CENTER FOR FINANCIAL STUDIES

CFS Working Paper Series

No. 707

Roman Kräussl, Joshua Pollet, and Denitsa Stefanova

Closed-end Funds and Discount Control Mechanisms

Center for Financial Studies | Goethe University | Theodor-W.-Adorno-Platz 3 | 60323 Frankfurt am Main | Germany
| Phone +49 69 798 30050 | info-cfs@hof.uni-frankfurt.de | www.gfk-cfs.de

The CFS Working Paper Series

presents ongoing research on selected topics in the fields of money, banking and finance. The papers are circulated to encourage discussion and comment. Any opinions expressed in CFS Working Papers are those of the author(s) and not of the CFS.

The Center for Financial Studies, located in Goethe University Frankfurt's House of Finance, conducts independent and internationally oriented research in important areas of Finance. It serves as a forum for dialogue between academia, policy-making institutions and the financial industry. It offers a platform for top-level fundamental research as well as applied research relevant for the financial sector in Europe. CFS is funded by the non-profit-organization Gesellschaft für Kapitalmarktforschung e.V. (GfK). Established in 1967 and closely affiliated with the University of Frankfurt, it provides a strong link between the financial community and academia. GfK members comprise major players in Germany's financial industry. The funding institutions do not give prior review to CFS publications, nor do they necessarily share the views expressed therein.

Center for Financial Studies | Goethe University | Theodor-W.-Adorno-Platz 3 | 60323 Frankfurt am Main | Germany
| Phone +49 69 798 30050 | info-cfs@hof.uni-frankfurt.de | www.gfk-cfs.de

Closed-end Funds and Discount Control Mechanisms

Roman Kräussl[a,b], Joshua Pollet[c] , and Denitsa Stefanova[a,1]

[a]University of Luxembourg, Department of Finance

[b]Hoover Institution, Stanford University

[c]University of Illinois at Urbana-Champaign, Department of Finance

January 2023

Abstract

The discount control mechanisms that closed-end funds often choose to adopt before IPO are supposedly implemented to narrow the difference between share price and net asset value. We find evidence that non-discretionary discount control mechanisms such as mandatory continuation votes serve as costly signals of information to reveal higher fund quality to investors. Rents of the skill signaled through the announcement of such policies accrue to managers rather than investors as differences in skill are revealed through growing assets under management rather than risk-adjusted performance.

JEL Codes: G10; G23

Keywords: Closed-end funds; discount; performance; skill; signaling; information asymmetry; repurchases; continuation vote

[1] *E-mail addresses:* roman.kraussl@uni.lu (Roman Kräussl), pollet@illinois.edu (Joshua Pollet), and denitsa.stefanova@uni.lu (Denitsa Stefanova).

1. Introduction

The persistence of closed-end fund discounts has generated an enduring debate in the literature. Closed-end funds (CEFs) as well as the publicly traded shares that constitute their portfolios are traded on stock exchanges. There exists a substantial difference between the price of a closed-end fund and the market value of its underlying portfolio for the typical fund. Usually, CEFs trade at a discount to their net asset value (NAV) although the shares of the fund are almost always issued at an IPO price that exceeds the initial NAV of the fund. The puzzling willingness of investors to pay a premium for CEFs at IPO when these funds usually trade at a substantial discount within one year after the IPO due to very low returns is difficult to explain within a rational framework (Weiss, 1989; Peavy, 1990; Jegadeesh, Kräussl and Pollet, 2015). Investors could wait one year to purchase these funds to avoid this underperformance or investors could purchase open-ended funds with a similar portfolio of assets under management (AUM) that do not have any difference between price and NAV instead.

Setting aside this transition from premium to discount during the year after issuance, the existence of fund discounts has generated considerable academic research. The various explanations for the fund discount include: management fees charged as a fraction of assets under management (Boudreaux, 1973; Gemmill and Thomas, 2002; Ross, 2000; Ross, 2005), market frictions and tax overhang (Malkiel, 1977; Chay, Choi and Pontiff, 2006; Day, Li and Xu, 2011), liquidity (Malkiel, 1977; Lee, Shleifer and Thaler, 1991; Berk and Stanton, 2007), investor irrationality (Lee, Shleifer and Thaler, 1991), and managerial ability (Berk and Stanton, 2007).

In our study, we investigate a costly signaling explanation in which closed-end fund managers commit to explicit policies of fund discount control to convey information about the expected quality of the fund. The seminal work of Spence (1973) considers the costly signal provided by acquiring education. In finance, signaling has been analyzed in a variety of contexts including dividends (Miller and Rock, 1985) and share repurchase programs (Oded, 2005). The typical benefit of a costly signal is a reduction in the impact of asymmetric information. In the context of CEFs, asymmetric information between investors and fund managers regarding the expectation of the difference between managerial skill and management fees has the potential to affect the price of fund shares, and consequently, the fund discount.

One discount control mechanism (DCM) frequently observed in fund prospectuses is the mandatory continuation vote. Shareholder votes of this type are often scheduled on a periodic basis or triggered by the fund discount reaching a pre-specified level. Fund liquidation or conversion to an open-ended structure is often associated with a large reduction in AUM and the resulting compensation for the management company. Thus, a mandatory vote may be costly to managers if this mechanism increases the probability that shareholders will liquidate the fund. This loss of fees, in expectation, could be the basis for signaling managerial ability if these costs are more likely to be imposed on managers with poor fund performance.

For instance, highly skilled managers that are expected to generate better risk-adjusted performance would have a lower probability of losing a mandatory continuation vote than managers with less skill. Thus, highly skilled managers who commit to this DCM find it less costly to do so than their less-skilled counterparts. Since expected fund performance after fees is reflected

in the discount at which the fund trades relative to NAV and there is heterogeneity in the expected cost that fund managers face when committing to this DCM, adopting a mandatory continuation vote policy could serve as a costly signal of skill. In a closely related manner, the mandatory continuation vote could also serve as a signal regarding the expected path of future management fees charged by fund. The commitment to hold a continuation vote and thus give shareholders the opportunity to decide whether to liquidate or convert to an open-end structure still serves as a costly signal of managerial risk-adjusted performance after fees.

While continuation votes are mandatory, the explicit language regarding share repurchases indicates that the management team can utilize its discretion to decide the timing and the amount of any share repurchases. The prospectus announces the intention to consider share repurchases under certain circumstances. Of course, managers may still decide not to implement repurchases when the fund discount increases substantially. Thus, the announcement of discretionary repurchase programs as a mechanism to control the discount is not an obvious costly signal of information. Nevertheless, Oded (2005) indicates that a firm's decision to announce a program that might repurchase shares on the open market is still consistent with a signaling equilibrium in the presence of some shareholders facing a liquidity constraint. Of course, the actual decision to repurchase shares, rather than the announcement of a discretionary repurchase plan, could also serve as a costly signal following the analogy in which the decision to purchase shares replaces the decision to pay a dividend as in Miller and Rock (1985). Nevertheless, we focus our attention on the type of signaling considered by Oded (2005) in which the prospectus itself contains the announcement about a repurchase program.

Alternatively, the announcement of DCMs at IPO might convince naïve investors to purchase shares. Essentially, these announcements are just talking points about investor protections that are not actually deployed with greater frequency in practice. To the extent that investors are wrong about the probability that these protections are implemented, managers receive greater compensation by increasing AUM. Managers might capitalize on investors' expectations regarding the value of these supposed protections by scheduling seasoned equity offerings or rights offerings.

We collect a database of equity-oriented UK closed-end funds. Compared to their US counterparts, the total assets of UK CEFs constituted a substantial proportion of the mutual fund universe.[2] The amount of institutional ownership of these funds is also much more pronounced in the UK (Dimson and Minio-Kozerski, 2001). In addition, explicit statements in prospectuses about DCMs are much more prevalent in the UK. For instance, about 60% of the funds in our sample of UK CEFs have mandatory continuation votes, whereas less than 1% of US CEFs have a continuation vote provision in their IPO prospectuses. Since DCMs became popular in this industry, their effectiveness has been questioned in the popular press.[3] During the period of the global financial crisis, the typical fund discount increased substantially despite the widespread presence of discount control policies.

[2] In the UK, the assets of equity CEFs represent 17% of the total assets of equity open-end funds, compared to 1.2% in the US as of December 2016 (see Investment Company Institute (2017), The Association of Investment Companies (2016), and The Investment Association (2016)).

