Active Mutual Fund Common Owners' Returns and Proxy Voting Behavior*

Ben Charoenwong†

Zhenghui Ni

Qiaozhi Ye

April 10, 2023

Abstract

We find that active mutual funds owning product market competitors have superior risk-adjusted returns that are not driven by industry concentration, common selection, or stock-picking ability. These funds charge higher fees but also generate persistent net-of-fee returns for investors. Funds with higher common ownership are more active voters who are more likely to vote *against* executive incentives compensation and *for* directors with existing directorships in competitors. Our findings suggest some actively-managed mutual funds have an incentive to soften product market competition and that proxy voting could serve as one mechanism for influencing corporate policy.

JEL Classification: G11, G14, G23, G32, G34, D43

Keywords: common ownership, performance evaluation, shareholder control, corporate governance

*The authors thank Sumit Agarwal, Florian Ederer, Kayla M. Freeman, Allaudeen Hameed, Ying Liu, Hoa Phan, Martin Schmalz, Yao Shen, Johan Sulaeman, Suhee Yun, Li Zhang, and participants at MFA 2023, Singapore Scholar Symposium 2022, Australasian Banking and Finance Conference 2022, International Society for the Advancement of Financial Economics 2022, CFAM 2022, NUS Risk Management Institute 2021 Annual Conference, FMCG Conference 2022, AsianFA Annual Conference 2022, and NUS Brownbag Seminar. Ben acknowledges financial support from the Singapore Ministry of Education AcRF Tier 1 Research Grant No. A-0003162-00-00. Any remaining errors are our own.

†Ben Charoenwong, Email: ben.charoenwong@nus.edu.sg, National University of Singapore Business School, 15 Kent Ridge Dr #07-69, Singapore 119245; Zhenghui Ni, Email: zhenghui.ni@u.nus.edu, National University of Singapore Business School, 15 Kent Ridge Dr, Singapore 119245; Qiaozhi Ye, Email: qiaozhi.ye@u.nus.edu, National University of Singapore Business School, 15 Kent Ridge Dr, Singapore 119245.

"I'd like to see them [airlines] boost their fares but also cut capacity."

—— A portfolio manager at Hodges Capital Management Inc. that jointly owns United Continental, Delta, American, Alaska, Virgin America, and Southwest, according to Bloomberg.

1 Introduction

Common ownership has been rising in the United States (Azar, 2012; Backus et al., 2019), sparking discussions among policymakers, industry practitioners, and academics as to whether it poses an antitrust issue.[1] Existing empirical research has focused on how firm- or industry-level measures of common ownership relate to product prices, but the evidence remains inconclusive.[2] Per Rotemberg (1984), a firm incorporating its shareholders' preferences will maximize the joint profits of its own and its competitors and soften competition if its shareholders commonly own competitors' stock. In this framework, common owners benefit from the lower product market competition. However, if common owners are rewarded, natural follow-up questions are (1) whether investors will allocate portfolios to have higher common ownership and (2) how these common owners manifest their preferences in corporate policy.[3]

In this paper, we study the returns and voting behavior of investors adopting strategies with high common ownership. We test three hypotheses. First, we study whether active investors who choose to own product market competitors are compensated for common ownership. Second, because most common owners are institutional investors that have an incentive to create value for their end clients (Lewellen and Lewellen, 2021), we test if end clients of institutional investors with high common ownership benefit net of fees. Third, we

[1]The United States Federal Trade Commission (FTC) had a one-day hearing at the New York University School of Law on December 6, 2018 titled "Hearings on Competition and Consumer Protection in the 21st Century", featuring both Commissioner of the FTC Noah Phillips as well as Commissioner of the Securities and Exchange Commission, Robert Jackson Jr, and academics whose work are cited in this paper.

[2]Some studies document that the rise in common ownership may increase product prices, like in the banking and the airline industries (Azar et al., 2018, 2019), accelerate market share growth, facilitate product market coordination (He and Huang, 2017), and increase future expected profits (Boller and Morton, 2019). Backus et al. (2020) argue the potential of common ownership effects on prices of ready-to-eat cereal is large. However, some other research finds little robust evidence that common ownership affects firm behavior (Koch et al., 2021; Lewellen and Lowry, 2021).

[3]López and Vives (2019), Azar and Vives (2021), and Antón et al. (2022) all assume that common owners do not face any incentive issues themselves, implicitly assuming that common owners always find it in their incentive to affect corporate policy in an anticompetitive way that may take the form of both passive (e.g., reduction in attention) and active (e.g., voting for M&A) mechanisms.

test whether common owners vote in favor of corporate policies that soften product market competition (a la Antón et al. 2022). Jointly, these three hypotheses shed light on the plausibility of the common ownership hypothesis by focusing on a key premise and mechanism: whether and how common ownership might generate value for common institutional owners and their clients. We test these hypotheses in the data by focusing on actively-managed equity mutual funds.

Studying actively-managed equity mutual funds has four advantages for examining the performance and implications of common ownership.[4] First, given that the total net assets allocated to actively-managed equity funds in our sample at the end of 2018 amounted to $3.8 trillion, many actively managed funds are also large common owners of companies. Second, the extant literature provides a clear and simple framework to evaluate the investment performance of mutual funds, which can be used to test the relation between common ownership presence and investment performance (e.g., Carhart, 1997). Third, active funds have a clear incentive to generate alpha. Empirically, this incentive to outperform means there is meaningful cross-sectional dispersion in returns attributable to different investment strategies, permitting a cross-sectional analysis to compare funds with different levels of common ownership. Fourth, active funds are likely more attentive investors than passive index funds, so they may have a larger impact on corporate policy than passive funds since corporate managers are more likely to internalize the preferences of attentive common investors (Gilje et al., 2020).

Our analysis proceeds in three steps. First, we derive a fund-level measure of the common ownership presence ("CO") based on the existing theoretical literature on common ownership (Rotemberg, 1984; O'Brien and Salop, 2000; Backus et al., 2019). This measure is a weighted average of competitors' pairwise profit weights in a fund's portfolio and quantifies the internalization of competitors' future profits for the portfolio companies owned by a fund. In particular, the measure comprises not only the profit considerations of competing firms but also the incentive and ability of a fund to influence a firm's corporate policy. Therefore, if firms incorporate common owners' preferences, this measure should be positively correlated with common owners' portfolio profits.[5]

[4]Following the literature, we define the universe of actively-managed mutual funds as the full universe of mutual funds excluding index funds. Therefore, our analyses include funds that are "fundamental indexers" and do not distinguish between discretionary or quantitative funds.

[5]Appendix B.1 shows a basic example featuring Cournot competition which motivates our measure.

We find that actively managed equity funds with higher CO outperform peers with lower CO, based on both factor- and benchmark-adjusted returns. In portfolio analyses, we find that the abnormal raw return of the top CO decile portfolio is 1.0% to 2.0% per year higher than that of the bottom CO portfolio and the annualized Sharpe ratio is 0.11 higher. These results are not due to alternative explanations and confounding variables like industry concentration, common selection of stocks in the portfolio, and mutual fund managers' stock picking ability. Specifically, we conduct the following four tests: (1) using portfolio double-sorting, we disentangle the common ownership effect from the effect of industry concentration and find that the results are not driven by managers' information advantage or investment skills that are linked to specific industries; (2) by double sorting on the average number of institutional investors of fund portfolio and CO measure, we further establish that the outperformance due to the common ownership presence is not attributed to the fund managers' abilities that result in commonly selecting high-performing firms; (3) using a modified measure that captures funds' asset allocation to firms with different levels of common ownership, we show that the results are not driven by fund managers' abilities to select firms with high common ownership; and (4) the active funds' common ownership presence is fairly persistent. Corroborating this evidence, we also document similar results using Fama-Macbeth and panel regressions controlling for fund characteristics.

In robustness tests, we further show these results are robust to two alternative constructions, alleviating concerns about the definition of competitors and the functional form of a firm's objective function. The first measure defines industry peers based on Fama-French 12 industry classifications rather than the Hoberg-Phillips textual network industry classifications (TNIC). The second measure is an overlapping ownership measure calculated similar to the main CO measure, except that firms' pairwise profit weights are further divided by the firms' relative investor concentration. Conceptually, for both definitions, a higher CO measure corresponds to a larger incentive for portfolio firms to internalize competitors' future profits. In addition, our results are robust when considering only 13-F or only 13-F and 13-D filings.

Our second analyses study whether active fund managers would have an incentive to adopt a high CO strategy. If fund managers must expend costly effort to monitor portfolio companies to actively soften competition and outperform, they should be compensated. A fund manager's objective function is the product of fund size and annual fees (Berk and

Green, 2004). CO can affect fund manager payoffs in two ways: fees and flows. We find that funds with higher CO have higher expense ratios and management fees. However, we do not find strong empirical evidence relating CO to average fund flows.[6] A back-of-the-envelope calculation taking into account the first-order relation between CO and higher fees suggests that a fund manager with a one-standard deviation higher CO earns around $300,000 million more annual compensation over five years (ignoring any flow effects), 17% relative to the median of $1.92 million. Incorporating flow-performance effects from higher performance attributable to CO would result in slightly larger economic magnitudes.

