \tag{17}$$

The subsequent probability of attack is

$$P_a(\delta_0) = \begin{cases} \frac{1}{2}\frac{\bar{\eta}^4}{\bar{\kappa} + \bar{\eta}^4} & \text{if } \delta_0 = 0 \text{ and } \bar{\eta} \leq 1 \\ \frac{1}{2}\frac{(16\bar{\eta} - 15)}{\bar{\kappa} + (8\bar{\eta} - 7)} & \text{if } \delta_0 = 0 \text{ and } \bar{\eta} \geq 1 \\ 0 & \text{otherwise.} \end{cases} \tag{18}$$

Thus, if $\delta_0 > 0$ then $P_a(\delta_0) = 0$ (i.e., preemption at date zero is decisive in the sense that it eliminates the possibility of a future attack). Finally, the date-0 discount is given by

$$D_0 = \begin{cases} D_2 + \frac{\bar{\eta}^4\bar{\xi}}{8}\left(1 - P_a(0)\right) & \text{if } \delta_0 = 0 \text{ and } \bar{\eta} \leq 1 \\ \bar{\xi}\bar{\eta}\left(1 - \frac{1}{16}\bar{\eta}^3\right) & \text{if } \delta_0 > 0 \text{ and } \bar{\eta} \leq 1 \\ D_2 + \bar{\xi}(\bar{\eta} - \frac{7}{8})\left(1 - P_a(0)\right) & \text{if } \delta_0 = 0 \text{ and } \bar{\eta} \geq 1 \\ \frac{15\bar{\xi}}{16} & \text{if } \delta_0 > 0 \text{ and } \bar{\eta} \geq 1 \end{cases} \tag{19}$$

The quantity $\bar{\kappa}$ measures the costs of initiating an attack relative to the future costs of a proxy battle and eventual liquidation. If it is low, then according to Eqs. (17) and (18), the manager will select a *preemptive* liquidation dividend that will ward off any future attack. On the other hand, if $\bar{\kappa}$ is not low, the manager will choose to distribute the minimum amount of payouts (i.e., $\delta_0 = 0$).[9] In the latter case, the probability of a date-1 attack by an activist is strictly positive but also strictly less than one. The reason that the probability of attack must be strictly

[9] Managers will not adopt a preemptive MDP in the case of a high cost of attack alongside low costs of a proxy battle and eventual liquidation. This is because the manager, given the high costs of attack, will prefer to adopt the MDP after an attack is initiated.

less than one is that the market prices it in, thus making it less profitable for the activist to attack in the first place. This feedback also plays an important role in Edmans, Goldstein, and Jiang (2011).

If an attack is precluded by a preemptive MDP (i.e., if $\delta_0 = 0$), then the discount is permanently set at the level indicated by Eq. (19). If an attack is possible, then the date-0 discount is strictly higher than the date-2 discount. Thus, an attack will be followed by a decline in the discount even if the management does not adopt an MDP. Figure 1A in the text summarizes the overall MDP strategy and its impact on the discount, probability of attack, and subsequent probability of a proxy battle and liquidation.

A.3 Proofs

Proof of Proposition 1 It should be clear that the manager will set δ_2 so that $P_\ell(\delta_2)P_{\wp}(\delta_2) < 1$. One need therefore consider the case in which $P_{\wp}(\delta_2) < P_\ell(\delta_2) = 1$ and the case $P_{\wp}(\delta_2) \leq P_\ell(\delta_2) < 1$. As δ_2 increases, it passes from the former region into the latter. In the first case, the manager optimizes

$$\max_{\delta \geq 0} \left\{ \frac{k}{\Delta - \alpha + \delta} \left[1 - \frac{\gamma}{2\bar{\chi}_3} \frac{k - \alpha}{\Delta - \alpha + \delta} \right] \right\}, \tag{20}$$

for which the solution to the first order condition is $\check{\delta} = (k - \alpha)\frac{\gamma}{\bar{\chi}_3} - (\Delta - \alpha)$, meaning that the probability of liquidation is $P_\ell(\check{\delta}) = \frac{\bar{\chi}_3}{\gamma \bar{F}} < 1$, by (6). Thus the optimum in the first case must be a corner solution: the largest $\hat{\delta}$ for which $P_{\wp}(\hat{\delta}) = 1$, and corresponding to $\hat{\delta} = (k - \alpha)\left(\frac{\gamma}{2\bar{\chi}_3 \bar{F}}\right)^{1/2} - (\Delta - \alpha)$. In the second case, the manager optimizes

$$\max_{\hat{\delta}\leq\delta}\left\{\frac{k}{\Delta-\alpha+\delta}\left[1-\frac{\gamma}{2\bar{\chi}_3\bar{F}^2}\left(\frac{k-\alpha}{\Delta-\alpha+\delta}\right)^3\right]\right\}, \tag{21}$$

and the maximand is given by δ^* in Eq. (11). Because $\hat{\delta}$ is attainable in (21), δ^* is the optimum and both $P_\ell(\delta_2)$ and $P_{\wp}(\delta_2)$ are interior at the optimum.

The value of the CEF (i.e., P_2), per unit of NAV (i.e., C_2), is given by

$$\frac{P_2}{C_2}=\left(1-P_\ell(\delta_2)P_{\wp}(\delta_2)\right)\frac{\Delta-k+\delta_2^*}{\Delta-\alpha+\delta_2^*}+\frac{P_\ell(\delta_2)P_{\wp}(\delta_2)}{2}\left[1+\frac{\Delta-k+\delta_2^*}{\Delta-\alpha+\delta_2^*}\right], \tag{22}$$

where the first term corresponds to the continuation value of the CEF in case of no eventual liquidation, and the second term is the contribution from possible liquidation. Plugging in the value for δ_2^* from Eq. (11), one obtains the desired result for the discount, $1-\frac{P_2}{C_2}$.