[3] See Financial Times (2010), for example, addressing corporate governance issues and credibility of discount control policies in the wake of the financial crisis.

First, we analyze whether the presence of a DCM changes the probability of the costly outcome related to the potential signal. Unconditionally, we find that the explicit device allowing shareholders to vote on the future of the fund has no statistical impact on the subsequent probability of fund liquidation. It is rather small funds and split-capital CEFs that appear to be more likely to liquidate. However, we show that when the volatility of the discount funds trade at increases, funds with mandatory voting liquidate more often compared to funds without this DCM.

Second, we evaluate the likelihood that a fund engages in share repurchases and the initial announcement by the fund at IPO granting explicit discretion to repurchase shares when the discount is large or more volatile. We find that funds with these repurchase program provisions are not more likely to repurchase their own shares. This pattern holds regardless of the level or the volatility of the current discount. Instead, all funds appear to engage in an increased level of repurchase activity when fund discounts are more substantial. Unlike the result for mandatory voting, the announcement of the discretion to repurchase is unrelated to its subsequent use. We find no support for differences in the cost of the announcement, as the probability of discretionary repurchases following the statement or lack thereof at IPO is similar for both groups of firms.

We further investigate whether there is a difference in performance outcomes that is typically observed in a separating equilibrium due to signaling. For instance, in Spence (1973) the average wage is higher for those workers acquiring education. The model in Oded (2005) is motivated by the empirical finding that firms announcing repurchase programs, even without a promise to repurchase shares, experience substantial stock price appreciation. In the context of a closed-end fund, the obvious reason for a fund manager to deploy a costly signal in equilibrium is to reveal

higher fund quality to investors. If investors understand that funds with DCMs are expected to have higher risk-adjusted portfolio performance after fees, then this information about subsequent performance net of fees should be immediately reflected in their price at IPO. Essentially, the costly signal for these funds changes the expectation of future performance net of fees and generates a lower average discount, that is, a higher premium, at IPO in rational models of the fund discount (Ross, 2005; Berk and Stanton, 2007, Jegadeesh, Kräussl and Pollet, 2015). However, if investors do not fully understand the signal immediately, then superior performance of the underlying portfolio net of fees, could eventually be revealed through lower average discounts as investors slowly learn about this superior performance. It is also possible to imagine that investors never fully understand the value of the signal. In this more pronounced case of investor irrationality, the signal should predict higher risk-adjusted returns for investors in these funds indefinitely as investors are always surprised to some extent by the superior performance of the underlying portfolio held by the fund with a DCM.

We test these implications by examining the relation between the presence of a particular DCM in the prospectus and subsequent fund returns. We find no observable difference in the risk-adjusted returns to investors for funds with a DCM compared to other funds. The long-short portfolios of funds with a DCM and funds without a stated policy of discount control all have insignificant risk-adjusted returns.

Our findings are consistent with the interpretation that differences in skill as signaled by the adoption of a policy of discount control are revealed through differences in fund size rather than performance. Managers respond to excess investor demand by growing their AUM. As long as

there exist diseconomies of scale, skilled managers would not generate superior returns and the rents of their skill would accrue to them rather than the investors through the fees generated on the higher AUM.

Our study is closely related to the strand of literature that investigates the predictions of signaling models in relation to the closed-end fund discount. Johnson, Lin and Song (2006) investigate the signaling value of managed distribution policies. In that paper the commitment to minimum dividend payments is an effective tool in substantially reducing the closed-end fund discount. However, Wang and Nanda (2011) propose an agency cost hypothesis and demonstrates that managed distribution policies do not necessarily improve fund performance when agency problems between managers and investors are present. Contrary to the two studies mentioned above, we focus on the adoption of a DCM at the fund's inception when the specific policies are outlined in the IPO prospectus. This approach allows us to analyze the signaling value of the DCM as part of the IPO itself.

In addition, we contribute to the literature investigating the information content in IPO prospectuses in relation to IPO pricing. Hanley and Hoberg (2010) provide evidence that greater informative content in prospectuses results in more accurate offer prices. Contrary to their findings, our results indicate that the presence of detailed statements about a DCM in the IPO prospectus does not appear to provide greater information about the fund's valuation or subsequent performance.

The remainder of the paper is structured as follows. Section 2 describes the sample and summary statistics. It also discusses the different types of DCMs that CEFs present in their IPO

prospectuses. Section 3 presents the results in detail. In Section 3.1, we explore the delisting behavior of funds as a function of the discount they trade at and their commitment to hold continuation votes. Section 3.2 analyses the likelihood of funds to engage in share repurchases given their stated (although not binding) objective to do so in the face of widening discounts. Section 3.3 examines the role that DCMs have in expanding the AUM via secondary equity offerings or rights offerings in response to past fund performance and investor expectations of future fund performance. Section 3.4 explores the implications of stated policies of discount control on closed-end fund discounts and long-term performance. Section 4 concludes.

2. Data

In the UK, CEFs attract a sizeable amount of funds compared to the open-end fund sector.[4] By December 2022, the British closed-end equity funds accounted for £131 billion of funds under management[5] which represent about 14% of the AUM of equity open-end funds. By the end of 2022, there were 184 active equity-oriented CEFs.

We analyze UK closed-end funds with IPOs between January 1992 and December 2021 that primarily hold public equity trade on the London Stock Exchange. We exclude venture capital trusts, hedge funds, funds with a finite life, private equity funds, and property funds. The resulting

[4] Contrary to the US, where CEFs market capitalization is less than 1.5% of the aggregate market value of US open-end stock funds (The Investment Company Institute, 2017).
[5] The Association of Investment Companies (2022).

sample of 231 funds does contain funds that did not survive until the end of the sample period, that is, we include delisted funds in our sample.

We obtain share prices, returns, NAVs, and number of shares outstanding from Datastream and Bloomberg. All companies listed in the UK are required to disclose blockholder ownership in excess of 3%. We use the fund's annual report to obtain data on the fraction of fund shares owned by the management company, that is, the management company's stake in a fund. We hand-collect data about each fund's DCMs introduced at inception from the IPO prospectus and the first annual report following IPO. There are two main types of DCMs that are typically employed by CEFs:

- *Continuation vote*: A mandatory continuation vote is the only DCM that is not implemented at the discretion of the fund management or board of directors. If the vote to continue fails, then the fund's directors are obligated to put forward proposals to "wind up" the fund. Typically, these proposals involve fund liquidation or conversion to an open-end fund structure. Continuation votes are either periodic (occurring at pre-determined periods, e.g., annually), or the vote may be triggered by the level of the fund discount (i.e., a discount floor provision).
- *Share repurchase:* Repurchasing shares in the secondary market is frequently discussed as a way to control the level of the fund discount to NAV by addressing imbalances between the demand and supply of shares. Overt share repurchase programs are often referenced in the prospectus. Prospectuses offer varying degrees of specificity about the use of share repurchases as a mechanism to narrow the NAV discount. The details may include the announcement of the existence of authority to repurchase shares in the open market, a

redemption facility allowing shareholders to periodically redeem a percentage of their shares at NAV less costs, and the potential to consider tender offers at the discretion of the Board of Directors. The circumstances under which these various share repurchase interventions are considered might include a trigger point, i.e., if the fund discount greater than a particular threshold, then the Board will evaluate the benefits of repurchasing shares. Ultimately, the implementation of share repurchases using these approaches is ultimately a discretionary action adopted by the Board.

We determine if each fund has a DCM belonging to either of these two categories. A fund may have one or both types of DCM as well as no DCM at all. We classify funds based on the information contained in their IPO prospectuses obtained via Bloomberg, Companies House or fund websites. We also examine on the first annual report and the provisions of the articles of association of the fund if the prospectus is not definitive. The mandatory voting classification includes funds with a periodic continuation vote clause in the prospectus. This clause may be conditional on the level of the discount. The share repurchase classification is represented by the overt discussion share repurchases, redemption facilities, or tender offers that are implemented at the discretion of the board (with or without a pre-specified fund discount trigger).

< Insert Table 1 about here >

In Table 1, we report the number of active CEFs per year for each of the two DCM categories. On average, there are 109 funds that are active each year during the 1994-2021 period. Out of the

231 funds in our sample, 123 have delisted during the period. In total, there are 146 funds in our sample with provisions that require mandatory voting of some form. For 50 funds, the directors have explicit discretion to repurchase shares, while the remaining 35 funds have no DCM in place at IPO.[6]

< Insert Table 2 about here >

Table 2 presents descriptive statistics of our sample of CEFs. We report the distribution of funds by size (market capitalization) in the month of the IPO. The median fund has a market capitalization of about £50 million, while the average size at IPO is £78 million. About 12% of the funds in our sample have an initial market capitalization of more than £200 million. All of these large funds have a statement about discount control at IPO. Funds with repurchase discretion tend to be substantially larger on average, that is, about twice as large as the rest of the funds in the sample. Almost half of the funds in our sample have delisted over the sample period.