Finally, we study whether high-CO funds are active firm monitors and whether they vote in line with maximizing their payoffs—and for policies that potentially soften competition. Edmans et al. (2019) show that if common owners do not threaten to exit but instead express their preferences through their "voice," then they are more likely to be active monitors. First, we find that high-CO funds have lower turnover than their peers and appear to be active monitors. They tend to vote against management on contentious and management-sponsored proposals but not on proposals sponsored by shareholders. In addition, higher CO funds are more likely to vote against proposals related to executives' stock and stock option plans, consistent with Antón et al. (2022). We also find that they are more likely to vote for directors with an existing directorship with industry peers, consistent with Azar and Vives (2021). Shared director connections have been empirically documented to potentially transmit peer effects, like changes in corporate policy in response to higher hedge fund activism threats (Gantchev et al. 2019).

Although we find that funds with higher CO tend to outperform, charge higher fees but still deliver alpha to their investors, and vote for corporate policies in line with theories linking common ownership to softened competition, we do not conclude that common ownership

[6] Appendix Table C.6 shows that, unconditionally, higher CO firms appear to receive more flows on average but the relation decreases by a factor of 10 and flips signs when conditioning on a fund's cross-sectional performance. Instead, CO appears to moderate flow-performance sensitivity: increasing sensitivity for low performance and reducing sensitivity for medium and high performance. For simplicity of our back-of-the-envelope calculation, we do not consider the second-order effect of CO on flow-performance sensitivity. Interestingly, in untabulated analyses, we also find higher CO funds are also less affected by diminishing returns to scales as additional flows tend to increase CO even though it also increases size. Nonetheless, our estimates suggest higher CO funds still face diminishing returns overall, consistent with Berk and Green (2004) and Pástor et al. (2020), because the estimated coefficient on CO is lower than those from size. However, since this is not a main finding of the paper, Table 8 does not show the point estimates of what we deem are controls to save space.

causes lower competition or outperformance. For example, active funds with high CO may have an information edge on their portfolio companies, affecting both returns and voting behavior. Nonetheless, relative to the existing academic literature, we believe our findings contribute are twofold.

First, our study contributes to the broad literature on the cross-section of mutual fund performance. Previous literature has documented many factors or strategies that drive the variation in the cross-section of mutual fund performance.[7] However, to our knowledge, no study relates the common ownership facet of funds' strategies to performance and fund managers' payoffs.

Second, we contribute to the growing literature on common ownership. The extant literature mainly focuses on the effect of common ownership on product market outcomes at the firm or the industry level.[8] A notable exception is Lewellen and Lewellen (2021), who focus on management fees charged by institutional shareholders and conclude that institutional shareholders gain modestly from common ownership in the most concentrated industries. Meanwhile, we study payoffs to mutual fund common owners and the incentive that those common institutional owners have to adopt CO strategies. Different from Lewellen and Lewellen (2021), we find that managers and fund investors of some actively-managed equity mutual funds are compensated for holding product market competitors, suggesting that at least some active institutional investors are incentivized to increase common ownership. Our findings on both mutual fund returns and voting behavior also related to the literature on institutional investor corporate governance such as He and Huang (2017), who find that common institutional ownership facilitates active forms of product market coordination, such as joint ventures, resource sharing, and coordination of research and development expenditures.

[7]For example, portfolio pumping (Carhart et al. 2002); active stock selection (Cremers and Petajisto 2009); industry concentration (Kacperczyk et al. 2005); name changing (Cooper et al. 2005); fee waiving (Christoffersen 2001); cross-fund subsidization (Gaspar et al. 2006) and strategic allocation of fund managers (Fang et al. 2014).

[8]For example, see He and Huang (2017); Azar et al. (2018); Boller and Morton (2019); Azar and Vives (2019); Xie and Gerakos (2020); Charoenwong and Asai (2021).

2 Empirical Framework and Data

2.1 Background and Hypotheses

A firm's manager should act to maximize the welfare of shareholders, but shareholders' portfolios and incentives differ. Rotemberg (1984) introduces a framework where the firm solves a social choice problem and put weights on investor's incentives, which may include other competitors' profits. Recent theoretical research linking common ownership to anticompetitive effects predict that common owners of firms competing in the same product market increase their portfolio returns if they can affect corporate policy in their favor (e.g., López and Vives 2019; Azar and Vives 2021; Antón et al. 2022). Such common ownership structure might have significant implications for firms' corporate decision and economic resource allocation by undermining the independence of managers' objective functions and internalizing corporate externalities (He et al., 2019). However, if shareholders' incentives do not consider other competitors' profits, then the firm's objective function would just include own profits.

The literature on the common ownership currently tackles the empirical relation and drivers behind common ownership and product market competition (Schmalz, 2018). On the one hand, some studies find that institutional common ownership among industry competitors may have anti-competitive effects. For instance, higher common ownership associates with higher product prices in the banking and the airline industries (Azar et al., 2018, 2019), product market coordination (He and Huang, 2017), and an increase in future expected profits (Boller and Morton, 2019). On the other hand, some find little robust evidence that the common ownership affects firm behavior (Lewellen and Lowry, 2021; Koch et al., 2021).

However, although He and Huang (2017) find that institutional common ownership associates with higher profitability, theoretically, the relation between common ownership, firm profits, and welfare is not obvious. For example, López and Vives (2019) show that for demand functions of goods and services that are not too convex, common ownership can increase innovation and output. Moreover, Proposition 2 of their paper, which studies a symmetric equilibrium setup, shows that profits rise with common ownership. However, the impact on economic welfare and consumer surplus depends on the size of the spillover relative to the impact of higher prices due to decreased competition. More recently, Antón et al. (2022) present a framework whereby common ownership actually decreases a focal firm's profitability. Azar and Vives (2021) show that intra-industry common ownership reduces competition and welfare while inter-industry common ownership increases welfare. Although the impact of common ownership on focal firms' profitability is theoretically ambiguous, the payoff to common owners always increases when firms consider common owners' preferences.

To this end, rather than studying the relation of common ownership and corporate policy, we take a step back and study a simpler premise: (1) do both fund managers and their end investors actually benefit financially from common ownership? And, if so, (2) is there any corroborating evidence that fund managers affect corporate policy? Such evidence would rationalize some existing findings for the common ownership hypothesis. For example, Shekita (2020) documents 30 cases of interventions by common owners, all of which not only required common owner attention, but active participation in engaging with corporate managers.

For the former, if both fund managers and their end investors benefit from investment strategies coinciding with more common ownership, then fund investors may continue to allocate capital to funds following high common ownership strategies and fund managers may have an incentive to actively engage with management. However, empirically this relationship between net-of-fee performance and high common ownership strategies is unclear for two reasons. First, many large common owners are institutional investors who themselves have end investors. Mutual fund managers might face an agency problem (e.g., Cohen et al. 2005; Agarwal et al. 2014; Bebchuk et al. 2017). Guercio and Reuter (2014) show that actively managed funds sold through brokers face a weaker incentive to generate alpha. For this reason, funds may not be willing to make efforts to obtain anti-competitive benefits even if they are assumed to be positive. Second, if adopting a common ownership strategy also involves costly effort by the managers, these costs should also be taken into consideration. We recognize that a fund manager's objective function is the product of fund size and annual fees (Berk and Green, 2004), and can be decomposed into two components: fund performance and annual fees. Therefore, we examine the association between CO and fund returns and fees, which represent the direct impact on fund manager payoffs respectively.

For the latter, we do not seek to establish causality, but rather study whether funds with more incentive appear to be more active voters on average. In particular, we study whether the direction of voting appears to facilitate coordination with competitors as well as whether they are consistent with theoretical predictions from Antón et al. (2022), whereby common owners would tend to vote to decrease executive pay-performance sensitivity. This hypothesis follows but are not obvious from the fund voting literature.[9] For example, Matvos and Ostrovsky (2008) and He et al. (2019) document peer effects in mutual fund voting. However, other research ascribes some peer effects to proxy advisory influence (Iliev and Lowry, 2015; Heath et al., 2021). Even when explained by common ownership, He and Huang (2017) argue that the voting behavior fosters product market competition.

2.2 Derivation of Fund-Level Measure of Common Ownership

In this subsection, we derive our fund-level measure of common ownership. We introduce the firm-level measure of common ownership consistent with the existing literature. A shareholder s of a firm m has cash flow rights denoted $\beta_{s,m}$ equal to the fraction of shares outstanding that they own and $\gamma_{s,m}$ represents the control rights held by shareholder s at firm m.[10] Following O'Brien and Salop (2000); Azar et al. (2018); Backus et al. (2019), the profit weight $\kappa_{m,n}$ that firm m places on its competitors n's profits is defined as

$$\kappa_{m,n} = \frac{\sum_{\forall s} \gamma_{s,m}\beta_{s,n}}{\sum_{\forall s} \gamma_{s,m}\beta_{s,m}}.$$

This weight represents the extent to which focal firm m will take a competing firm n's profit into its own objective function.[11] When $\kappa_{m,n}$ is one, firm m treats its own profits and the profits of firm n equally in maximization of its objective function. In this case, maximizing firm n's profit is equally important as maximizing firm m's own profit. In fact, $\kappa_{m,n}$ could theoretically go beyond one. In that case, firm m places more weight on

[9] And even though Antón et al. (2022) theoretically show that common ownership may increase product prices through reduced managerial incentives and provide empirical evidence supporting the model's predictions, Walker (2019) argues existing research linking common ownership to executive pay design is flawed due to measurement and methodological issues.