■

Proof of Proposition 2: The manager optimizes his objective function:

$$\max_{\delta_0\geq 0}\left\{\frac{k\left(1-P_a(\delta_0)\right)}{\Delta-\alpha+\delta_0}+\frac{kP_a(\delta_0)\left(1-P_{\wp}(\delta_2)P_\ell(\delta_2)\right)}{\Delta-\alpha+\delta_2}\right\}, \tag{23}$$

Where the $P_a(\delta_0)$ is the probability of an initiated attack at date-1. $P_a(\delta_0)$ solves

$$P_a(\delta_0) = \begin{cases} \left[\left(\frac{\bar{\gamma}}{\bar{\chi}_1}\left(1-\frac{P_1}{C_1}\right)-\frac{15\bar{\gamma}^{2/3}}{16\bar{\chi}_1}\left(\frac{\bar{\chi}_3\bar{F}^2}{2}\right)^{1/3}\right)^+,1\right]^- & \text{if } \delta_2=\delta^* \\ \left[\left(\frac{\bar{\gamma}}{\bar{\chi}_1}\left(1-\frac{P_1}{C_1}\right)-\frac{\bar{\gamma}}{\bar{\chi}_1}\frac{k-\alpha}{\Delta-\alpha}\left(1-\frac{\bar{\gamma}}{8\bar{F}^2\bar{\chi}_3}\left(\frac{k-\alpha}{\Delta-\alpha}\right)^3\right)\right)^+,1\right]^- & \text{if } \delta_2=0 \end{cases} \tag{24}$$

where $(a)^{+}$ is zero if $a < 0$ and a otherwise. The date-1 CEF price is set by the market's anticipation of an attack to

$$\frac{P_1}{C_1} = \left(1 - P_a(\delta_0)\right)\frac{\Delta - k + \delta_0}{\Delta - \alpha + \delta_0} + P_a(\delta_0)\left(1 - \frac{k - \alpha}{\Delta - \alpha + \delta_2}\left(1 - \frac{P_{\wp}(\delta_2)P_{\ell}(\delta_2)}{2}\right)\right) \tag{25}$$

The first term is the payoff if there is no attack, while the second is the expected payoff conditional on an attack (and includes the expected payoff from liquidation). So the date-1 CEF discount (prior to an attack) reflects the possibility of a sequence of attacks, as well as the continuation value of the fund. Let $Q_0 = \Delta - \alpha + \delta_0$. Because $P_{\wp}(\delta_2)$ and $P_{\ell}(\delta_2)$ are interior, one can use Proposition 1 to rewrite this as follows,

$$\frac{P_1}{C_1} = \begin{cases} 1 - P_a(\delta_0)\frac{7}{8}\left(\frac{\bar{\chi}_3\bar{F}^2}{2\bar{\gamma}}\right)^{1/3} - \left(1 - P_a(\delta_0)\right)\frac{k-\alpha}{Q_0} & \text{if } \delta_2 = \delta^* \\ 1 - P_a(\delta_0)\frac{k-\alpha}{\Delta-\alpha}\left(1 - \frac{\bar{\gamma}}{4\bar{F}^2\bar{\chi}_3}\left(\frac{k-\alpha}{\Delta-\alpha}\right)^3\right) - \left(1 - P_a(\delta_0)\right)\frac{k-\alpha}{Q_0} & \text{if } \delta_2 = 0 \end{cases}. \tag{26}$$

It's straight forward to check that $P_a(\delta_0) = 1$ is not a consistent solution, because by plugging that into Eq. (26) and substituting the results back into (24) one obtains a negative probability for $P_a(\delta_0)$. After some algebra, one can combine Eqs. (26) and (24) to solve for $P_a(\delta_0)$:

$$P_a(\delta_0) = \begin{cases} \dfrac{\frac{\bar{\gamma}}{\bar{\chi}_1}\left(\frac{k-\alpha}{Q_0} - \frac{15}{16}\left(\frac{\bar{\chi}_3\bar{F}^2}{2\bar{\gamma}}\right)^{1/3}\right)^{+}}{1 + \frac{\bar{\gamma}}{\bar{\chi}_1}\left(\frac{k-\alpha}{Q_0} - \frac{7}{8}\left(\frac{\bar{\chi}_3\bar{F}^2}{2\bar{\gamma}}\right)^{1/3}\right)^{+}} & \text{if } \delta_2 = \delta^* \\ \dfrac{\frac{\bar{\gamma}}{\bar{\chi}_1}\left(\frac{k-\alpha}{Q_0} - \frac{k-\alpha}{\Delta-\alpha}\left(1 - \frac{\bar{\gamma}}{8\bar{F}^2\bar{\chi}_3}\left(\frac{k-\alpha}{\Delta-\alpha}\right)^3\right)\right)^{+}}{1 + \frac{\bar{\gamma}}{\bar{\chi}_1}\left(\frac{k-\alpha}{Q_0} - \frac{k-\alpha}{\Delta-\alpha}\left(1 - \frac{\bar{\gamma}}{4\bar{F}^2\bar{\chi}_3}\left(\frac{k-\alpha}{\Delta-\alpha}\right)^3\right)\right)^{+}} & \text{if } \delta_2 = 0 \end{cases}. \tag{27}$$