[6] Prior to 2000, only a small proportion of CEFs had repurchase discretion at inception. The most-often cited reason behind the introduction of share repurchases to manage NAV discounts is the abolition of the Advance Corporation Tax in April 1999. Prior to that date, share repurchases would impose an additional tax liability since they qualified as distributions for tax purposes. See also the discussion in Oswald and Young (2004).

3. Discussion of Results

3.1. Mandatory Voting and Fund Liquidations

More than half of the funds in our sample offer shareholders the ability to vote on the continuation of the fund, with or without conditions related to the fund discount. This mandatory DCM that a fund announces in its IPO prospectuses could be interpreted as a costly signal about the future performance of the fund. Managers of funds that trade at large discounts face an increased probability of fund liquidation. To the extent that the level of the fund discount reflects expectations of superior fund performance, managers who expect their fund to outperform would have an incentive to signal their type to investors by adopting an explicit discount control policy.

First, we test whether it is indeed costly for fund managers to commit to a mandatory voting policy at the inception of the fund. We analyze whether a fund delisting is predicted by the presence of the mandatory voting provision in the fund prospectus. In Table 3, we estimate a linear probability model to explain the indicator of fund liquidation in a given year using an indicator variable equal to one if the fund prospectus has mandatory voting and zero otherwise, the volatility of the fund discount during the previous year, as well as other controls such as the log of fund market value, the return of the fund and the market return at the end of the previous year, as well as the management fee at IPO. Since a considerable portion of the assets held by the CEFs in our sample are not concentrated in any single geographical region, we use the return of the MSCI World index as the market return in specifications without year fixed effects.[7] We also include an

[7] Alternatively, since a third of the funds in our sample have a UK equity focus, we consider a specification where the market portfolio is represented by the MSCI UK index. The results remain largely unchanged.

indicator variable for split-capital CEFs – funds with more than one class of shares that offer different rights to income and capital.[8]

< Insert Table 3 about here >

Surprisingly enough, the results indicate that the volatility of the discount a fund trades at during the previous year does not have any significant predictive power with respect to the probability of its liquidation. Since fund investors are concerned about the potential of a fund to develop a large discount, and as the fund discount is the main justification for DCMs such as mandatory voting, the absence of a relation between the discount and liquidation is not the anticipated result. Once we also consider the presence of a mandatory voting provision at IPO, this specific DCM does not predict fund liquidations either. Instead, the strongest predictor of delisting is the size of the fund. Despite the absence of any direct relation between mandatory voting and fund liquidation, it is quite comforting that funds managing more money, that is, larger funds, are significantly less likely to delist.

However, a different pattern emerges once we consider the interaction of the mandatory voting provision with the past fund discount volatility (columns 3 to 6 in Table 3). Funds with mandatory voting provisions are more likely to liquidate if they have traded at highly volatile discounts over the past year. Thus, the DCM that allows shareholders to vote on liquidating a fund

[8] Split-capital CEFs have several classes of shares. Most often, they have zero-dividend preference shares that offer a pre-determined level of capital growth over a fixed period of time, and ordinary shares which pay all the dividends.

works in the anticipated direction: Such funds are more likely to liquidate after experiencing a period with volatile discounts relative to funds with no mandatory voting in place.

There are other considerations, such as agency conflicts, that might also affect the fund discount. For instance, if managers do not have a stake in the fund, they would not directly benefit from controlling the discount. However, it is not uncommon that the management company holds a stake in the fund it manages among UK CEFs.[9] Barclay, Holderness and Pontiff (1993) demonstrate that even in the presence of substantial managerial stock ownership or if blockholders are affiliated with the fund manager, these large shareholders tend to use their voting power to secure private benefits that do not accrue to other shareholders and they are more likely to vote against liquidation proposals. As a result, discounts might tend to be volatile, even in the presence of mandatory continuation votes. In order to evaluate the impact of the stake that the management company may have in the fund, we include in our specification an indicator variable that takes the value of one if the management company has a beneficial stake in the fund and zero otherwise. Our results show that the presence of management company stake marginally decreases the probability of liquidating the fund. When we control for managerial ownership, the pattern of increased likelihood to liquidate for funds with mandatory voting and trading at a more volatile discount is still present and the coefficient estimate is of similar magnitude.[10]

[9] The management company has a blockholder stake (either directly or indirectly) in about a third of the funds in our sample. We collect data on managerial ownership from the first annual report post-IPO. All companies listed in the UK are required to report blockholder stakes when they exceed 3%.

[10] In unreported results, we also consider a logit model for the probability of liquidation. All results remain qualitatively the same.

< Insert Table 4 about here >

To verify whether the revealed pattern is not due to the interaction of the mandatory voting provision with other variables that may be relevant for the likelihood of the fund to liquidate, we augment our baseline linear probability model with interaction terms of the mandatory voting variable with the management company stake indicator, fund size, previous year's fund return, and the return of a broad market index. The results in Table 4 indicate that the relation between fund liquidation and the interaction between the fund discount volatility and mandatory voting persists.[11] In all specifications, funds remain significantly more likely to liquidate when the fund discount is more volatile and the fund has a mandatory voting provision. Interestingly, we also confirm the evidence, however weak, that funds in which the management company owns a stake are less likely to liquidate.[12] Our findings are consistent with the finding in Barclay, Holderness and Pontiff (1993) that managers or blockholders who are affiliated with the fund tend to resist fund liquidation to preserve their private benefits even though they bear the wealth effects of volatile discounts. This evidence gives further support to the hypothesis that CEF shareholders have little capacity to control or discipline managers through these votes. While open-end funds face outflows in response to poor performance, the management company of a CEF tends to resist liquidating the fund to preserve the private benefits of control.

[11] In Table 4, we include year fixed effects, but removing these indicators does not change the results.
[12] In unreported results, we augment our baseline specification by adding interaction terms of the volatility of the fund discount in year $t-1$ with each of the controls. The results confirm the evidence that funds with a mandatory voting provision are more likely to liquidate when the fund discount is more volatile.

In general, our analysis of fund liquidations provides evidence that the DCM of mandatory continuation votes represents a costly signal from the management company to investors. Announcing mandatory votes in the IPO prospectus translates in a higher probability that a fund will be liquidated.

3.2 Share Repurchases and the Stated Policy of Repurchase Discretion

An alternative mechanism to control the fund discount is the overt announcement to repurchase shares in the open market. For 21% of the funds in our sample, the mechanism of discount control that is announced at inception involves the authority to repurchase shares on the open market, through a redemption facility, or via tender offer at the discretion of the fund's Board of Directors. The rationale behind share repurchases typically referred to in the IPO prospectus is that they are expected to enhance the price per share for the remaining shareholders or to reduce the fund discount relative to NAV.

The theory of signaling indicates that the costly signal reduce the information asymmetry between managers and shareholders. However, it is not straightforward to interpret the announcement of potential repurchase programs as a costly information signal because announcing potential share repurchases does not represent even a conditional commitment. The board of the fund in conjunction with the fund manager retain the full discretion to decide on whether to seek

authority from shareholders to repurchase shares and subsequently, whether to carry out such market repurchases.[13]

Are funds that announce repurchase discretion in their IPO prospectuses more likely to subsequently repurchases shares than funds that do not mention share repurchases at inception? We consider the following exercise: We regress an indicator variable of whether a fund has carried out share repurchases in year *t* on a repurchase discretion at IPO indicator variable, the volatility of the discount the fund was trading at in year *t-1*, as well as a set of controls including the fund market value and its return at the end of the previous year and the return of the MSCI World index at the end of year *t-1*. We report these results in Table 5.