[10] We call a shareholder in firm m and n a common owner if both $\beta_{s,n,t}$ and $\beta_{s,m,t}$ are greater than zero. We follow the literature in assuming $\gamma_{s,m,t} = \beta_{s,m,t}$, motivated by proportional control, the "one share, one vote" rule, which applies to most publicly traded firms in the United States economy (Backus et al., 2019).

[11] For the detailed proofs, readers can refer to Backus et al. (2019). In the framework, the profit function of the firm is the objective function of the firm, $Q_m(x_m, x_{-m}) = \pi_m$, where x_m and x_{-m} are the strategic choices made by a firm m and its competitors and firm m's objective function Q_m is based only on its own profits π_m. The framework is motivated by the assumption that a firm answers to its investors (Friedman, 1953). This is also the point of departure for the common ownership hypothesis. In a world with common owners, maximizing shareholder value yields a different objective function for the firm. We have $Q_m(x_m, x_{-m}) = \pi_m + \sum_{n \neq m} \kappa_{m,n}(\gamma_m, \beta)\pi_n$.

its competitor n's profits than its own. Profit weights are used both in the context of differentiated Bertrand price competition and symmetric Cournot competition. Specifically, they are the main constituents of the "modified HHI" used in the empirical literature of common ownership such as Azar et al. (2018).[12]

From the equation above, the pairwise profit weight $\kappa_{p,m,n}$ specific to fund p is defined as

$$\kappa_{p,m,n} = \frac{\gamma_{p,m}\beta_{p,n}}{\sum_{\forall s}\gamma_{s,m}\beta_{s,m}}.$$

This measures the value to the focal firm m of a dollar of profit generated for the commonly owned competing firm n specific to the holdings of the common owner fund p. It follows that the value to the focal firm m of a dollar of profit generated for all commonly owned competing firms specific to fund p can be defined as:

$$\kappa_{p,m} = \frac{\sum_{\forall n \neq m}\gamma_{p,m}\beta_{p,n}}{\sum_{\forall s}\gamma_{s,m}\beta_{s,m}}. \tag{1}$$

Lastly, we define our measure of fund-level common ownership presence, CO_p, as follows:

$$CO_p = \sum_m w_{p,m}\kappa_{p,m}, \tag{2}$$

where $w_{p,m}$ is the portfolio weight fund p invests in firm m.

Analogous to the definition of profit weight, CO_p measures the extent of common ownership within a fund p's holdings, and can be interpreted as the portfolio-weighted average value, specific to fund p, of a dollar of profits accruing to firm m's competitors, relative to a dollar of profits for firm m, in firm m's maximization problem. The intuition is that, as common ownership increases, the competition reduces and firms gain more profits. As a result, common owners get a proportion of the larger profits. Appendix B.1 presents a simplified example featuring Cournot competition to illustrate this intuition more clearly. Note that while the numerator of $\kappa_{p,m}$ is the aggregate common ownership of fund p across firm m's competitors, the denominator of $\kappa_{p,m}$ is firm m's ownership concentration based on all available ownership data, including 13F, 13D, 13G, and others, not just fund p's own-

[12] The modified HHI (MHHI) introduced by Bresnahan and Salop (1986) comprises normal HHI and an MHHI delta. The MHHI delta captures the additional concentration of the market due to the common ownership computed above.

ership.[13] Therefore, larger funds tend to have higher $\kappa_{p,m}$. However, simply gaining assets under management by holding other stocks that did well does not mechanically increase CO_p, since $\kappa_{p,m}$ is weighted with portfolio weight $w_{p,m}$. Therefore, for a larger fund to have a higher $CO_{p,m}$, it must also consider its allocation $w_{p,m}$. Maintaining existing portfolio weights and increasing assets under management will increase CO_p since $\kappa_{p,m}$ rises and $w_{p,m}$ remains fixed for all positions m. In this sense, CO_p not only measures the consideration for profits of competing firms, but also the ability and incentive of a fund p to influence the policies of firm m. Further, because CO_p depends crucially on a fund's portfolio allocation, we view it as part of a fund's strategy.

Therefore, if firms incorporate common owners' preferences in their corporate policies, this measure should be positively correlated with common owners' portfolio profits. In other words, a positive association between CO_p and fund returns indicates that funds get financially rewarded when they contribute to the common ownership among industry competitors. CO_p is bounded below by zero. When it is equal to zero, fund p holds a single firm or a set of firms that are not product market competitors. In both cases, fund p makes zero contribution to the profit weights. Like $\kappa_{m,n}$ and the "modified HHI", the upper bound on CO_p is not bounded above. When it is greater than one, a fund invests in firms which place more weight on their competitors' profits than their own. However, the converse is not true. Firms placing more weight on competitors does not imply a fund-level CO measure greater than one. The firm-level profit weights can be larger than one (firms care more about competitors' profits than their own), but the fund-level CO measure may still be far less than one because the CO measure is the portfolio-weighted profit weights specific to a fund.

Our definition of CO_p requires fund p to hold both firm m and its competitor n to make $\sum_{\forall n \neq m} \gamma_{p,m} \beta_{p,n}$ in CO_p non-zero. If fund p only holds firm m without holding its competitor n, then the incentive and the ability of facilitating coordination between firm m and n would be low. Even if a fund obtains outperformance by holding only one side of a pair of competitors, it's possible that fund p purely picks stocks or free-rides other funds holding both firm m and n. Therefore, our empirical analyses will seek to disentangle these effects.

In our main analyses, competitors are identified by the Hoberg-Phillips TNIC data set, defined on an annual basis. In robustness checks, we consider using the Fama-French 12 industry classifications in the computation of the profit weights and an alternative CO measure

[13] Our robustness tests focusing only holdings data from 13F and 13Ds shows consistent results.

based only on the overlapping ownership through a cosine similarity between fund holdings. In the following sections, CO refers to CO_p from equation (2).

2.3 Data Sources

Our sample is constructed by merging fund characteristics, stockholdings, stock characteristics, and fund voting data from different sources of databases. In our analyses, we use observations at two different levels: (1) fund-by-month observations to study returns and fund characteristics and (2) fund-by-year observations to study fees and voting characteristics.

We obtain fund names, monthly returns, monthly total net assets (TNA), investment objectives, and other fund characteristics from the CRSP Survivorship Bias Free Mutual Fund Database. Similar to prior studies (Kacperczyk et al., 2005; Huang et al., 2011), we identify actively managed United States equity mutual funds based on their objective codes and their disclosed asset compositions.[14] Because data coverage on the monthly TNA and quarterly portfolio holding prior to 1999 is limited and with poor quality, our sample period spans from January 1999 to December 2018. We filter funds to be domiciled in the United States, and exclude money market funds, index funds, fixed income funds, and also funds which manage less than \$5 million in the previous month and those whose total equity holding in dollar value (calculated from the mutual fund holding data discussed below) is less than \$5 million in a quarter. For funds with multiple share classes, we calculate the weighted average monthly fund returns by the weights of share class TNA.

We obtain mutual funds' portfolio holdings from the Thomson Reuters Mutual Fund Holdings Database (S12) and the CRSP Mutual Fund Holdings Database. Recent studies show that the Thomson stockholdings data have problems on missing new funds after 2008 (Zhu, 2020), while CRSP portfolio holdings data are "inaccurate prior to the fourth quarter of

[14] From Huang et al. (2011): "We first select funds with the following Lipper objectives: CA, CG, CS, EI, FS, G, GI, H, ID, LCCE, LCGE, LCVE, MC, MCCE, MCGE, MCVE, MLCE, MLGE, MLVE, MR, NR, S, SCCE, SCGE, SCVE, SG, SP, TK, TL, UT. If a fund does not have any of the above objectives, we select funds with the following Strategic Insights objectives: AGG, ENV, FIN, GMC, GRI, GRO, HLT, ING, NTR, SCG, SEC, TEC, UTI, GLD, RLE. If a fund has neither the Lipper nor the SI objectives listed above, then we use the Wiesenberger Fund Type Code to select funds with the following objectives: G, G-I, G-S, GCI, IEQ, ENR, FIN, GRI, HLT, LTG, MCG, SCG, TCH, UTL, GPM. If none of these objectives are available and the fund holds more than 80% of its value in common shares, then the fund will be regarded as equity fund."