If $P_a(\delta_0) = 0$ then the manager's objective function is monotonically decreasing in δ_0. If $P_a(\delta_0) > 0$, then in each case in Eq. (27) the manager's objective function can be written in the form $\frac{a+bQ_0}{c+dQ_0}$ which is also monotonic in δ_0 and admits only corner solutions. The corners are determined by the smallest δ_0 such that $P_a(\delta_0) = 0$ and by $\delta_0 = 0$. In the former case, to completely rule out an attack, the manager has to consider the activist's calculation in Eq. (14) and set the dividend policy so that

$$\begin{aligned} \left(1 - \frac{P_1}{C_1}\right) &= \frac{15}{16}\left(\frac{\bar{\chi}_3 \bar{F}^2}{2\bar{\gamma}}\right)^{1/3} & \text{if } \delta_2 = \delta^* \\ \left(1 - \frac{P_1}{C_1}\right) &= \frac{k-\alpha}{\Delta-\alpha}\left(1 - \frac{\bar{\gamma}}{8\bar{F}^2\bar{\chi}_3}\left(\frac{k-\alpha}{\Delta-\alpha}\right)^3\right) & \text{if } \delta_2 = 0 \end{aligned}.$$

If an attack has been completely ruled out, then $\frac{P_1}{C_1} = \frac{\Delta-k+\delta_0}{\Delta-\alpha+\delta_0}$, giving $\delta_0 = \delta_0^c$ where

$$\delta_0^c = \begin{cases} \left(\frac{16}{15}(k-\alpha)\left(\frac{2\bar{\gamma}}{\bar{\chi}_3\bar{F}^2}\right)^{1/3} - (\Delta-\alpha)\right)^+ & \text{if } \delta_2 = \delta^* \\ \left(\frac{1}{\left(1-\frac{\bar{\gamma}}{8\bar{F}^2\bar{\chi}_3}\left(\frac{k-\alpha}{\Delta-\alpha}\right)^3\right)} - 1\right)(\Delta-\alpha) & \text{if } \delta_2 = 0 \end{cases}. \quad (28)$$

To see which solution dominates, consider the manager's objective function, $M_0(\delta_0)$, at the two corners:

$$M_0(\delta_0^c) = \begin{cases} \frac{15}{16}\frac{k}{k-\alpha}\left(\frac{\bar{\chi}_3\bar{F}^2}{2\bar{\gamma}}\right)^{1/3} & \text{if } \delta_2 = \delta^* \\ \frac{k}{\Delta-\alpha}\left(1 - \frac{\bar{\gamma}}{8\bar{F}^2\bar{\chi}_3}\left(\frac{k-\alpha}{\Delta-\alpha}\right)^3\right) & \text{if } \delta_2 = 0 \end{cases}.$$

whereas

$$M_0(0) = \begin{cases} \frac{k}{\Delta - \alpha}\left(1 - P_a(0)\right) + \frac{3}{4} P_a(0) \frac{k}{k - \alpha}\left(\frac{\bar{\chi}_3 \bar{F}^2}{2\bar{\gamma}}\right)^{1/3} & \text{if } \delta_2 = \delta^* \\ \frac{k}{\Delta - \alpha}\left(1 - P_a(0)\right) + \frac{k P_a(0)\left(1 - \frac{\bar{\gamma}}{2\bar{F}^2 \bar{\chi}_3}\left(\frac{k - \alpha}{\Delta - \alpha}\right)^3\right)}{\Delta - \alpha} & \text{if } \delta_2 = 0 \end{cases}.$$

with $P_a(0)$ given by Eq. (27) . Comparing the two managerial policies when $\delta_2 = 0$, one obtains that $M_0(0) > M_0(\delta_0^c)$ if and only if $P_a(0) < \frac{1}{4}$. This, however, is true only when $\bar{\kappa} \leq \bar{\eta}^4$. For the case where an attack will be met by a response (i.e., $\delta_2 = \delta^* > 0$), it is possible that $M_0(0) \lesseqgtr M_0(\delta_0^c)$. The boundary is determined by $\bar{\kappa} \leq 0$. In particular, as $\frac{\bar{\gamma}}{\bar{\chi}_1} \to 0$, the $\delta_0 = 0$ solution prevails. On the other hand, as $\frac{\bar{\gamma}}{\bar{\chi}_1} \to \infty$, the $\delta_0 = \delta_0^c$ solution dominates.

Finally, we note that under the assumption that $\frac{16}{15}(k - \alpha)\left(\frac{2\bar{\gamma}}{\bar{\chi}_3 \bar{F}^2}\right)^{1/3} > (\Delta - \alpha)$, required to ensure $\delta_0^c > 0$, it must be that $\frac{k}{\Delta - \alpha} > \frac{15}{16}\frac{k}{k - \alpha}\left(\frac{\bar{\chi}_3 \bar{F}^2}{2\bar{\gamma}}\right)^{1/3}$ and thus the probability of attack $P_a(0)$ is strictly positive.