< Insert Table 5 about here >

Announcing repurchase discretion at IPO by itself does not predict the likelihood of carrying out share repurchases over the life of the fund.[14] Analyzing the volatility of previous year's discount for funds specifically possessing repurchase discretion (the interaction term

[13] For example, the IPO prospectus of Aberdeen Latin American Income Fund (2010, p.9) states the following: "*It is the Directors' intention to implement an active discount management policy through the use of share buy-backs to seek to maintain the price at which the Ordinary Shares trade relative to their prevailing net asset value at a discount of no more than 5%. As described under the heading "Capital Structure" in Part 1 of this document, the making and timing of share buy-backs is subject to a number of legal and regulatory restrictions and other factors and will also remain at the absolute discretion of the Board. Accordingly, there is no guarantee that the Board's discount management policy will achieve its objective or always be, or be capable of being, implemented.*"

[14] We define share repurchases as a reduction in the number of shares outstanding in any given year of 5% or more. Varying the level of the threshold (1%, 3%) or treating repurchases as a continuous variable does not change our findings. Instead of our baseline linear probability model, we also consider a logit specification. The results remain qualitatively unchanged.

*RepurchaseDiscretion*VolDisc*$_{t-1}$ in columns 3 to 6 of Table 5) does not affect the key pattern. These funds are not more likely to repurchase a substantial fraction of shares during the subsequent year even if the discount has become more volatile.

The results in Table 5 indicate that large funds and funds with a lower return during the previous year are significantly more likely to repurchase shares during the next year. We extend our baseline specification to include interactions with these variables to confirm the relation between discretion at IPO and subsequent repurchases.

< Insert Table 6 about here >

Table 6 shows that the inclusion of interaction terms for fund size, previous performance, management company stake, management fee, and the dual class indicator variable with repurchase discretion at IPO does not alter our main results. It still remains the case that funds that announce repurchase discretion at IPO are not significantly more likely than their peers to implement share repurchases in general, or specifically when the fund discount volatility is high.[15]

There is no evidence that the statements at IPO regarding the potential use of repurchases to reduce the fund's discount should be interpreted as a costly signal. Funds with repurchase policies announced at IPO are not more likely to actually implement repurchases in general or specifically

[15] In unreported results, we document that the inclusion of other interactions between the set of controls and the volatility of the fund discount over the previous year does not change the insignificant relation between subsequent repurchases and repurchase discretion at IPO or repurchase discretion at IPO interacted with the fund discount volatility.

when the fund discount is large compared to other funds in the CEF universe. Since there is no difference in actual repurchase patterns, there is no support for a separating equilibrium based on a costly signal of increased repurchases in expectation.

3.3 Discount Control Mechanisms and Fund Expansion

We have established that the presence of a non-discretionary DCM changes the probability of the costly outcome related to the signal. Funds that have announced a firm commitment to hold continuation votes either at predetermined frequencies or when a trigger discount level is reached, liquidate more frequently when the volatility of the discounts they trade at increases compared to funds with no such commitment. When the DCM is discretionary, however, we find no evidence that it changes the probability of the outcome. Funds that have indicated the potential to repurchase shares do not seem to repurchase shares more often than funds with no such provisions. More volatile discounts do not induce funds with repurchase discretion to implement repurchases more frequently even on a conditional basis.

Given the support for a signaling explanation for non-discretionary discount management policies, we investigate in the following whether the difference in managerial skill as signaled by the DCM is reflected in fund size. In open-end funds, the possibility to issue shares on demand allows managers that are perceived as being skilled to accept additional money from investors to buy more shares at NAV and increase AUM. Since management fees are proportional to the AUM, compensation increases accordingly for more skilled managers (Berk and Green, 2004). In the CEF industry, however, shares outstanding are not continuously changing based on investor

demand. Instead, fluctuations in investor demand are reflected in the premium or the discount to NAV for CEF shares. In this case, CEF managers can increase compensation by issuing new shares through seasoned equity offerings or rights offerings. To the extent that there are decreasing returns to scale in the CEF industry (Wu, Wermers and Zechner, 2016), existing fund shareholders do not have an incentive to favor an increase in the AUM. Thus, increase in fund size likely reflects a transfer of rents from shareholders to fund managers.

The two DCMs appear to enable fund managers to exploit investor perceptions and increase AUM. In the following, we study whether continuation votes or share repurchase discretion announced at IPO are tools that generate greater fund AUM. We regress an indicator variable of whether a fund has issued new shares in any given year *t* on the repurchase discretion indicator and the mandatory voting indicator as well as the typical controls used in previous sections. We define new share issuances as an increase of more than 5% in the number of shares outstanding.[16]

< Insert Table 7 about here >

The results in Table 7 provide evidence that fund managers are more likely to issue additional shares if the fund has announced a discount control policy at IPO. This pattern holds for both discretionary and mandatory actions. This pattern is consistent with previous literature that

[16] Results remain robust to varying the threshold to 1%, 3% or 10% or alternatively considering share issuances as a continuous variable.

investigates managerial power in capturing CEFs rents[17]. Funds that adopted DCMs at IPO are more likely to increase in size, since they do not repurchase shares more often than their peers and these funds issue shares more frequently.

To further explore the ability of managers to capture the rents of their skill signaled by the announcement of a DCM, we interact the mandatory voting and repurchase variables with an indicator of whether the management company has a stake in the fund (columns (7) and (8) in Table 7). We find that when the manager has a stake in the fund, funds with a stated commitment to mandatory voting are more likely to issue shares after IPO.

< Insert Table 8 about here >

Next, we analyze whether these DCMs are also linked to fund size at IPO. We regress the market capitalization of a fund *i* at IPO on indicator variables for mandatory voting or alternatively, repurchase discretion. In Table 8 we find that repurchase discretion announced in the IPO prospectus is associated with a larger fund IPO. A similar announcement of mandatory voting is not significantly related to IPO size after controlling for the announcement of repurchase discretion. When we control for the presence of a management company stake in the fund, however, a strong pattern emerges: Funds that announce a discount control policy achieve a significantly larger size at IPO. Overall, our results are consistent with the hypothesis that

[17] For example, see Wu, Wermers and Zechner (2016) who investigate the determinants of AUM expansions at the management company level.

differences in managerial skill signaled by DCMs are reflected in fund size – either at IPO or later during the life of the fund as it engages in seasoned equity offerings – and indicate a transfer of rents from shareholders to fund managers.

3.4 Policies of Discount Control and Fund Performance

In the previous subsections, we provided evidence in support of the hypothesis that DCMs are used as a signaling mechanism at IPO. Non-discretionary policies impose costs on unskilled managers. Consistent with Berk and Green (2004), skilled fund managers capture the rents: They appear to exploit the announcement of discount control policies to expand their AUM. To the extent that there are diseconomies of scale, the growth in fund size would deteriorate alpha. Skilled fund managers faced with excess demand would grow their AUM without achieving high alpha.

To investigate the performance consequences from DCM adoption, we construct buy-and-hold portfolios of funds based on their discount control policy at IPO. Specifically, we consider the following five portfolio strategies: (i) long all funds, (ii) long funds with mandatory voting and short all other funds, (iii) long funds with mandatory voting and short funds with no explicit discount control policy, (iv) long funds with mandatory voting and short funds with discretionary repurchases, and (v) long funds with discretionary repurchases and short in funds with no explicit DCM in place. Even if investors do not fully understand the costly signal from a particular DCM, it is still possible that the managers implementing a particular DCM are more likely to generate abnormal performance for the underlying portfolio. This skill should be reflected in the risk-adjusted returns to the investors holding funds for in the particular category.

We consider different risk model specifications: a single-factor CAPM, a three-factor Fama-French model, and a four-factor model, augmented with momentum. Since more than a third of the CEFs in our sample invest less than 80% of their assets in any one geographical area and thus have a predominantly global focus, we consider the MSCI World index as the market portfolio. We also use the Global SMB, HML and momentum factors from Ken French's website.

< Insert Table 9 about here >

Across all specifications in Table 9, the average fund does not generate significant risk-adjusted performance. In addition, there is no evidence of differential risk-adjusted performance between various categories of funds classified by DCMs announced at IPO. For all specifications, we obtain consistently insignificant alphas that range between –8 to 19 basis points per month.[18] Thus, the average fund during the sample period is not overpriced or underpriced. More importantly, there is no evidence of mispricing across DCM categories of CEFs.

Our result is consistent with a separating equilibrium where there are no cross-sectional differences between funds based on the skill signaled by an adopted policy of discount control. Consistent with the Berk and Green (2004) argument of diseconomies of scale, differences in skill are manifested only through cross-sectional differences in fund size across closed-end funds.

[18] Given that about 40% of the funds in our sample have portfolios that are invested in predominantly UK equities, we also consider an alternative specification of the factor models and take the MSCI UK index as the market portfolio, and the European SMB, HML, and momentum factors from the Ken French's website. The results remain vastly unchanged.