2007" (Schwarz and Potter, 2016). To circumvent data quality problems, we consolidate the Thomson stockholdings data before the second quarter of 2010 with the CRSP stockholdings data on and after that quarter. The consolidated data include ownership from institutional and individual owners, using all available 13-F filings, 13-D filings, and 13-G filings. In addition, we include other publicly-reported ownership and only keeps firms with a minimum of 10% available aggregated ownership across subsidiaries and related companies (our results remain robust without this restriction).[15] To tackle asynchronicities in reported holdings, we keep the fund stockholdings reported at each quarter end. For those who did not report at the quarter end, we use their most recent holding positions before each quarter end.[16] To the best of our knowledge, this is the most comprehensive ownership data used for calculating firm-level profit weights.[17] For common ownership calculation, we use the Hoberg-Phillips TNIC data which provide the pairwise competition linkages based on textual analysis on firms' product information.[18] In a robustness check, we use the Fama-French 12 Industry Classification to identify industry peers.

We obtain stock fundamentals data from the CRSP-Compustat Merged database. The returns of Fama-French five-factors and momentum factors are sourced from Kenneth French's

[15]13-F filings are for registered investment companies like funds, 13-D filings also apply to individuals who own greater than 5%, and 13-G filings is a simplified version of form 13-D which may apply to owners who also satisfy additional criteria like being a qualified institutional owner under Rule 13d-1(b), a passive investor in terms of exercising control over a company (Rule 13d-3(b)), and owning less than 20% of the firm. In our Thomson Reuters ownership data with information on 94.6 million owner-firm reports, 13-F's constitute slightly over 80% of filings, 13-D's constitute 0.09%, and 13-G's constitute 0.16%. The remaining fraction come from other sources. Other reported ownership may be subject to voluntary disclosure and include news updates, proxy filings, fund prospectuses, Form 20-F, Form 3's, shareholder reports, and even foreign regulatory filings which apply to foreign owners of the American firms in our sample. If an individual or institution reports more than one filing for a firm in a quarter, we keep the filing which records the largest shareholding.

[16]The CRSP Mutual Fund Holding data miss out a large number of funds before the second quarter of 2010. The number of unique active funds, according to our definition of active funds, jumps from 138 in Q1 2010 to 1,451 in Q2 2010.

[17]Previous studies mostly use 13-F fillings, which omit the impact of individual investors's ownership on firms. And although individuals and institutional investors filing schedule 13-G must satisfy the criteria of having "no intention of influencing control" of the issuer among other criteria for 13-D exemption, they hold significant stakes on firms even if these investors are not actively voting their shares to affect corporate policy. Amel-Zadeh et al. (2022) show the importance of accounting for filings other than the 13-F to measure ownership composition.

[18]In the TNIC data, the score variable measures the similarity of products among rivals. Pairwise firms are treated as competitors if the similarity score exceeds the minimum threshold needed to be included in the database.

website. The factor returns of the q-factor model are from the Hou-Xue-Zhang q-factors data library. We consider common stock held by mutual funds which are listed on the NYSE, Nasdaq, or AMEX stock exchanges. We restrict our sample to have stocks with complete information on month-end prices, monthly returns, four digits SIC industry code, and annual net sales. Stock prices, returns, and number of outstanding shares are sourced from CRSP. Fundamentals data come from Compustat.

We obtain fund voting data from ISS Voting Analytics dataset that includes all management and shareholder proposals for public companies in their proxy statements after 2003. For each proposal, the dataset contains the information on the short description of the proposal, the type of proposal categorized using ISS's system (ISSAgendaItemID), management recommendation, and mutual fund votes for the proposal, against the proposal, abstaining from voting, and withholding. We match the fund name provided by ISS with the ones by CRSP and TR (6,522 funds in ISS are identified). Because this study focuses on the proposals potentially related to competition, we keep the proposals on executive stock compensation (ISSAgendaItemID: M0501, M0503, M0507, M0509, M0510, M0522, and M0524) and election of CO-directors (M0201). CO-directors are defined as those who have existing directorship in at least one competitor identified in the Hoberg-Phillips TNIC data when they are elected as a director of a focal firm.

Consolidating the above datasets results in a final sample including 6,705 actively managed equity funds with 377,343 fund-month observations. Since we consolidate CRSP and TR mutual fund dataset, 3,373 unique funds are identified in the CRSP sample and 3,332 funds in the TR sample. In many cases, a fund has two separate identifiers, one in each subsample. We coalesce the datasets to maximize the sample and lose some observations when estimating rolling alphas. Table 1 reports summary statistics for our sample.

[Table 1 Here]

3 Common Ownership and Mutual Fund Returns

This section first describes mutual funds' common ownership characteristic and then studies whether funds with higher CO have higher returns, both gross and net-of-expenses. After that, we address alternative explanations and potential confounders of the results.

3.1 Common Ownership As a Fund Strategy

We observe a substantial variation in CO measure across actively managed equity mutual funds. The maximum CO measure is 7.12% after winsorization at the 99% level, with a median of 0.2 basis points. Figure C.1 shows the histogram of the CO measure with a log scale, suggesting a log-normal-like distribution where a small fraction of funds appear to adopt investment strategies with high CO. Table 2 shows some of the top CO funds across different years in our sample.[19]

[Table 2 Here]

CO appears to be a persistent characteristic of mutual funds. The CO measure is autocorrelated with a coefficient of 0.809 (Table C.1). However, the absorbing states appear driven by funds with extreme high or low CO. Table C.2 shows that a fund in the lowest decile of CO in a quarter is over 86% likely to stay in the same decile in the next quarter, while those in the top decile are over 91% likely to stay in the same decile quarterly. Other deciles are slightly less absorbing, with between 60-78% likely to stay in the same decile. For example, the CO measure for Hodges Capital Small Intrinsic Value Fund, quoted in the introduction of this paper, increases from the bottom half in 2014 to the top quintile in 2018. This allocation is consistent with the portfolio construction methodology on Hodges Capital's website stating their managers may "concentrate the number of holdings in the portfolio within a certain sector during a sector pull back".[20]

Table 3 shows the 6-factor (Fama and French (2015) with momentum) loadings of funds in different decile portfolios of CO. There does not seem to be a distinguishable pattern or statistically significant difference (at the 5% level) in the loadings in the high-minus-low CO portfolio of funds for the loadings on the market, value, profitability, investment, or momentum factors. However, funds with higher CO tend to have higher loadings on the size factor. The size loadings monotonically increase with deciles of CO, and the loading on the high-minus-low CO decile portfolio is 0.173 with a t-statistic of over 5. This is not surprising since the definition of CO (equation 2) shows that all else equal, a fund holding smaller stocks have a higher $\kappa_{p,m}$ (equation 1). In words, this means taht for the same dollar

[19] Although the top CO funds also appear to be sector funds, our later analyses show that sector funds and industry concentration alone do not drive our results.

[20] See https://hodgescapital.com/process as of July 2022.

allocation to a stock, allocating toa smaller stock gives the fund a larger influence on that company's policies.[21]

[Table 3 Here]

And although CO is defined based on competitors in the same industry classification, it is not purely driven by funds specializing in a particular industry. For example, the correlation between Kacperczyk et al. (2005)'s industry concentration (IC) measure and CO is 0.12. In addition, removing sector funds from our analyses does not affect the summary statistics and empirical results below. Therefore, even though funds may not allocate their portfolios to hit a particular value of CO, CO is a characteristic of a fund's strategy that is not accounted for in factor exposures or standard industry measures.

Corroborating our derivation of CO measure, Figure C.2 shows the time series evolution of the average firm pairwise profit weights, consistent with an increasing pattern documented in Backus et al. (2019). Interestingly, we document a decreasing trend in the average fund common ownership. We are agnostic to the potential drivers that deter average mutual funds from allocating assets among product market competitors in recent years.

In the following analyses, we first test whether higher CO strategies associate with higher returns. Then, we show that the relation between CO and returns are not driven by other fund strategy characteristics like industry concentration, mutual funds picking common stocks, and stock picking ability.

3.2 Fund Returns

Portfolio Sorts. To evaluate fund performance, we use both risk- and benchmark-adjusted return measures. For risk-adjusted returns, we consider the 6-factor (Fama and French (2015) with momentum), Ferson and Schadt (1996), Pastor and Stambaugh (2003), and q-5-factor (Hou et al., 2021) models to calculate alpha. For example, the Fama-French 6-factor alpha

[21] Our CO measure is based on control/cash flow rights of funds and doesn't depend on the market capitalization of portfolio firms, so funds can achieve a higher CO by investing more in smaller companies. To illustrate, consider two hypothetical funds, A and B, each with a portfolio of \$10 million, investing in three firms: X (\$100 million), Y (\$1 billion), and Z (\$10 billion). Fund A invests equally in X and Y, while fund B invests equally in Y and Z. As a result, fund A owns a higher percentage of portfolio firms than fund B, and thus has a higher CO. This also means that fund A can exert greater control over corporate decisions compared to fund B, despite the equal dollar allocations.

is the intercept from the following time-series regression:

$$r_{p,t} - r_t^f = \alpha_p + \beta^M \left(r_t^M - r_t^f\right) + \beta^S SMB_t + \beta^H HML_t + \beta^R RMW_t + \beta^C CMA_t + \beta^U UMD_t + \varepsilon_{p,t}, \tag{3}$$

where $r_{p,t}$ is the return in month t for fund portfolio p, r_t^f is the Treasury-bill rate in month t, r_t^M is the value-weighted stock market return in month t, and SMB_t, HML_t, RMW_t, CMA_t, and UMD_t correspond to the Fama-French size, value, profitability, investment, and momentum factors, respectively.[22]

Using the Morningstar benchmark data, we calculate the benchmark-adjusted returns as

$$\alpha_p^{BM} = r_{p,t} - r_t^{BM(p)}, \tag{4}$$

where the indices follow from equation 3 and $r_t^{BM(p)}$ is the return of the benchmark identified by Morningstar for fund portfolio p. For all of these analyses, standard errors are Newey-West corrected up to three lags, allowing for autocorrelation in returns for up to one quarter.