■

Online Appendix B: Capital Financing and MDP CEFs

Here, we investigate whether MDP funds are able to raise more investment capital relative to non-MDP funds. We obtain data on capital changes for all funds in our sample from their NSAR filings with the SEC. The NSAR filings separately report the net proceeds from issuance of common stock and the capital expenditure for repurchase of common stock during each fiscal-year period. The issuance of common stock includes new shares issued through the automatic dividend reinvestment program and/or seasoned equity offering (mostly via rights offerings). We calculate the net change in common stock by subtracting share repurchase from share issuance. We also obtain fiscal-year end net assets from NSAR filings and total distribution to common shareholders from annual reports. To facilitate comparison, we normalize all variables by the previous fiscal-year end net assets.

Table A1 compares the net assets growth, distribution yield, and changes in equity capital between MDP funds and non-MDP funds during the 2001 to 2006 period. For each fund, we first compute the annual averages during the sample period. We require each fund to have a minimum of three year data available to be included in the analysis. We then compute the cross-fund averages separately for MDP and non-MDP groups. Finally, we report and test for the mean (median) differences between the two payout groups.

Consistent with our analysis in Table 3 of the paper, the annual growth rate in net assets for MDP funds is on average 5 percentage points lower than that for non-MDP funds (3.49% vs. 8.41%). The difference is statistically significant at the 5 percent level. The annual total distribution is on average 10.59% for MDP funds, compared to 5.66% for non-MDP funds. The 5 percentage points difference (statistically significant at the 1 percent level) confirms that MDP funds distribute significantly more assets than non-MDP funds each year. Can MDP funds offset the higher distribution ratio by raising more investment capital? Consistent with the referee's conjecture, MDP funds on average issue 2.16% more and repurchase 1.34% less common stock than non-MDP funds. Putting together, the net issuance of common stock by MDP funds is on average 3.54% per annum higher than non-MDP funds. All differences are statistically significant at the 5 percent level or better.

The evidence suggests that, although MDP funds tend to issue more common stock than non-MDP funds, the magnitude is not big enough to completely offset the negative impact of higher distribution on net assets. Combining this with the previous finding that MDP funds do not seem to perform worse than non-MDP funds, we believe the relative large decline in asset growth observed for MDP funds is mainly driven by the commitment to a high payout target.

Table A1. Equity Capital Changes: MDP Funds vs. Non-MDP Funds

This table examines the change in equity capital for MDP and non-MDP funds between 2001 and 2006. For each fund, we first calculate the annual averages of net assets growth, total distribution yield, net proceeds from common stock issuance, expenditure for common stock repurchase, and net change in equity capital (stock issuance – stock repurchase). All variables are normalized by previous year-end net assets and measured in percentage. We then average across all funds in each payout group and report the mean and median (in parentheses) statistics. Finally, we report the difference in means (medians) and test for statistical significance. The sample includes 26 MDP funds and 96 non-MDP funds. Statistical significance for the mean (median) tests of 1% and 5% are indicated by **,and * respectively.

	Net Assets Growth	**Distribution Yield**	**Stock Issuance**	**Stock Repurchase**	**Net Equity Change**
MDP	3.495 (1.516)	10.589 (9.964)	2.909 (1.270)	0.107 (0.000)	2.802 (1.143)
Non-MDP	8.407 (5.483)	5.656 (5.089)	0.752 (0.000)	1.444 (0.021)	-0.735 (0.000)
Difference	-4.912* (-3.967)	4.933** (4.875**)	2.157* (1.270**)	-1.337** (-0.021**)	3.537** (1.143**)

Online Appendix C:

Table A2. Management Fees:Preemptive vs. Reactive MDP Funds

This table compares the management fees between MDP funds and non-MDP funds. For MDP funds, we report the mean (median) statistics for the average management fees during the three-year periods before and after the MDP adoption as well as the changes. For each MDP fund, we identify a control group of non-MDP funds that have the same investment objective and compute the mean (median) statistics during the same pre-MDP and post-MDP periods. We report the mean (median) difference between the MDP group and the non-MDP control group as well as the difference-in-difference results around MDP adoption. Panels A and B of the table present management fee statistics for the 16 reactive MDP funds and 21 pre-emptive MDP funds, respectively. Statistical significance for the mean (median) tests of 1% and 5% are indicated by ** and * respectively.

	Pre-MDP	**Post-MDP**	**Change**
Panel A: Reactive MDP Funds			
MDP Funds	1.088 (1.000)	1.080 (1.000)	-0.008 (0.000)
Non-MDP Funds	0.869 (0.872)	0.877 (0.857)	0.008 (-0.013)
Difference	0.219** (0.128**)	0.203** (0.143**)	-0.016 (0.011)
Panel B: Pre-emptive MDP Funds			
MDP Funds	0.868 (0.833)	0.856 (0.800)	-0.012 (0.000)
Non-MDP Funds	0.774 (0.767)	0.785 (0.812)	0.010 (0.006)
Difference	0.094 (0.045)	0.071 (0.008)	-0.023 (0.000)

Online Appendix D:

Table A3. Inception MDPs and Share Illiquidity

This table investigates how various fund characteristics affect MDP adoption at fund inception using Probit regressions. The dependent variable is the event of MDP adoption at fund inception (0=No-MDP at Inception, 1=MDP at Inception). The regressors include various fund characteristics measured in the second year following fund inception: the share illiquidity measured by the average daily Amihud illiquidity ratio of fund shares during the year; the year-end fund TNA, the year-end leverage ratio; the management fee; an indicator variable (Mgt Ownership) that equals one if more than 10% of common shares were beneficially controlled by board members and executive officers; and the accumulated unrealized capital gains as a percentage of year-end TNA. All variables except the indicator variables are standardized by subtracting the mean and scaling by the standard deviation of all funds in any given year. We also control for style fixed effects based on the Wall Street Journal style classification. The Huber/White/Sandwich robust standard errors are calculated. The z-statistics are reported in parentheses. Statistical significance of 1% and 5% are indicated by ** and * respectively.