4 Conclusion

The stated reason for DCMs in IPO prospectuses is a deliberate effort to reduce the fund discount relative to NAV. We provide evidence that is consistent with interpreting non-discretionary DCMs as a costly information signal. Funds that adopt mandatory voting are more likely to liquidate than the rest of the funds in our sample when faced with increasingly volatile discounts. Contrary to these findings, the announcement of discretionary DCMs do not change the likelihood of a costly outcome: funds that announce the potential for repurchases are not more likely to carry out share repurchases in the face of volatile discounts.

Consistent with a separating equilibrium where differences in skill are manifested through differences in fund size and not in performance, we find no relation between fund alphas and the adoption of DCMs at IPO. If investors do not understand this signal, but it is still associated with superior managerial skill, then the superior performance of the underlying portfolio should eventually be revealed. However, the differential risk-adjusted performance of long-short portfolio strategies based on DCM type is indistinguishable from zero. Investors cannot infer anything about fund quality, as measured by risk-adjusted performance, from the adoption of a particular DCM. Instead, the evidence we bring forward supports the hypothesis that signaling through the adoption of a policy of discount control allows managers to accommodate the excess investor demand through growing their AUM and thus capture the rents of their skill.

References

Arora, Navneet, Nengjiu Ju, and Hui Ou-Yang, 2003. An agency explanation of the closed-end fund puzzles. Working Paper, University of Maryland.

Barclay, Michael J, Clifford G Holderness, and Jeffrey Pontiff, 1993. Private benefits from block ownership and discounts on closed-end funds. *Journal of Financial Economics* 33(3), 263-291.

Berk, Jonathan B, and Richard C Green, 2004. Mutual fund flows and performance in rational markets. *Journal of Political Economy* 112(6), 1269-1295.

Berk, Jonathan B, and Richard Stanton, 2007. Managerial ability, compensation, and the closed-end fund discount. *Journal of Finance* 62(2), 529-556.

Boudreaux, Kenneth J., 1973. Discounts and premiums on closed-end mutual funds: A study on valuation. *Journal of Finance* 28(2), 515-522.

Brickley, James, Steven Manaster, and James Schallheim, 1991. The tax-timing option and the discounts on closed-end investment companies. *Journal of Business* 64(3), 287-312.

Chay, JB, Dosoung Choi, and Jeffrey Pontiff, 2006. Market valuation of tax-timing options: Evidence from capital gains distributions. *Journal of Finance* 61(2), 837-865.

Cherkes, Martin, J. Sagi, and Richard Stanton, 2009. A liquidity-based theory of closed-end funds. *Review of Financial Studies* 22(1), 257-297.

Day, Theodore E, George Z Li, and Yexiao Xu, 2011. Dividend distributions and closed-end fund discounts. *Journal of Financial Economics* 100(3), 579-593.

Dimson, Elroy, and Carolina Minio-Kozerski, 2001. The closed-end fund discount and performance persistence. Citeseer.

Elton, Edwin J, Martin J Gruber, and Christopher R Blake, 2005. Marginal stockholder tax effects and ex-dividend-day price behavior: evidence from taxable versus nontaxable closed-end funds. *Review of Economics and Statistics* 87(3), 579-586.

Ferguson, Robert, and Dean Leistikow, 2004. Closed-end fund discounts and expected investment performance. *Financial Review* 39(2), 179-202.

Fried, Jesse M, 2000. Insider signaling and insider trading with repurchase tender offers. *The University of Chicago Law Review* 67(2), 421-477.

Gemmill, Gordon, and Dylan C Thomas, 2002. Noise trading, costly arbitrage, and asset prices: Evidence from closed-end funds. *Journal of Finance* 57(6), 2571-2594.

Gemmill, Gordon, and Dylan C Thomas, 2004. Does governance affect the performance of closed-end funds? Working paper.

Hanley, Kathleen Weiss, Charler M. C. Lee, and Paul J. Seguin, 1996. The marketing of closed-end fund IPOs: Evidence from transactions data. *Journal of Financial Intermediation* 5, 127-159.

Hanley, Kathleen Weiss, and Gerard Hoberg, 2010. The information content of IPO prospectuses. *Review of Financial Studies* 23(7), 2821-2864.

Hwang, Byoung-Hyoun, 2011. Country-specific sentiment and security prices. *Journal of Financial Economics* 100(2), 382-401.

Jegadeesh, Narasimhan, Roman Kräussl, and Joshua M. Pollet, 2015. Risk and expected returns of private equity investments: Evidence based on market prices. *Review of Financial Studies* 28(12) , 3269-3302.

Johnson, Shane A, Ji-Chai Lin, and Kyojik Roy Song, 2006. Dividend policy, signaling, and discounts on closed-end funds. *Journal of Financial Economics* 81(3), 539-562.

Khorana, Ajay, Sunil Wahal, and Marc Zenner, 2002. Agency conflicts in closed-end funds: The case of rights offerings. *Journal of Financial and Quantitative Analysis* 37(2), 177-200.

Kim, Chang-Soo, 1994. Investor tax-trading opportunities and discounts on closed-end mutual funds. *Journal of Financial Research* 17(1), 65-75.

Klibanoff, Peter, Owen Lamont, and Thierry A Wizman, 1998. Investor reaction to salient news in closed-end country funds. *Journal of Finance* 53(2), 673-699.

Kumar, Alok, and Charles Lee, 2006. Retail investor sentiment and return comovements. *Journal of Finance* 61(5), 2451-2486.

Kumar, Raman, and Gregory M Noronha, 1992. A re-examination of the relationship between closed-end fund discounts and expenses. *Journal of Financial Research* 15(2), 139-147.

Lee, Charles, Andrei Shleifer, and Richard H Thaler, 1991. Investor sentiment and the closed-end fund puzzle. *Journal of Finance* 46(1), 75-109.

Malkiel, Burton G., 1977. The valuation of closed-end investment-company shares. *Journal of Finance* 32(3), 847-859.

Miller, Merton H., and Kevin Rock, 1985. Dividend policy under asymmetric information. *Journal of Finance* 40(4), 1031-1051.

Oded, Jacob, 2005. Why do firms announce open-market repurchase programs? *Review of Financial Studies* 18(1), 271-300.

Oswald, Dennis, and Steven Young, 2004. What role taxes and regulation? A second look at open market share buyback activity in the UK. *Journal of Business Finance & Accounting* 31(1-2), 257-292.

Peavy III, John W., 1990. Returns on initial public offerings of closed-end funds. *Review of Financial Studies* 3(4), 695-708.

Pontiff, Jeffrey, 1995. Closed-end fund premia and returns implications for financial market equilibrium. *Journal of Financial Economics* 37(3), 341-370.

Pontiff, Jeffrey, 1997. Excess volatility and closed-end funds. *American Economic Review* 87(1), 155-169.

Spence, Michael, 1973. Job Market Signaling. *The Quarterly Journal of Economics* 87(3), 355-374.

Wang, Z Jay, and Vikram Nanda, 2011. Payout policies and closed-end fund discounts: Signaling, agency costs, and the role of institutional investors. *Journal of Financial Intermediation* 20(4), 589-619.

Weiss, Kathleen, 1989. The post-offering price performance of closed-end funds. *Financial Management* 18(3), 57-67.

Wu, Youchang, Russ Wermers, and Josef Zechner, 2016. Managerial rents vs. shareholder value in delegated portfolio management: The case of closed-end funds. *Review of Financial Studies* 29(12), 3428-3470.

Table 1. Number of Active Funds

This table reports the number of closed-end funds (CEFs) per year for each of the discount control mechanism (DCM) categories we consider. The last row reports the number of delisted funds for each category. The sample covers funds with IPOs between January 1992 and December 2021.

	All Funds	No DCM	Repurchase Discretion	Mandatory Voting
1994	38	8	0	30
1995	55	11	0	44
1996	69	14	2	53
1997	79	18	2	59
1998	86	20	4	62
1999	104	25	8	71
2000	119	24	12	83
2001	138	27	14	97
2002	142	26	17	99
2003	134	24	18	92
2004	126	23	18	85
2005	121	19	23	79
2006	120	18	24	78
2007	120	17	24	79
2008	118	17	24	77
2009	114	16	23	75
2010	116	16	23	77
2011	113	14	24	75
2012	111	14	24	73
2013	105	12	21	72
2014	105	12	22	71
2015	107	12	24	71
2016	109	11	25	73
2017	112	11	27	74
2018	117	11	32	74
2019	115	11	32	72
2020	111	10	31	70
2021	108	10	31	67
Full Sample	231	35	50	146
Delisted Funds	123	25	19	79

Table 2. Summary Statistics

This table presents the breakdown of funds across discount control mechanism (DCM) categories based on fund size. It reports the number of funds within each size category. The market capitalization of each fund is measured at IPO. The last two rows report the average and median size of a fund across DCM categories. The sample covers funds with IPOs between January 1992 and December 2021.