[Table 4 Here]

Table 4 reports the results from portfolio sorting. In each quarter during the sample period, we sort funds into decile portfolios by their most recent quarterly CO measure and compute the value-weighted risk- and benchmark-adjusted returns in the next quarter using the models specified above. In Panel A, we find that actively managed equity mutual funds with a larger degree of common ownership presence exhibit better gross performance. The adjusted returns of funds in the top decile of CO are 1.08 to 1.92% per annum (9-16 basis points per month) greater than those in the bottom decile of CO. Figure **??** shows the cumulative returns on a long-short portfolio based on CO throughout our sample. Although the return volatility is also higher, the overall annualized Sharpe ratio of high CO funds is also 0.11 higher than those of lower CO funds. Panel B in Table 4 shows that the higher gross returns also appear to flow through to higher net-of-fee returns.

For robustness, we also consider three alternative measures on fund common ownership presence, all detailed in Appendix. The first considers Fama-French 12 industries rather

[22]The Fama-French data are downloaded in January 2021.

than Hoberg-Phillips classifications (Table C.3). The second is built on the current profit weight measure ($\kappa_{f,m}$) but the relative investor concentration component is removed from the calculation of the CO measure (detailed in Appendix B.2 and reported in Table C.3). The third considers alternative fund ownership measures, considering only 13-F filings as well as 13-F and 13-D (Table C.4). Appendix Tables C.3 and C.4 report the portfolio sorting results for the two alternative measures respectively. We find a consistent positive relation between active investors' performance and their common ownership presence. In addition, we also consider a multivariate regression analysis.

Regression Analysis. In this analyses, we consider the Fama-MacBeth regression which controls for mutual fund characteristics that have been shown to be associated with fund performance using the following specification:

$$r_{p,t} = \alpha + \beta CO_p + cZ_{p,t-1} + \eta_{p,t}, \tag{5}$$

where CO_p is the measure of common ownership presence of fund f in the most recent quarter, $Z_{p,t-1}$ is a matrix of control variables including lagged one-month log total net assets (TNA), lagged fund expense ratio, lagged fund turnover ratio, lagged fund flow, lagged fund age, and the lagged fund returns. The dependent variable $r_{p,t}$ is either monthly gross or net-of-fee raw returns, Fama-French 6-factor alpha, Ferson and Schadt (1996) alpha, Pastor and Stambaugh (2003) alpha, q5-factor alpha, or benchmark-adjusted return. The alphas are the difference between actual and expected fund returns with factor loadings being estimated based on rolling 36-month regressions.[23]

Panel A in Table 5 reports the Fama-MacBeth regression results for gross returns and Panel B reports the results for net-of-fee returns. Across both panels in all specifications, fund performance is statistically significantly positively associated with CO after controlling for standard fund characteristics. In terms of economic magnitude, a one-standard-deviation increase in CO (0.930%) is associated with a 2.0-basis-points increase in monthly Fama-French 6-factor gross alpha (column (2) in Panel B). The improvement in alpha is meaningful given

[23]The alphas for most of the funds during the period from 2010 Q2 to 2013 Q2 cannot be estimated in the CRSP sample alone because these funds are missing in the three-year estimation window before 2010 Q2. We remedy this issue by estimating the alphas for these funds in this period based on the TR sample and then adding the alphas to the corresponding CRSP funds using MFLink.

that the average net-of-fee alpha is negative 10 basis points monthly. Appendix Figure C.3 showing a bin-scatter plot of the residualized Fama-French 6-factor alpha and CO measure suggests that the relationship do not appear driven by outliers. Finally, as additional robustness, we consider panel regressions in Table C.5 with year-month fixed effects and standard errors clustered at the fund and year levels. We find quantitatively and qualitatively similar results.

Overall, the results in the Fama-MacBeth regression approach are qualitatively and quantitatively consistent with that in the portfolio sorts. Funds with higher CO measure tend to have higher gross and net-of-fee returns, suggesting that not only do funds with higher CO measure tend to do better in terms of average returns and Sharpe ratio, they also share the gains with their end investors.

3.3 Alternative Explanations

The above analysis shows that there is a positive relation between fund-level common ownership presence and fund performance. This subsection considers three alternative explanations which may be driving our results: industry concentration effects, common selection, and stock picking skills by using conditional double-sorting portfolio analyses. In all three analyses below, we consider sequential sorted portfolios, first by the potential confounding explanatory variables and then by CO.[24] For conciseness, we only report the low, high, and HML CO sub-portfolios.

Confounding Industry Concentrations. Actively managed funds who employ CO strategies may also tend to concentrate holdings in specific industries, perhaps where they have an information advantage. Therefore, CO might be correlated to industry concentration measure. Since Kacperczyk et al. (2005) document that funds concentrating in certain industries tend to outperform funds that diversify across industries, a plausible concern is that our main results are driven by the industry concentration effect. Conceptually, high industry concentration, as developed by Kacperczyk et al. (2005) based on portfolio concentration on 10 industries, does not necessarily result in high common ownership presence, measured

[24]We use a sequential sort to maintain observation balance across different portfolio measures. In untabulated analyses, we find that independent double sorted portfolios generate consistent results but with lower statistical power.

based on direct product market concentration in our study. Conversely, a high CO strategy does not necessarily lead to industry-concentrated portfolios since fund managers are not required to be equipped with industry expertise to execute the CO strategy, even though the CO measure is constructed following the same industry definitions as in Kacperczyk et al. (2005).

[Table 6 Here]

To further control for the industry concentration effect, we follow Kacperczyk et al. (2005) to construct the industry concentration measure (IC) and consider a double-sort. We first sort funds into tercile portfolios by IC measure and then into quintile sub-portfolios by CO in each quarter (3×5 sequential sorts). Table 6 Panel A reports the double sorting results. We find that funds with higher CO still obtain statistically better risk-adjusted performance even for a set of funds with low industry concentration. Therefore, industry concentration effect alone cannot drive our results. This is not surprising, as the correlation between IC and CO is below 0.2. Finally, our results also persist when removing sector funds from our sample and when including industry-concentration measures as a control in Fama-MacBeth regressions.

Common Stock Selection. Another alternative explanation is the common selection effect, meaning that funds may commonly select the stocks with good investment potential and those stocks subsequently perform better. For example, Alti and Sulaeman (2012) and Sias et al. (2006) find that the number of institutional investors is a better predictor for stock return than aggregate institutional ownership. We measure the common selection effect by the weighted average of changes in the number of institutional investors in fund portfolio. To this end, we first calculate the change in the number of distinct institutional investors for each stock that a fund holds in each quarter and then aggregate this number to the fund level by the weights of the stocks in the fund portfolio.[25]

In Table 6 Panel B, to control for the common selection effect, we first sort funds into tercile portfolios by their weighted number of institutional investors and then into quintile

[25] Backus et al. (2019) provide a vivid example to illustrate why the profit weights do not directly depend on number of investors. They consider that, in a market with just two firms, there are N identical common owners each of whom hold 1% and x% of ownership in firm A and B respectively. Then the profit weight that firm A (B) places on firm B's (A's) profit is x (1/x). Both profit weights do not directly depend on N the number of common investors.

sub-portfolios by CO measure in each quarter. We find that, conditioning on institutional presence, funds with higher CO still obtain statistically significant risk-adjusted performance. Therefore, our results are not only driven by the common selection effect.

CO Stock Picking. Another concern is that the outperformance of the funds with large common ownership presence may be attributed to fund managers' ability on selecting firms with high profit weights. Put differently, fund managers may simply allocate investment into the firms with high firm-level common ownership without taking significant stakes on the firms. To address this concern, we construct the CO stock picking measure (COSP):

$$COSP_p = \sum_m w_{p,m}\kappa_m, \tag{6}$$

where $\kappa_m = \sum_n s_n \kappa_{m,n}$. We first calculate the firm-level common ownership measure κ_m by summing all pairwise profit weights, $\kappa_{m,n}$, of the firm m to its competitors n weighted by s_n, the relative sales percentage. Then, $COSP_p$ is the sum of the profit weights for all the stocks held in portfolio p in quarter t, weighted by the portfolio weights of the stocks $w_{p,m}$. Different from the CO measure, $COSP_p$ takes into consideration the common ownership of all institutional investors on a firm and does not require the fund to invest in both the focal firm and its competitors. Funds that invest in a firm but do not invest in its competitors are less likely to actively engage in corporate decision making to soften competition since they would only gain if the focial firm outcompetes its competitors. Hence, we do not expect $COSP_p$ to be predictive of fund performance by itself.