	Event {1=Inception MDP; 0=No Inception MDP}	
Intercept	-1.132** (-3.34)	-1.051** (-3.01)
Share Illiquidity	-0.288 (-0.84)	-0.698 (-1.19)
TNA		-0.381 (-1.93)
Leverage		0.066 (0.32)
Mgt Fee		-0.459* (-2.49)
Mgt Ownership		1.955 (1.66)
Unrealized Capgain		-0.002 (-0.01)
Style Fixed-Effects	Included	Included
Observations	117	110

Online Appendix E:

Table A4. Bivariate Probit with Institutional Ownership as the Instrument

This table investigates how various fund characteristics affect its MDP adoption and activist attack using bivariate Probit regressions. The dependent variables are the MDP Event (0=No-MDP, 1=MDP) and the Activist Attack (0=No-Attack, 1=Attack). The regressors include: the fund TNA at the end of previous year; the fund age at the end of previous year; an indicator variable (Activist Attack) that equals one if the fund was ever attacked by activist shareholders in the previous three years; the average institutional holdings in the previous year; the share illiquidity measured by the average daily Amihud illiquidity ratio of fund shares in the previous year; the leverage ratio in the previous year; the asset illiquidity measured by the first-order serial correlation of monthly NAV returns in the previous three years; the management fee in the previous year; an indicator variable (Mgt Ownership) that equals one if more than 10% of common shares were beneficially controlled by board members and executive officers in the previous year; the accumulated unrealized capital gains as a percentage of year-end TNA in the previous year; and the four-factor alpha based on the monthly NAV returns in the previous three years. All variables except the indicator variables are standardized by subtracting the mean and scaling by the standard deviation of all funds in any given year. We also control for style fixed effects based on the Wall Street Journal style classification. We report the correlation coefficient (Rho) between the two error terms. The Huber/White/sandwich robust standard errors are calculated. The z-statistics are reported in parentheses. Statistical significance of 1% and 5% are indicated by ** and * respectively.

	All Funds		**Domestic Equity Funds**	
	MDP	**Attack**	**MDP**	**Attack**
Intercept	-2.271*** (-15.13)	-1.236*** (-12.22)	-0.737*** (-5.01)	-1.633*** (-6.51)
TNA	0.043 (0.91)	-0.034 (-0.50)	-0.069 (-0.78)	-0.548*** (-2.80)
Age	-0.048 (-0.65)	-0.053 (-0.68)	0.185 (1.40)	0.406** (2.29)
MDP		-0.347 (-1.18)		-0.986*** (-2.72)
Activist Attack	1.016*** (6.51)	--	1.064*** (4.59)	--
Inst. Holdings	--	0.235*** (4.41)	--	0.035*** (3.73)
Share Illiquidity	--	-0.186 (-1.61)	--	-0.456*** (-2.74)
Leverage	-0.107 (-1.49)	-0.141 (-1.63)	-0.264** (-2.47)	-0.482*** (-3.34)
Asset Illiquidity	-0.135** (-2.27)	-0.148** (-2.49)	-0.121 (-1.34)	-0.312*** (-2.76)
Mgt Fee	0.154*** (2.82)	-0.062 (-0.89)	0.373*** (4.10)	0.276** (2.10)
Mgt Ownership	-0.315 (-1.46)	-0.354 (-1.39)	-1.213*** (-4.72)	-0.506 (-1.28)
Unrealized Capgain	0.043 (0.66)	-0.139** (-2.51)	0.099 (1.03)	-0.151 (-1.14)
Alpha	-0.045 (-0.74)	-0.043 (-0.71)	0.001 (0.01)	-0.192* (-1.87)
Style Fixed-Effects	Included	Included	Included	Included
Rho	0.396** (2.16)		0.167 (0.74)	
Observations	1004		320	

Online Appendix F:

Table A5. Bivariate Probit with At-Inception MDP Funds

This table investigates how various fund characteristics affect its MDP adoption and activist attack using bivariate Probit regressions. The dependent variables are the MDP Event (0=No-MDP, 1=MDP) and the Activist Attack (0=No-Attack, 1=Attack). The regressors include: the fund TNA at the end of previous year; the fund age at the end of previous year; an indicator variable (Activist Attack) that equals one if the fund was ever attacked by activist shareholders in the previous three years; the average institutional holdings in the previous year; the share illiquidity measured by the average daily Amihud illiquidity ratio of fund shares in the previous year; the leverage ratio in the previous year; the asset illiquidity measured by the first-order serial correlation of monthly NAV returns in the previous three years; the management fee in the previous year; an indicator variable (Mgt Ownership) that equals one if more than 10% of common shares were beneficially controlled by board members and executive officers in the previous year; the accumulated unrealized capital gains as a percentage of year-end TNA in the previous year; and the four-factor alpha based on the monthly NAV returns in the previous three years. All variables except the indicator variables are standardized by subtracting the mean and scaling by the standard deviation of all funds in any given year. We also control for style fixed effects based on the Wall Street Journal style classification. We report the correlation coefficient (Rho) between the two error terms. The Huber/White/sandwich robust standard errors are calculated. The z-statistics are reported in parentheses. Statistical significance of 1% and 5% are indicated by** and * respectively.