	All Funds	No DCM	Repurchase Discretion	Mandatory Voting	Delisted Funds
Fund Size					
<20 million	38	5	6	27	20
20-100 million	150	25	27	94	77
100-200 million	30	4	7	18	8
>200 million	12	0	8	4	4
N/A	6	1	2	1	6
Total	236	35	50	144	115
Average Size	78.46	46.99	149.35	62.75	54.80
Median Size	49.88	31.99	71.30	44.80	38.62

Table 3. Fund Liquidation

This table reports the results of a linear regression of the probability of liquidation of a closed-end fund (CEF) in year *t* on an intercept, an indicator variable of whether the fund has mandatory voting, the volatility of the discount of the fund in year *t-1* ($Disc_{t-1}$), an indicator variable of whether the fund has a non-zero management company stake (*MngmtCoStake*), an indicator variable of whether the fund is a split capital fund (*DualClass*), the fund's market value at the end of year *t-1* ($Size_{t-1}$), the return of the fund at the end of year *t-1* ($FundRet_{t-1}$), the return of the MSCI World index at the end of year *t-1* ($MarketRet_{t-1}$), and an interaction term of the mandatory voting indicator variable *MandatoryVoting* with $Disc_{t-1}$. The sample covers the period between January 1994 and December 2021. Standard errors clustered at fund level are given in parentheses. ***, ** and * indicate significance at the 1%, 5%, and 10% level.

	(1)	(2)	(3)	(4)	(5)	(6)
MandatoryVoting	0.0240	0.0281	0.00916	0.0131	0.00685	0.00963
	(0.0170)	(0.0176)	(0.0166)	(0.0171)	(0.0171)	(0.0175)
$VolDisc_{t-1}$	0.00630	-0.000486	-0.0401**	-0.0490***	-0.0402**	-0.0492***
	(0.0322)	(0.0318)	(0.0192)	(0.0181)	(0.0192)	(0.0181)
MandatoryVoting × $VolDisc_{t-1}$			0.138*	0.145**	0.138*	0.146**
			(0.0707)	(0.0678)	(0.0708)	(0.0679)
MngmtCoStake					-0.0246	-0.0367*
					(0.0184)	(0.0209)
DualClass	0.0825**	0.0709*	0.0704*	0.0586	0.0689*	0.0564
	(0.0380)	(0.0377)	(0.0380)	(0.0373)	(0.0382)	(0.0375)
$Size_{t-1}$	-0.0368***	-0.0641***	-0.0363***	-0.0641***	-0.0361***	-0.0638***
	(0.00759)	(0.0103)	(0.00751)	(0.0102)	(0.00750)	(0.0102)
$FundRet_{t-1}$	0.0223	0.0371**	0.0227	0.0376**	0.0227	0.0376**
	(0.0154)	(0.0180)	(0.0160)	(0.0186)	(0.0160)	(0.0186)
$MarketRet_{t-1}$	0.0338		0.0340		0.0339	
	(0.0236)		(0.0237)		(0.0237)	
Mngmt Fee	0.0330*	0.0221	0.0288	0.0177	0.0308*	0.0207
	(0.0180)	(0.0197)	(0.0178)	(0.0196)	(0.0182)	(0.0200)
Constant	0.154***	0.195***	0.164***	0.207***	0.164***	0.208***
	(0.0404)	(0.0434)	(0.0398)	(0.0428)	(0.0398)	(0.0429)
Observations	2,314	2,314	2,314	2,314	2,314	2,314
Number of funds	221	221	221	221	221	221
Year FE	No	Yes	No	Yes	No	Yes
R^2	0.0453	0.0510	0.0553	0.0588	0.0553	0.0593

Table 4. Liquidations with Mandatory Voting Interactions

This table reports the results of a linear regression of the probability of liquidation of a closed-end fund (CEF) in year *t* on an intercept, an indicator variable of whether the fund has mandatory voting, the standard deviation of the discount of the fund in year *t-1* ($VolDisc_{t-1}$), an indicator variable of whether the fund has a non-zero management company stake (*MngmtCoStake*), an indicator variable of whether the fund is a split capital fund (*DualClass*), the fund's market value at the end of year *t-1* ($Size_{t-1}$), the return of the fund at the end of year *t-1* ($FundRet_{t-1}$), the return of the MSCI World Index at the end of year *t-1* ($MarketRet_{t-1}$), an interaction term of the mandatory voting indicator variable with $Disc_{t-1}$, as well as interaction terms of fund size, fund return and market return in year *t-1* with *MandatoryVoting* .The sample covers the period between January 1994 and December 2021. Standard errors clustered at fund level are given in parentheses. ***, ** and * indicate significance at the 1%, 5%, and 10% level.

	(1)	(2)	(3)	(4)	(5)	(6)
MandatoryVoting	0.0123	-0.0113	0.00888	0.0520	0.00408	0.0154
	(0.0186)	(0.0642)	(0.0174)	(0.0427)	(0.0169)	(0.0784)
$VolDisc_{t-1}$	-0.0490***	-0.0515***	-0.0499***	-0.0489***	-0.0457**	-0.0485***
	(0.0181)	(0.0183)	(0.0173)	(0.0181)	(0.0182)	(0.0183)
MandatoryVoting × $VolDisc_{t-1}$	0.145**	0.150**	0.147**	0.145**	0.138**	0.144**
	(0.0679)	(0.0693)	(0.0672)	(0.0681)	(0.0685)	(0.0697)
MngmtCoStake	-0.0232	-0.0346	-0.0366*	-0.0332	-0.0379*	-0.0235
	(0.0231)	(0.0216)	(0.0209)	(0.0210)	(0.0208)	(0.0240)
$Size_{t-1}$	-0.0640***	-0.0672***	-0.0637***	-0.0643***	-0.0641***	-0.0685***
	(0.0103)	(0.0132)	(0.0102)	(0.0102)	(0.0102)	(0.0136)
$FundRet_{t-1}$	0.0377**	0.0377**	0.0303	0.0379**	0.0376**	0.0325
	(0.0186)	(0.0187)	(0.0227)	(0.0187)	(0.0186)	(0.0235)
MngmtFee	0.0218	0.0209	0.0207	0.0390*	0.0196	0.0357
	(0.0201)	(0.0200)	(0.0200)	(0.0222)	(0.0201)	(0.0224)
DualClass	0.0564	0.0549	0.0562	0.0564	0.0229	0.0194
	(0.0374)	(0.0373)	(0.0374)	(0.0375)	(0.0629)	(0.0608)
MandatoryVoting × *MngmtCoStake*	-0.0352					-0.0239
	(0.0453)					(0.0465)
MandatoryVoting × $Size_{t-1}$		0.00522				0.00616
		(0.0133)				(0.0142)
MandatoryVoting × $FundRet_{t-1}$			0.0101			0.00764
			(0.0250)			(0.0268)
MandatoryVoting × *MngmtFee*				-0.0432		-0.0357
				(0.0421)		(0.0432)
MandatoryVoting × *DualClass*					0.0229	0.0194
					(0.0629)	(0.0608)
Constant	0.206***	0.222***	0.208***	0.192***	0.213***	0.215***
	(0.0426)	(0.0588)	(0.0429)	(0.0434)	(0.0432)	(0.0610)
Observations	*2,314*	*2,314*	*2,314*	*2,314*	*2,314*	*2,314*
Number of funds	*221*	*221*	*221*	*221*	*221*	*221*
Year FE	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
R^2	*0.0593*	*0.0599*	*0.0595*	*0.0602*	*0.0593*	*0.0610*

Table 5. Repurchases

This table reports the results of a linear regression of the probability of share repurchases in year *t* on an intercept, an indicator variable of whether the fund has repurchase discretion, the standard deviation of the discount of the fund in year *t-1* ($VolDisc_{t-1}$), an indicator variable of whether the fund has a non-zero management company stake (*MngmtCoStake*), an indicator variable of whether the fund is a split capital fund (*DualClass*), the fund's market value at the end of year *t-1* ($Size_{t-1}$), the return of the fund at the end of year *t-1* ($FundRet_{t-1}$), the return of the MSCI World index at the end of year *t-1* ($MarketRet_{t-1}$), and an interaction term of the repurchase discretion variable with $Disc_{t-1}$. Repurchases are defined as a reduction in the number of shares outstanding of 5% or more. The sample covers the period between January 1994 and December 2021. Standard errors clustered at fund level are given in parentheses. ***, ** and * indicate significance at the 1%, 5%, and 10% level.