Similar to the previous two analyses, we first sort funds into tercile portfolios by $COSP_p$ and then into quintile sub-portfolios by CO in each quarter and report the value-weighted monthly returns in the next quarter. Table 6 shows that given a CO group, funds with high $COSP_p$ measure do not perform better than those with low COSP. However, we find an interesting interaction between CO and $COSP_p$ — the outperformance of high CO funds is higher in the high COSP portfolios, suggesting that the effectiveness of a fund's CO strategy is affected by the level of common ownership from other shareholders. In other words, there appears to be some strategic complementarities: having high CO among portfolio companies that are more cross-held by other shareholders correlates with larger alpha.

Altogether, these three sets of analyses above suggest neither industry concentration effects, common selection, nor stock picking skills appear to be driving our results.

3.4 Return Persistence

Our last analysis relating CO and fund performance studies whether the persistence in alphas appear to line up with the persistence in CO. We repeat the portfolio sort analysis using lagged CO measures from 1 to 6 years, studying both the average CO measure as well as Fama-French 6 factor net-of-fee alphas. Table 7 Panel A shows the persistence of the mutual fund common ownership strategy and Panel B shows the persistence of 6-factor net-of-fee alphas.

[Table 7 Here]

We find that funds with high CO consistently outperform those with low CO for at least six years after the formation of the portfolios. The results indicate that the funds' common ownership presence remains persistent across all fund portfolios. Funds that have large common ownership presence in the past also tend to have large presence in the future for at least six years after forming the portfolios. One reason for such persistence could be that corporate policies take time to be approved and implemented. Hence, we expect that competition decays in a gradational manner and fund performance steps up accordingly. We investigate the incentives of fund managers to adopt high CO strategies in the next section.

4 Fund Manager Payoffs

In this section, we study how CO relates to fund manager payoffs. To do so, we adopt the framework from Berk and Green (2004) and consider the first-order effects of fund managers payoffs from management fees. Since high CO managers generate positive gross and net-of-fee alphas, we next study whether fund managers also share in the surplus by charging higher fees. Then, taking the results from fund returns and fees together, we conduct a simple back-of-the-envelope calculation to estimate the relation between CO measure and fund managers' compensation.

4.1 Fund Fees

To study the differences in fees, we use a panel regression with fund-by-year observations with the following specification:

$$ExpRatio_{p,t} = \alpha_{j(p),t} + \beta CO_{p,t} + X'_{p,t-1}\Gamma + \varepsilon_{p,t}, \tag{7}$$

where p indexes a fund, $j(p)$ is the fund family, and t indexes a year. The control variables in $X_{p,t-1}$ include lagged TNA, expense ratio, turnover ratio, flows, fund age, and fund returns. In addition, we include fund family-by-year fixed effects $\alpha_{j(p),t}$ to account for time-varying fund family policies (e.g., Hortaçsu and Syverson 2004; Gil-Bazo and Ruiz-Verdú 2009; Guercio and Reuter 2014). Standard errors are clustered by both the fund and year, allowing for shocks to fees that commonly affect all funds as well as autocorrelated shocks within a fund through time.

[Table 8 Here]

Table 8 shows that, after controlling for time-varying fund and fund-family characteristics, CO is positively associated with management fees and expense ratios—both in the cross-section (columns (1) and (3)) as well as within fund family (columns (2) and (4)). In terms of economic magnitude, funds with a one-standard-deviation higher CO (of 0.93%) is associated with a 4.56-basis-points higher expense ratio (column (1)) and 2.44-basis-points higher management fee (column (3)).

To evaluate whether the relation between CO and fund manager fees is plausibly meaningful as an incentive for fund managers to adopt higher CO strategies, we next consider the average fund manager's compensation.

4.2 Implications for Fund Manager Compensation

We conduct a simple back-of-the-envelope calculation similar to Lewellen and Lewellen (2021). However, where Lewellen and Lewellen (2021) consider an exogenous increase in the value of a portfolio position, we consider the payoff to a manager using a higher CO strategy. Following Berk and Green (2004), fund manager p's objective is to maximize their own compensation, which is broken down into

$$Compensation_{p,t} = TNA_{p,t-1} \times (1 + r_{p,t}) \times (1 + Flow_{p,t}) \times (1 - ExpRatio_{p,t}) \times ManageFee_{p,t}, \tag{8}$$

where $TNA_{p,t-1}$ is the lagged total net assets, $r_{p,t}$ is the gross monthly return, $Flow_{p,t}$ is the fund flow represented as a fraction of $TNA_{p,t-1}$, $ExpRatio_{p,t}$ is the fund's expense ratio, and $ManageFee_{p,t}$ denotes the management fee.

From the previous regression results with the strictest specifications, funds with a one-standard-deviation (0.93%) higher CO have 3.35 basis points higher monthly raw gross returns (column (1) of Panel A in Table 5), 2.45 basis points higher annual expense ratio (column (2) of Table 8), and 1.20 basis points higher annual management fees (column (4) of Table 8). Table C.6 in the Appendix shows that average fund flows are not significantly affected by CO directly conditional on fund returns, and there is no existing theory suggesting that fund-level CO should be unconditionally correlated with fund flows. Therefore, we assume no relation between CO and average fund flows.

For a typical fund in our sample with median value of all characteristics, fund managers earn around 2% (approx. $38,000) more annual compensation relative to the median of $1.92 million if they adopt a strategy with a one-standard-deviation higher CO. Over 5 years, the fund manager earns around 17% (approx. $300,000) more cumulative compensation, since the increase in annual compensation compounds through the CO-return relation. This calculation shows that taking the results from fund returns and fees together, active mutual fund managers seem to have an incentive to employ common ownership strategy.

We believe our estimate of the first-order effect of CO on managerial compensation is a lower bound. Although the average relation of CO and fund flow conditional on cross-sectional performance is marginally statistically significanly negative, the economic magnitude is small with funds in the highest decile of CO seeing on average 0.36 to 0.38% less flow (Table C.6). In addition, we find a non-trivial relationship between CO and flow-performance sensitivity. Table C.6 in the Appendix shows that CO dampens inflows for funds with high returns but increase outflows for funds with low returns. However, overall higher returns still relate to more inflows even with the dampened effects. Therefore, since higher CO is related to higher returns on average, the flow-performance relation will result in an even larger economic magnitude than that reported above. For simplicity, we do not consider this third-order relation of CO on flow-performance sensitivity in the back-of-the-envelope calculation.[26]

5 Fund Manager Voting on Corporate Policies

So far, we find that not only do funds with higher CO tend to do better, their investors also do better despite their charging higher fees. The higher fees could also reflect a compensation for costly effort to monitor or affect corporate policy among competing firms. Therefore, in this section, we study whether funds with higher CO tend appear to engage with their portfolio companies in a manner consistent with the common ownership hypothesis. If the active mutual fund managers with higher CO generate outperformance by affecting corporate policy, they should (1) have more outperformance if they hold their positions for longer, and also (2) actively vote to maximize their portfolio returns and thereby reduce incentives for competition between product market competitors.

If active mutual fund managers were able to time or directly affect corporate policy to soften product market competition, we would expect funds with lower turnover to exhibit better performance from adopting high CO strategies as they have longer holding periods to benefit from the additional portfolio firm profitability. Therefore, for each quarter, we sort the funds into tercile portfolios, first by their turnover ratio and then into quintile portfolios by the CO measure (3×5 sequential sorts). Table 9 shows that the abnormal returns of the high CO minus low CO portfolio of funds is most statistically significant in the portfolio with lowest turnover, followed by those in the medium turnover, while the performance of the CO strategy generally becomes statistically insignificant in the top turnover portfolios.[27] This finding supports our hypothesis that, to exploit the common ownership effect, common

[26] Another source of heterogeneity affecting these results may be how funds are distributed. Guercio and Reuter (2014) use data from Finance Research Corporation to show that active mutual funds which are directly sold to investors have more incentive to generate outperformance compared to those which are sold through brokers. Unfortunately, we are unable to access the same or extended data for our sample to study how fund manager incentives may be affected by such market segmentation. Nonetheless, we believe our calculations above to be conservative, as funds with less incentive to generate alpha may be less likely to adopt a strategy with high CO.

[27] In an untabulated analyses, we show that splitting funds into two rather than three segments of turnover shows the outperformance of the CO strategy only exists in the below-median-turnover portfolios.

owners are likely to be the middle- and long-term shareholders.