	All Funds		**Domestic Equity Funds**	
	MDP	**Attack**	**MDP**	**Attack**
Intercept	-1.926*** (-14.88)	-1.055*** (-11.45)	-0.420*** (-3.12)	-1.495*** (-4.88)
TNA	0.046 (0.96)	-0.070 (-1.02)	-0.109 (-1.36)	-0.389*** (-3.22)
Age	-0.087 (-1.30)	-0.054 (-0.74)	0.062 (0.57)	0.285* (1.77)
MDP		-0.566* (-1.80)		-1.848*** (-5.16)
Activist Attack	0.843*** (5.53)		0.914*** (4.33)	
Share Illiquidity		-0.203** (-2.52)		-0.460** (-2.31)
Leverage	-0.108* (-1.66)	-0.164** (-2.09)	-0.246*** (-2.57)	-0.571*** (-3.06)
Asset Illiquidity	-0.159*** (-3.06)	-0.157*** (-2.78)	-0.103 (-1.28)	-0.304*** (-2.65)
Mgt Fee	0.077 (1.50)	-0.031 (-0.50)	0.241*** (2.97)	0.275* (1.90)
Mgt Ownership	-0.442** (-2.13)	-0.131 (-0.55)	-1.346*** (-5.41)	-0.504 (-1.35)
Unrealized Capgain	-0.049 (-0.89)	-0.110** (-2.15)	-0.050 (-0.61)	-0.341*** (-2.98)
Alpha	-0.044 (-0.81)	-0.030 (-0.50)	-0.002 (-0.02)	-0.238** (-2.25)
Style Fixed-Effects	Included	Included	Included	Included
Rho	0.362* (1.86)		0.626** (2.51)	
Observations	1076		369	

Online Appendix G:

Table A6. Probit Regression: Preemptive vs. Reactive MDPs

This table investigates the determinants of preemptive vs. reactive MDP adoptions using probit regressions. The probability is calculated for preemptive MDP adoption. The explanatory variables include share illiquidity measured by the Amihud illiquidity ratio, asset illiquidity measured by the AR1 coefficient based on the NAV returns, leverage ratio, and four-factor alpha. All variables are measured as the annual averages during the 5-year window from 3 years before and 2 years after the MDP adoption year. We convert all variables into ranks between 0 and 1. We also construct a relative illiquidity measure (share illiquidity relative to asset illiquidity) by calculating the difference between the share illiquidity rank and the asset illiquidity rank. The data sample in Panel A includes 27 post-inception preemptive MDP adoptions and 22 reactive MDP adoptions. The data sample in Panel B includes 59 preemptive MDP adoptions (both at-inception and post-inception MDPs) and 22 reactive MDP adoptions. The z-statistics are reported in parentheses. Statistical significance of 1% and 5% are indicated by ** and * respectively.

	Event {1=Preemptive MDP; 0=Reactive MDP}					
	Panel A: Excluding At-Inception MDPs			**Panel B: Including At-Inception MDPs**		
Intercept	0.136 (0.74)	-1.919** (-3.01)	-0.480 (-0.23)	0.626** (4.14)	-0.909 (-1.83)	2.723 (1.50)
TNA		2.419* (2.40)	1.142 (0.57)		1.451* (1.96)	-1.556 (-1.00)
Share Illiquidity			-0.465 (-0.24)			-2.912 (-1.70)
Asset Illiquidity			-1.152 (-1.46)			-0.789 (-1.22)
Relative Illiquidity	-0.654 (-1.44)	0.903 (1.32)		-0.456 (-1.15)	0.384 (0.65)	
Leverage		2.142** (2.71)	2.264** (2.89)		1.874** (3.29)	1.786** (3.00)
Alpha		-0.359 (-0.45)	-0.379 (-0.47)		-0.041 (-0.07)	-0.221 (-0.34)
Observations	49	49	49	81	81	81

Online Appendix H: Toeholds and MDP size

Below is the scatter plot to which Section 3.7 refers:

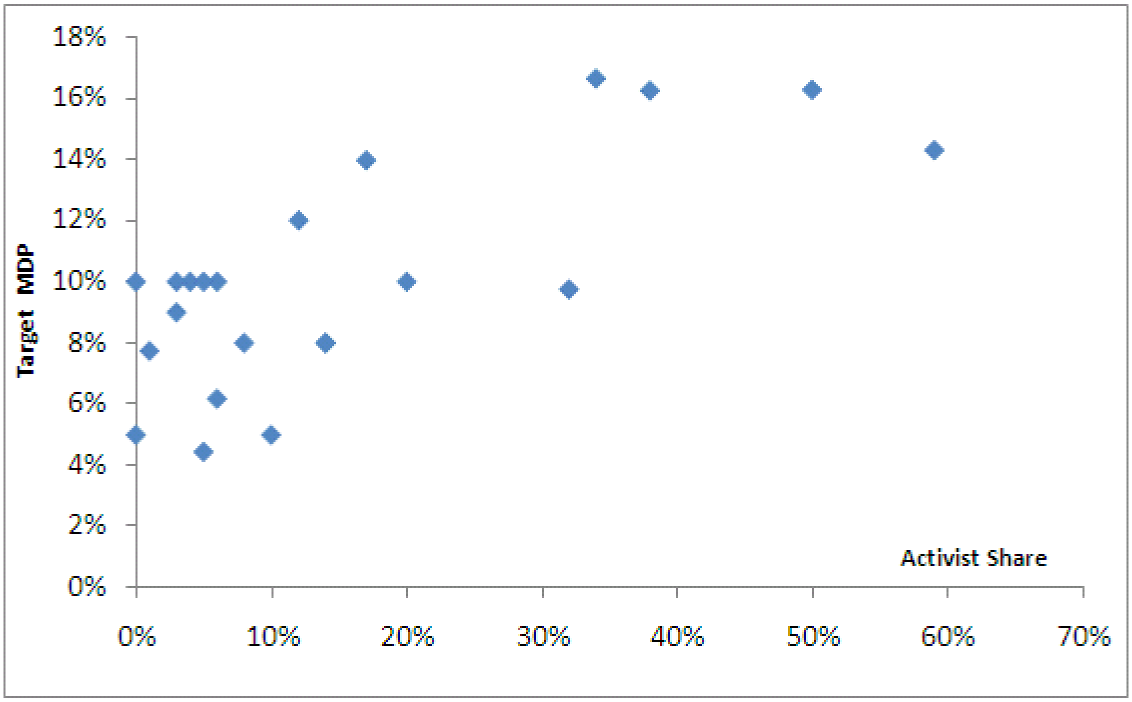

Figure H1: A scatter plot of MDP targets announced by funds subsequent to activist attacks. The horizontal axis indicates the percentage share of the activist in the fund. The vertical axis indicates the target MDP as a percentage of NAV.

Online Appendix I: Missing Data

In the tests performed in the text, some funds were not used. This was either because data was not available for these funds or because the funds did not fit the criteria for the test (e.g., they were outside the observation window specified for the test). Table A7 below summarizes the missing MDP funds in our empirical analysis. We list for each table in the text the full MDP sample, the number of MDP funds actually used in analysis, and a brief explanation on the reason for missing data.

Table A7. Summary of Missing Data

Tables	**Full Sample**	**Sample Used**	**Reason**
3A	49 Post-inception MDPs	37 Post-inception MDPs	Twelve funds are excluded due to missing management fee information. Eight funds adopted the MDPs before 1995 and thus do not have electronic filings available with the SEC. For the remaining four funds, we could not find management fee data due to missing SEC filings either before or after the MDP adoption.
3B	28 MDPs	26 MDPs	The analysis includes all funds that had MDPs in place in 2000, and that maintained the closed-end status for the next three years or longer. Out of 28 MDP funds observed in 2000, two funds were terminated within three years and thus were excluded from the analysis.
4	22 reactive MDPs 70 Preemptive MDPs	19 reactive MDPs 48 preemptive MDPs	We require MDP adoption years to be in or prior to 2004. Out of the 22 reactive MDP funds in our sample, 19 funds adopted MDPs in response to activist attacks prior to 2004. Out of the 70 preemptive MDP funds in our sample, 48 adoptions were in or prior to 2004 – with 16 post-inception adoptions and 32 at-inception adoptions, respectively.
5	49 Post-inception MDPs	45 post-inception MDPs	Out of 49 post-inception MDP funds, we exclude 4 funds due to missing data on explanatory variables and thus leave 45 post-inception MDP funds in the regression analysis.
6	22 reactive MDPs	21 reactive MDPs	Out of 22 reactive MDP funds, we exclude 1 fund due to missing discount data in the event window.

Because Tables 3 and 4 are missing a sizeable portion of the funds, we address the concern that their results are skewed. Table A8, below, repeats the analysis done in Table 3 of the text *including* the missing funds. As can be seen from the Table A8, the results are similar or stronger. To assess the impact of missing funds on Table 4, we compare the empirical distributions for the sample used in Table 4 with the full MDP sample for a list of key variables. As Table A9 suggests, the distributions are similar between the two samples, and the Kolmogorov-Smirnov tests fail to reject the equality of two distributions across all key variables. We have little reason, therefore, to suspect that our results are driven by selection bias.

Table A8. Management Fee, Fund Size and Discount: MDP vs. Non-MDP Funds: Including Missing MDP Funds

This table examines the impact of MDP adoption on managerial compensation, fund assets, and discount using data from 1995-2006. In Panel A, we examine changes during the three-year periods before vs. after the MDP adoption. For each MDP fund, we identify a control group of non-MDP funds that have the same investment objective and compute the mean (median) statistics during the same pre-MDP and post-MDP periods. We report the mean (median) difference between the MDP group and the non-MDP control group as well as the difference-in-difference results around MDP adoption. We include in Panel A all 49 post-inception MDP funds. Since 12 funds have missing management fee data, we omit the comparison of management fees in % and $ terms. In Panel B, we compare MDP funds and a matched sample of non-MDP funds during the period 2000-2006. The analysis includes all 28 funds that have MDPs in place in 2000. For each MDP fund, we identify a matched non-MDP fund that have the same investment objective and the closest fund TNA at the end of 2000. We report the mean (median) difference between the MDP group and the non-MDP matched group for year 2000, the annual averages during the subsequent 5-year period (2001-2006), the changes relative to year 2000, and the difference-in-difference results. In both panels, we compute the mean (median) statistics for the following variables: average management fee (%), average year-end TNA ($ million), average annual managerial pay (average monthly net assets in million dollars * percentage management fee), and average discount (%). Statistical significance for the mean (median) tests of 1% and 5% are indicated by ** and * respectively.