	(1)	(2)	(3)	(4)	(5)	(6)
RepurchaseDiscretion	0.0306	0.0279	0.0295	0.0274	0.0322	0.0276
	(0.0377)	(0.0386)	(0.0388)	(0.0397)	(0.0399)	(0.0406)
$VolDisc_{t-1}$	-0.0215*	-0.0150	-0.0242*	-0.0160	-0.0240*	-0.0160
	(0.0114)	(0.0120)	(0.0125)	(0.0132)	(0.0125)	(0.0133)
RepurchaseDiscretion × $VolDisc_{t-1}$			0.0295	0.0274	0.0322	0.0276
			(0.0388)	(0.0397)	(0.0399)	(0.0406)
MngmtCoStake					-0.0160	-0.00168
					(0.0558)	(0.0569)
$Size_{t-1}$	0.0193**	0.0222*	0.0193**	0.0222*	0.0196**	0.0223*
	(0.00838)	(0.0117)	(0.00838)	(0.0117)	(0.00852)	(0.0118)
$FundRet_{t-1}$	-0.0303*	-0.0560**	-0.0304*	-0.0561**	-0.0305*	-0.0561**
	(0.0173)	(0.0227)	(0.0173)	(0.0227)	(0.0173)	(0.0227)
MngmtFee	0.00544	0.00195	0.00544	0.00191	0.00653	0.00200
	(0.0364)	(0.0363)	(0.0364)	(0.0363)	(0.0367)	(0.0368)
DualClass	-0.0663*	-0.0608	-0.0663*	-0.0609	-0.0669*	-0.0610
	(0.0359)	(0.0374)	(0.0359)	(0.0374)	(0.0359)	(0.0374)
$MarketRet_{t-1}$	0.0412		0.0410		0.0409	
	(0.0479)		(0.0479)		(0.0479)	
Constant	0.0686	-0.0520	0.0688	-0.0519	0.0675	-0.0521
	(0.0532)	(0.0646)	(0.0532)	(0.0646)	(0.0538)	(0.0652)
Observations	2,305	2,305	2,305	2,305	2,305	2,305
Number of funds	221	221	221	221	221	221
Year FE	No	Yes	No	Yes	No	Yes

Table 6. Repurchases with Discretion Interactions

This table reports the results of a linear regression of the probability of share repurchases in year *t* on an intercept, an indicator variable of whether the fund has repurchase discretion, the standard deviation of the discount of the fund in year *t-1* ($VolDisc_{t-1}$), an indicator variable of whether the fund has a non-zero management company stake (*MngmtCoStake*), an indicator variable of whether the fund is a split capital fund (*DualClass*), the fund's market value at the end of year *t-1* ($Size_{t-1}$), the return of the fund at the end of year *t-1* ($FundRet_{t-1}$), the return of the MSCI World Index at the end of year *t-1* ($MarketRet_{t-1}$), an interaction term of the repurchase discretion indicator variable with $Disc_{t-1}$, as well as interaction terms of fund size, fund return and market return in year *t-1* with *RepurchaseDiscretion*. Repurchases are defined as a reduction in the number of shares outstanding of 5% or more. The sample covers the period between January 1994 and December 2021. Standard errors clustered at fund level are given in parentheses. ***, ** and * indicate significance at the 1%, 5%, and 10% level.

	(1)	(2)	(3)	(4)	(5)	(6)
RepurchaseDiscretion	0.0422	0.0858	0.0295	0.0813	0.0309	0.183
	(0.0439)	(0.0813)	(0.0416)	(0.0877)	(0.0423)	(0.132)
$VolDisc_{t-1}$	-0.0152	-0.0134	-0.0151	-0.0156	-0.0179	-0.0151
	(0.0133)	(0.0141)	(0.0135)	(0.0134)	(0.0141)	(0.0146)
RepurchaseDiscretion × $VolDisc_{t-1}$	0.000895	-0.00860	0.00432	0.00347	0.0207	0.0177
	(0.0172)	(0.0242)	(0.0169)	(0.0168)	(0.0182)	(0.0212)
MngmtCoStake	0.0604	0.00398	-0.00102	-0.00451	-0.00277	0.0550
	(0.0651)	(0.0583)	(0.0567)	(0.0570)	(0.0571)	(0.0654)
$Size_{t-1}$	0.0231*	0.0249*	0.0223*	0.0225*	0.0218*	0.0255*
	(0.0120)	(0.0130)	(0.0118)	(0.0118)	(0.0119)	(0.0131)
$FundRet_{t-1}$	-0.0564**	-0.0562**	-0.0524**	-0.0564**	-0.0559**	-0.0538**
	(0.0228)	(0.0227)	(0.0238)	(0.0227)	(0.0227)	(0.0241)
MngmtFee	-0.00162	0.00147	0.00176	0.0194	0.000967	0.0153
	(0.0365)	(0.0368)	(0.0368)	(0.0469)	(0.0370)	(0.0477)
DualClass	-0.0593	-0.0619	-0.0615	-0.0606	-0.0550	-0.0477
	(0.0375)	(0.0377)	(0.0375)	(0.0375)	(0.0398)	(0.0402)
RepurchaseDiscretion × *MngmtCoStake*	-0.118					-0.104
	(0.106)					(0.113)
RepurchaseDiscretion × $Size_{t-1}$		-0.0134				-0.0169
		(0.0182)				(0.0232)
RepurchaseDiscretion × $FundRet_{t-1}$			-0.0265			-0.0202
			(0.0374)			(0.0418)
RepurchaseDiscretion × *MngmtFee*				-0.0543		-0.0569
				(0.0719)		(0.0731)
RepurchaseDiscretion × *DualClass*					-0.0698	-0.153*
					(0.0589)	(0.0812)
Constant	-0.0531	-0.0608	-0.0521	-0.0699	-0.0499	-0.0793
	(0.0652)	(0.0669)	(0.0653)	(0.0726)	(0.0656)	(0.0749)
Observations	*2,305*	*2,305*	*2,305*	*2,305*	*2,305*	*2,305*
Number of funds	*221*	*221*	*221*	*221*	*221*	*221*
Year FE	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*