[Table 9 Here]

Then, we investigate the relation between CO and fund voting based on different corporate policy proposals. Motivated by the voice model of Edmans et al. (2019) showing that common owners have higher incentives to monitor, we use the classifications and recommendations from Institutional Shareholder Services (ISS) to study (1) whether active mutual funds with higher CO tend to be more active monitors (Heath et al., 2021), and whether (2) they tend to vote for reducing executive pay-performance sensitivity (Antón et al., 2022) and for the appointment of more "common directors" (Azar and Vives, 2021).

Our analyses use a panel regression of the form

$$Vote_{p,k(i,t)} = \alpha_{j(p),t} + \gamma_{k(i,t)} + \beta CO_{p,t} + X'_{p,t-1}\Gamma + \varepsilon_{p,k(i,t)t}, \tag{9}$$

where p indexes a fund, i is a portfolio company, $k(i,t)$ is a specific corporate policy proposal for firm i in year t, and $j(p)$ is the fund family. Observations are at the fund-portfolio company-proposal ID level, where a portfolio company has multiple proposals in the same year. The control variables in $X_{p,t-1}$ are the same as those in equation 7. We include proposal fixed effects $\gamma_{k(i,t)}$ and fund family-by-year fixed effects $\alpha_{j(p),t}$. The former accounts for unobserved heterogeneity at the firm, proposal, and time period levels, while the latter accounts for time-varying fund family voting patterns (e.g., the family's general propensity to vote with ISS recommendations). The dependent variable $Vote_{p,k(i,t)}$ varies based on the specific analyses below and the key independent variable is the previous year's fund-level CO measure. Standard errors are clustered by the fund-by-year level, allowing for correlated voting behavior across proposals within a fund-year.

First, we examine whether high-CO funds are more likely to be active firm monitors. Following Heath et al. (2021), we study the propensity to vote against management in the contentious proposals as a proxy of fund monitoring activeness. Contentious proposals are defined as those where ISS and management disagree. In this analysis, the dependent variable is a dummy variable that equals one if a fund votes against management and zero otherwise. Given that the standard deviation of CO measure is 0.93%, column (1) in Panel A of Table 10 shows that a one-standard deviation increase in CO measure is associated with a 36-basis-point increase in the probability of a fund to vote against management on a contentious and management-sponsored proposal. One may concern that funds that are more likely to vote against management may blindly follow ISS recommendations, which indicates that they are not active voters. If this is true, we should not observe a heterogeneous effect on proposals of different types. Yet, we find that high CO funds are not more likely to vote against management on the contentious proposals sponsored by shareholders (column (2)) or on the consensus proposals (columns (3) and (4)). Therefore, the fact that high-CO funds have a higher propensity to vote against management is consistent with higher CO funds being more active corporate monitors.

Second, we investigate the proposals that are related to executive compensation using observations at the fund-by-proposal level.[28] Antón et al. (2022) show theoretically that managerial compensation will tend to be less sensitive to own company performance in the presence of common ownership because weaker managerial incentives can soften competition within the same industry. Analogously in our context, high CO funds will be more likely to vote against the proposals related to the approval of executive compensations, such as stock plan and stock option plan. In this analysis, the dependent variable is a dummy variable that equals one if a fund votes against stock or stock option plans. Column (1) in Panel B of Table 10 shows that funds with a larger degree of CO measure are more likely to vote against executive stock or stock option plans. A one-standard-deviation increase in CO (0.93%) is associated with a 25-basis-point increase in the probability of voting against stock plans. Therefore, high-CO funds are more likely to vote against the proposals that increase executives stock compensation. However, voting against stock compensations by high-CO funds may not necessarily result in a lower executives' pay-performance sensitivity (the so-called executive compensation "delta"). To directly measure this effect, we consider whether a fund's CO measure is related to the average executives' compensation delta of the portfolio firms held by the fund. We download all available executives' delta during the 1998-2018 period from Lalitha Naveen's personal website (Core and Guay, 2002; Coles et al., 2006) and construct a fund's portfolio delta using the log of the weighted average executives'

[28] In our main results, we do not aggregate mutual funds' votes to the fund family level because the fund-level CO measure can vary considerably within a family-year, and mutual fund managers may have discretion on how they vote (Butler and Gurun, 2012). Aggregating our observations to the fund family-by-year level by taking the weighted average of voting and CO generates similar results but with smaller magnitudes. For the purpose of our study, linking returns to voting behavior at the fund level, we believe the fund-level observations are most appropriate (Butler and Gurun, 2012; Dimmock et al., 2018; Calluzzo and Kedia, 2019).

delta of the portfolio firms held by the fund at the end of a year.[29] Column (2) in Panel B of Table 10 reports the results of regressing the portfolio delta on the lagged one-year CO measure with fund family-by-year fixed effects. We find that CO is significantly negatively associated with the portfolio-holdings-weighted executice compensation delta. In terms of economic magnitude, a one-standard-deviation increase in CO (0.93%) is associated with a 21.6% decrease in the log of portfolio-weighted executive compensation delta. Therefore, the higher propensity of higher CO funds to vote against executive stock compensation plans manifest as lower pay-performance sensitivity overall for portfolio firms' executives.

Third, we investigate whether high-CO funds are more likely to vote for a director who has an existing directorship in a firm's competitor (which we term "CO-director") by considering only director elections.[30] From the proposal description, we are able to extract the name of the proposed directors (54,612 directors from 219,660 distinct proposals). The ISS director names are then matched with the ones from BoardEx. Using the Hoberg-Phillips industry classifications, we further identify whether a proposed director has directorship in one or more industry competitors at the time of the proposal. A total of 5,227 proposals are identified as CO-director related proposals, which corresponds to 1,824 individual directors and 106,970 fund-vote observations. [31] In this analysis, the dependent variable is a dummy taking the value of one if a fund votes for a CO-director. Column (3) in Panel B of Table 10 shows that the propensity to vote for CO-directors is significantly and positively related to CO. A one-standard-deviation increase in CO measure is associated with a 22-basis-point increase in the propensity to vote for CO-directors. These results suggest that high CO funds appear to use proxy voting to support CO-directors among industry peers. This is consistent with Azar and Vives (2021) showing that firm pairs with higher level of common ownership are associated with higher probability of sharing directors.

As a placebo test, we examine proposals related to ratifying an auditor in Table 10 Panel

[29] See https://sites.temple.edu/lnaveen/data/ for the data.

[30] We acknowledge that the Section 8 of the Clayton Act prohibits horizontal directorships in competing corporations. Yet, despite this prohibition, a large number of directors serve on boards in the same industry, even narrowly defined (Gopalan et al., 2022). The potential reasons can be that Section 8 lacks a clear rule understanding of the "competitors" prerequisite, and that the enforcement of Section 8 involves discretion, negotiations and amicability, as well as lack of publicity, according to Nili (2020).

[31] Using the Hoberg-Phillips industry classifications, Gopalan et al. (2022) identify 1,492 instances of new direct board connection to a product market peer from 1999 to 2018. The number of the instances is comparable to the number of CO-directors nominated for vote in our sample.

B column (4). We use this category as a placebo since ratifying auditor is the second most common proposal type in ISS database, following director elections. Since ratifying auditor is not related to coordination nor anti-competition, we expect an insignificant relation between CO measure and fund voting behaviors for these proposals. In this analysis, the dependent variable is a dummy taking the value of one if a fund votes for ratifying an auditor. We find no statistically significant relationship between CO and voting for ratifying auditors.

[Table 10 Here]

Overall, we find that funds with high common ownership presence tend to be long-term investors who also vote actively in shareholder meetings. Specifically, these funds are more likely to vote against stock compensation proposals but for CO-directors, suggesting that common owners have incentive to reduce industrial competition.

6 Conclusion

Common ownership has risen substantially over the past few decades in the United States. While empirical studies show that the common ownership may have anti-competitive effects on firms and industries, this paper investigates whether common owners benefit from investing in product market competitors. Using the United States mutual fund data from 1999 to 2018, we find that there is a positive relation between the common ownership presence of a fund and fund performance for actively-managed equity mutual funds. These findings suggest that both common institutional investors and their end investors do benefit from common ownership presence, which is consistent with the common ownership hypothesis. Funds with a larger degree of common ownership also charge higher fees. Taking fund returns and fees together suggests that fund managers have an incentive to adopt common ownership strategy. Funds adopting a higher common ownership straetgy are more active voters and vote in a direction that softens competition.

References

Agarwal, V., Gay, G. D., and Ling, L. (2014). Window dressing in mutual funds. *Review of Financial Studies*, 27(11):3133–3170.

Alti, A. and Sulaeman, J. (2012). When do high stock returns trigger equity issues? *Journal of Financial Economics*, 103(1):61–87.

Amel-Zadeh, A., Kasperk, F., and Schmalz, M. (2022). Mavericks, universal, and common owners - the largest shareholders of u.s. public firms. *Working Paper*, pages 1–66.

Antón, M., Ederer, F., Giné, M., and Schmalz, M. C. (2022). Common ownership, competition, and top management incentives. *Journal of Political Economy*, Forthcoming.