	Panel A: Before vs. After MDP Adoption				**Panel B: MDP vs. Non-MDP in 2001-2006**		
	Pre-MDP	**Post-MDP**	**Change**		**2000**	**2001-2006**	**Change**
	Management Fee (%)				**Management Fee (%)**		
MDP Funds	--	--	--		0.91 (0.88)	0.89 (0.88)	-0.01 (0.00)
Non-MDP Funds	--	--	--		0.85 (0.92)	0.88 (0.83)	0.03 (0.00)
Difference	--	--	--		0.06 (0.07)	0.01 (0.02)	-0.05 (-0.00)
	TNA ($millions)				**TNA ($millions)**		
MDP Funds	284.47 (153.19)	340.15 (190.25)	55.68 (40.08)		391.07 (206.66)	336.21 (149.39)	-54.86** (-47.17**)
Non-MDP Funds	172.56 (141.19)	293.80 (195.74)	121.24**(100.65**)		273.14 (127.09)	276.49 (207.59)	3.36 (-0.36)
Difference	111.91** (21.71)	46.35 (40.49)	-65.56* (-18.96)		117.93 (8.33*)	59.71 (-22.43)	-58.21* (-64.85**)
	Management Fee ($millions)				**Management Fee ($millions)**		
MDP Funds	--	--	--		3.38 (1.81)	2.90 (1.24)	-0.48** (-0.53**)
Non-MDP Funds	--	--	--		2.05 (1.22)	2.30 (1.57)	0.24 (-0.00)
Difference	--	--	--		1.33** (0.58**)	0.61 (0.00)	-0.72** (-0.65**)
	Discount (%)				**Discount (%)**		
MDP Funds	10.43 (13.23)	8.49 (10.05)	-1.94 (0.50)		11.50 (12.67)	-1.82 (-1.02)	-13.33** (-11.90**)
Non-MDP Funds	9.48 (8.64)	12.83 (12.24)	3.35** (3.59*)		18.20 (17.47)	9.51 (9.97)	-8.69** (-5.91**)
Difference	0.95 (2.22)	-4.34* (-1.74*)	-5.29** (-5.21**)		-6.70** (-4.60**)	-11.34** (-10.34**)	-4.64* (-7.13*)

Table A9. Comparison of Empirical Distributions

This table compares the empirical distributions of key variables between the MDP sample used in Table 4 and the full MDP sample. The key variables include year-end TNA, average monthly discount in the year, total annual distribution normalized by year-beginning NAV, share illiquidity measured by the average daily Amihud illiquidity ratio of fund shares in the year, asset illiquidity measured by the first-order serial correlation of monthly NAV returns in the past 36 months, leverage ratio defined as year-end liabilities normalized by year-end total assets, and management fee ratio. All variables are standardized by subtracting the mean and scaling by the standard deviation of all funds in any given year. For each standardized variable, we first calculate the time series average over years for each fund and then derive empirical distributions across funds. For the MDP sample used in Table 4 and the full MDP sample, we separately report the 95th, 75th, 50th, 25th, and 5th percentiles. We also report the p-values for Kolmogorov-Smirnov statistics testing for the equality of the two distributions. We separately report the percentiles and testing statistics for reactive MDP funds (Panel A) and preemptive MDP funds (Panel B).

Panel A: Reactive MDPs											
	Sample in Table 4 (19 Funds)					Full Sample (22 Funds)					K-S Test
	P95	P75	P50	P25	P5	P95	P75	P50	P25	P5	P-value
TNA	1.38	0.04	-0.31	-0.46	-0.60	1.02	-0.10	-0.32	-0.46	-0.58	1.00
Discount	0.74	0.44	0.28	-0.56	-1.03	0.71	0.44	0.30	-0.56	-0.82	1.00
Share Illiquidity	0.99	-0.08	-0.25	-0.29	-0.32	0.35	-0.08	-0.23	-0.29	-0.32	1.00
Asset Illiquidity	0.66	0.45	-0.04	-0.50	-1.01	0.64	0.45	-0.02	-0.50	-1.00	1.00
Leverage	0.84	-0.08	-0.37	-0.62	-0.70	0.52	-0.08	-0.34	-0.62	-0.70	1.00
Mgt Fee	1.44	0.54	0.22	-0.27	-0.91	1.44	0.47	0.18	-0.59	-0.91	1.00
Total Dist	1.22	0.71	0.47	0.18	-0.34	0.95	0.70	0.44	0.11	-0.34	1.00

Panel B: Preemptive MDPs											
	Sample in Table 4 (48 Funds)					Full Sample (70 Funds)					K-S Test
	P95	P75	P50	P25	P5	P95	P75	P50	P25	P5	P-value
TNA	2.02	0.44	-0.34	-0.52	-0.68	2.11	0.59	-0.34	-0.53	-0.81	1.00
Discount	0.93	0.55	0.01	-0.65	-1.96	0.90	0.44	-0.01	-0.60	-1.82	1.00
Share Illiquidity	-0.02	-0.16	-0.18	-0.26	-0.32	0.07	-0.14	-0.18	-0.24	-0.32	0.99
Asset Illiquidity	0.82	0.19	-0.28	-0.97	-1.64	1.00	0.27	-0.28	-1.02	-1.67	1.00
Leverage	1.36	0.81	0.20	-0.54	-0.96	1.62	1.02	0.55	-0.59	-0.92	0.83
Mgt Fee	0.54	0.16	-0.45	-0.90	-1.92	0.50	0.12	-0.38	-0.74	-1.73	0.98
Total Dist	1.05	0.66	0.21	-0.17	-0.38	1.08	0.63	0.18	-0.17	-0.44	1.00