Table 7. Issuance

This table reports the results of a linear regression of the probability of share issuances in year *t* on an intercept, an indicator variable of whether the fund has mandatory voting or repurchase discretion, the discount volatility of the fund in year *t-1* ($VolDisc_{t-1}$), an indicator variable of whether the fund has a non-zero management company stake (*MngmtCoStake*), an indicator variable of whether the fund is a split capital fund (*DualClass*), the fund's market value at the end of year *t-1* ($Size_{t-1}$), the return of the fund at the end of year *t-1* ($FundRet_{t-1}$), the return of the MSCI World Index at the end of year *t-1* ($MarketRet_{t-1}$), and an interaction term of the repurchase discretion variable and the mandatory voting variable with $Disc_{t-1}$. Issuances are defined as an increase in the number of shares outstanding of 5% or more. The sample covers the period between January 1994 and December 2021. Standard errors clustered at fund level are given in parentheses. ***, ** and * indicate significance at the 1%, 5%, and 10% level.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
RepurchaseDiscretion	0.0742**	0.0567*	0.0777**	0.0596*	0.0702**	0.0537	0.0767**	0.0609
	(0.0324)	(0.0341)	(0.0335)	(0.0353)	(0.0342)	(0.0357)	(0.0360)	(0.0378)
MandatoryVoting	0.0423**	0.0340	0.0438**	0.0350	0.0437**	0.0349	0.0391*	0.0316
	(0.0213)	(0.0216)	(0.0221)	(0.0224)	(0.0222)	(0.0225)	(0.0224)	(0.0226)
$VolDisc_{t-1}$	-0.0117	-0.00815	0.000692	0.00129	-1.27e-05	0.000823	-0.000656	0.000329
	(0.0135)	(0.0131)	(0.0106)	(0.0108)	(0.0105)	(0.0108)	(0.0106)	(0.0108)
RepurchaseDiscretion × $VolDisc_{t-1}$			-0.0382**	-0.0331*	-0.0354*	-0.0307	-0.0377**	-0.0331*
			(0.0185)	(0.0195)	(0.0186)	(0.0195)	(0.0187)	(0.0199)
MandatoryVoting × $VolDisc_{t-1}$			-0.0119	-0.00674	-0.0118	-0.00678	-0.0101	-0.00568
			(0.0164)	(0.0150)	(0.0164)	(0.0150)	(0.0164)	(0.0151)
MngmtCoStake					0.0426	0.0344	-0.0718***	-0.0474**
					(0.0454)	(0.0444)	(0.0179)	(0.0208)
RepurchaseDiscretion × *MngmtCoStake*							0.0752	0.0423
							(0.0697)	(0.0674)
MandatoryVoting × *MngmtCoStake*							0.181***	0.142**
							(0.0632)	(0.0643)
$Size_{t-1}$	0.0165*	0.0122	0.0163*	0.0121	0.0157*	0.0119	0.0159*	0.0124
	(0.00907)	(0.00805)	(0.00911)	(0.00807)	(0.00910)	(0.00807)	(0.00903)	(0.00793)
$FundRet_{t-1}$	0.0513***	0.0551***	0.0516***	0.0554***	0.0517***	0.0552***	0.0516***	0.0549***
	(0.0190)	(0.0213)	(0.0190)	(0.0213)	(0.0190)	(0.0213)	(0.0189)	(0.0212)
MngmtFee	-0.0449*	-0.0443*	-0.0450*	-0.0444*	-0.0481**	-0.0468**	-0.0325	-0.0204
	(0.0236)	(0.0231)	(0.0237)	(0.0232)	(0.0235)	(0.0231)	(0.0252)	(0.0273)
DualClass	-0.0339	-0.0219	-0.0340	-0.0221	-0.0327	-0.0212	-0.0526**	-0.0507**
	(0.0252)	(0.0272)	(0.0251)	(0.0271)	(0.0253)	(0.0273)	(0.0235)	(0.0230)
$MarketRet_{t-1}$	-0.0534		-0.0533		-0.0530		-0.0529	
	(0.0464)		(0.0465)		(0.0465)		(0.0464)	
Constant	0.0551	0.178**	0.0544	0.177**	0.0583	0.180**	0.0639	0.184**
	(0.0417)	(0.0803)	(0.0418)	(0.0805)	(0.0416)	(0.0804)	(0.0417)	(0.0802)
Observations	2,293	2,293	2,293	2,293	2,293	2,293	2,293	2,293
Number of Funds	220	220	220	220	220	220	220	220
Year FE	No	Yes	No	Yes	No	Yes	No	Yes
R^2	0.0144	0.0346	0.0144	0.0346	0.0148	0.0347	0.0162	0.0358

Table 8. Size at IPO

The table reports the results of a linear regression of the market capitalization of fund *i* at IPO on an intercept and two indicator variables of whether the fund has a mandatory voting and a repurchase discretion. The sample covers funds with IPOs between January 1992 and December 2021. Standard errors clustered at fund level are given in parentheses. ***, ** and * indicate significance at the 1%, 5%, and 10% level.

	(1)	(2)	(3)	(4)	(5)	(6)
MandatoryVoting	0.0585	-0.0336	0.0543	-0.0338	0.00629	-0.0600
	(0.147)	(0.147)	(0.151)	(0.147)	(0.143)	(0.148)
RepurchaseDiscretion	0.667***	0.420*	0.616***	0.435*	0.469**	0.379
	(0.206)	(0.215)	(0.225)	(0.224)	(0.227)	(0.232)
MngmtCoStake			0.249	-0.0903	-1.775***	-1.303***
			(0.269)	(0.258)	(0.114)	(0.293)
RepurchaseDiscretion × *MngmtCoStake*					2.405***	1.372***
					(0.358)	(0.462)
MandatoryVoting × *MngmtCoStake*					1.807***	1.228**
					(0.364)	(0.485)
Constant	3.663***	3.911***	3.656***	3.911***	3.714***	3.931***
	(0.121)	(0.220)	(0.123)	(0.220)	(0.114)	(0.222)
Observations	214	214	214	214	214	214
R-squared	0.067	0.302	0.071	0.303	0.097	0.310
Year FE	No	Yes	No	Yes	No	Yes

Table 9. Long-term Performance

The table reports the risk-adjusted returns (alphas) of equal-weighted and value-weighted portfolios of all closed-end funds (CEFs) in our sample, funds with mandatory voting, funds with discretionary repurchases, funds with no discount control mechanism (*no-DCM*), as well as long-short portfolios of funds with mandatory voting and the rest of the funds (*MandatoryVoting minus Rest*), funds with mandatory voting and no-DCM funds (*MandatoryVoting minus no-DCM*), funds with mandatory voting and funds with discretionary repurchases (*MandatoryVoting minus DiscretionaryRepurchases*), and funds with discretionary repurchases and no-DCM funds (*DiscretionaryRepurchases minus no-DCM*). We report CAPM alphas, where the MSCI World index represents the market portfolio, 3-factor Fama/French alphas, where in addition to the MSCI World index as the market portfolio we use the SMB and HML European factors obtained from Ken French's website, and 3-factor Fama/French with momentum alphas, where we use the European momentum factor from the Ken French's website. The sample covers the period between January 1994 and December 2021. Standard errors clustered at fund level are given in parentheses. ***, ** and * indicate significance at the 1%, 5%, and 10% level.

	Equal-weighted			Value-weighted		
	CAPM	5-factor FF	5-factor FF with Mom	CAPM	5-factor FF	5-factor FF with Mom
All	-0.0006	0.0003	0.0006	0.0005	0.0016	0.0018
	(0.0019)	(0.0018)	(0.0017)	(0.0018)	(0.0016)	(0.0016)
MandatoryVoting minus Rest	-0.0002	0.0002	0.0003	0.0008	0.0012	0.0014
	(0.0015)	(0.0015)	(0.0015)	(0.0013)	(0.0014)	(0.0014)
MandatoryVoting minus no-DCM	0.0004	0.0010	0.0012	0.0010	0.0018	0.0019
	(0.0018)	(0.0018)	(0.0018)	(0.0012)	(0.0012)	(0.0012)
MandatoryVoting minus DiscretionaryRepurchases	0.0001	0.0005	0.0005	0.0014	0.0014	0.0016
	(0.0019)	(0.0019)	(0.0019)	(0.0023)	(0.0024)	(0.0024)
DiscretionaryRepurchases minus no-DCM	-0.0012	-0.0007	-0.0007	-0.0027	-0.0016	-0.0018
	(0.0023)	(0.0024)	(0.0024)	(0.0023)	(0.0024)	(0.0024)

CENTER FOR FINANCIAL STUDIES

CFS Working Paper Series

Recent Issues

All CFS Working Papers are available at www.gfk-cfs.de.

No.	Authors	Title
706	Roman Kräussl, Zsofia Kräussl, Joshua Pollet, and Kalle Rinne	The Performance of Marketplace Lenders
705	Rainer Haselmann, Christian Leuz, Sebastian Schreiber	Know Your Customer: Informed Trading by Banks
704	Christian Leuz, Steffen Meyer, Maximilian Muhn, Eugene F. Soltes, Andreas Hackethal	Who Falls Prey to the Wolf of Wall Street? Investor Participation in Market Manipulation
703	Christian Leuz	Towards a Design-Based Approach to Accounting Research
702	Christian Leuz, Anup Malani, Maximilian Muhn, and Laszlo Jakab	Do Conflict of Interests Disclosures Work? Evidence from Citations in Medical Journals
701	Christian Andres, Dmitry Bazhutov, Douglas J. Cumming, and Peter Limbach	Does Speculative News Hurt Productivity? Evidence from Takeover Rumors
700	Douglas J. Cumming and Pedro Monteiro	Sovereign Wealth Fund Investment in Venture Capital, Private Equity, and Real Asset Funds
699	Douglas J. Cumming and Pedro Monteiro	Hedge Fund Investment in ETFs
698	Dirk Krueger and Harald Uhlig	Neoclassical Growth with Long-Term One-Sided Commitment Contracts

Center for Financial Studies | Goethe University | Theodor-W.-Adorno-Platz 3 | 60323 Frankfurt am Main | Germany
| Phone +49 69 798 30050 | info-cfs@hof.uni-frankfurt.de | www.gfk-cfs.de