Azar, J. (2012). *A new look at oligopoly: Implicit collusion through portfolio diversification*. PhD thesis, Princeton University.

Azar, J. A., Raina, S., and Schmalz, M. (2019). Ultimate ownership and bank competition. *Working Paper*.

Azar, J. A., Schmalz, M. C., and Tecu, I. (2018). Anti-competitive effects of common ownership. *Journal of Finance*, (5):1–79.

Azar, J. A. and Vives, X. (2019). Common ownership and the secular stagnation hypothesis. *AEA Papers and Proceedings*, 109:322–326.

Azar, J. A. and Vives, X. (2021). General equilibrium oligopoly and ownership structure. *Econometrica*, 89(3):999–1048.

Backus, M., Conlon, C., and Sinkinson, M. (2019). Common ownership in America: 1980-2017. *American Economic Journal: Microeconomics*, pages 1980–2017.

Backus, M., Conlon, C., and Sinkinson, M. (2020). Common ownership and competition in the ready-to-eat cereal industry. *NBER Working Paper*, 53(9):1689–1699.

Bebchuk, L. A., Cohen, A., and Hirst, S. (2017). The agency problems of institutional investors. *Journal of Economic Perspectives*, 31(3):89–112.

Berk, J. B. and Green, R. C. (2004). Mutual fund flows and performance in rational markets. *Journal of Political Economy*, 112(6):1269–1295.

Boller, L. and Morton, F. S. (2019). Testing the theory of common stock ownership. *Working Paper*.

Bresnahan, T. F. and Salop, S. C. (1986). Quantifying the competitive effects of production joint ventures. *International Journal of Industrial Organization*, 4(2):155–175.

Butler, A. W. and Gurun, U. G. (2012). Educational networks, mutual fund voting patterns, and ceo compensation. *The Review of Financial Studies*, 25(8):2533–2562.

Calluzzo, P. and Kedia, S. (2019). Mutual fund board connections and proxy voting. *Journal of Financial Economics*, 134(3):669–688.

Carhart, M. (1997). On persistence in mutual fund performance. *Journal of Finance*, 52(1):57–82.

Carhart, M., Kaniel, R., Musto, D. K., and Reed, A. V. (2002). Leaning for the tape: evidence of gaming behavior in equity mutual funds. *Journal of Finance*, 57(2):661–693.

Charoenwong, B. and Asai, K. (2021). Ownership networks and bid-rigging. *Working Paper*, pages 1–50.

Christoffersen, S. E. K. (2001). Why Do Money Fund Managers Voluntarily Waive Their Fees? *Journal of Finance*, 56(3):1117–1140.

Cohen, R., Coval, J., and Pastor, L. (2005). Judging fund managers by the company they keep. *Journal of Finance*, 60(3):1057–1096.

Coles, J. L., Daniel, N. D., and Naveen, L. (2006). Managerial incentives and risk-taking. *Journal of financial Economics*, 79(2):431–468.

Cooper, M. J., Gulen, H., and Rau, P. R. (2005). Changing names with style: mutual fund name changes and their effects on fund flows. *The Journal of Finance*, 60(6):2825–2858.

Core, J. and Guay, W. (2002). Estimating the value of employee stock option portfolios and their sensitivities to price and volatility. *Journal of Accounting research*, 40(3):613–630.

Cremers, K. J. and Petajisto, A. (2009). How active is your fund manager? A new measure that predicts performance. *Review of Financial Studies*, 22(9):3329–3365.

Dimmock, S. G., Gerken, W. C., Ivković, Z., and Weisbenner, S. J. (2018). Capital gains lock-in and governance choices. *Journal of Financial Economics*, 127(1):113–135.

Edmans, A., Levit, D., and Reilly, D. (2019). Governance under common ownership. *Review of Financial Studies*, 32(7):2673–2719.

Fama, E. F. and French, K. R. (2015). A five-factor asset pricing model. *Journal of Financial Economics*, 116(1):1–22.

Fang, J., Kempf, A., and Trapp, M. (2014). Fund manager allocation. *Journal of Financial Economics*, 111(3):661–674.

Ferson, W. E. and Schadt, R. W. (1996). Measuring fund strategy and performance in changing economic conditions. *Journal of Finance*, 51(2):425–461.

Friedman, M. (1953). The methodology of positive economics. *Essays in positive economics*, 3(3):145–178.

Gantchev, N., Gredil, O. R., and Jotikasthira, C. (2019). Governance under the Gun: Spillover Effects of Hedge Fund Activism. *Review of Finance*, 23(6):1031–1068.

Gaspar, J., Massa, M., and Matos, P. (2006). Favoritism in mutual fund families? evidence on strategic cross-fund subsidization. *Journal of Finance*, 61(1):73–104.

Gil-Bazo, J. and Ruiz-Verdú, P. (2009). The relation between price and performance in the mutual fund industry. *Journal of Finance*, 64(5):2153–2183.

Gilje, E., Gormley, T. A., and Levit, D. (2020). Who's paying attention? Measuring common ownership and its impact on managerial incentives. *Journal of Financial Economics*, 137(1):152–178.

Gopalan, R., Li, R., and Zaldokas, A. (2022). Do board connections between product market peers impede competition? *SSRN Working Paper*.

Guercio, D. D. and Reuter, J. (2014). Mutual fund performance and the incentive to generate alpha. *Journal of Finance*, 69(4):1673–1704.

He, J. and Huang, J. (2017). Product market competition in a world of cross-ownership: evidence from institutional blockholdings. *Review of Financial Studies*, 30(8):2674–2718.

He, J. J., Huang, J., and Zhao, S. (2019). Internalizing governance externalities: The role of institutional cross-ownership. *Journal of Financial Economics*, 134(2):400–418.

Heath, D., Macciocchi, D., Michaely, R., and Ringgenberg, M. C. (2021). Do index funds monitor? *The Review of Financial Studies*, 00:1–41.

Hoberg, G. and Phillips, G. (2016). Text-based network industries and endogenous product differentiation. *Journal of Political Economy*, 124(5):1423–1465.

Hortaçsu, A. and Syverson, C. (2004). Product Differentiation, Search Costs, and Competition in the Mutual Fund Industry: A Case Study of SP 500 Index Funds. *The Quarterly Journal of Economics*, 119(2):403–456.

Hou, K., Mo, H., Xue, C., and Zhang, L. (2021). An augmented q-factor model with expected growth. *Review of Finance*, 25(1):1–41.

Huang, J., Sialm, C., and Zhang, H. (2011). Risk shifting and mutual fund performance. *Review of Financial Studies*, 24(8):2575–2616.

Iliev, P. and Lowry, M. (2015). Are mutual funds active voters? *Review of Financial Studies*, 28(2):446–485.

Kacperczyk, M., Sialm, C., and Zheng, L. (2005). On the industry concentration of actively managed equity mutual funds. *Journal of Finance*, 60(4):1983–2011.

Koch, A., Panayides, M., and Thomas, S. (2021). Common ownership and competition in product markets. *Journal of Financial Economics*, 139(1):109–137.

Lewellen, J. W. and Lewellen, K. (2021). Institutional investors and corporate governance: the incentive to be engaged. *Journal of Finance*, (Forthcoming).

Lewellen, K. and Lowry, M. B. (2021). Does common ownership really increase firm coordination? *Journal of Financial Economics*, 141(1):322–344.

López, Á. L. and Vives, X. (2019). Overlapping ownership, R&D spillovers, and antitrust policy. *Journal of Political Economy*, 127(5):2394–2437.

Matvos, G. and Ostrovsky, M. (2008). Cross-ownership, returns, and voting in mergers. *Journal of Financial Economics*, 89(3):391–403.

Nili, Y. (2020). Horizontal directors. *Northwestern University Law Review*, 114(5):1179–1262.

O'Brien, D. P. and Salop, S. C. (2000). Competitive effects of partial ownership: Financial interest and corporate control. *Antitrust Law Journal*, 67(3):559–603.

Pastor, L. and Stambaugh, R. F. (2003). Liquidity risk and expected stock returns. *Journal of Political Economy*.

Pástor, Ľ., Stambaugh, R. F., and Taylor, L. A. (2020). Fund tradeoffs. *Journal of Financial Economics*, 138(3):614–634.

Rotemberg, J. (1984). Financial transaction costs and industrial performance. *Working Paper*.

Schmalz, M. C. (2018). Common-ownership concentration and corporate conduct. *Annual Review of Financial Economics*, 10(1):413–448.

Schwarz, C. G. and Potter, M. E. (2016). Revisiting mutual fund portfolio disclosure. *Review of Financial Studies*, 29(12):3519–3544.

Shekita, N. (2020). Interventions by common owners. *Working Paper*.

Sias, R. W., Starks, L. T., and Titman, S. (2006). Changes in institutional ownership and stock returns: assessment and methodology. *The Journal of Business*, 79(6):2869–2910.

Sirri, E. R. and Tufano, P. (1998). Costly search and mutual fund flows. *Journal of Finance*, 53(5):1589–1622.

Walker, D. I. (2019). Common ownership and executive incentives: The implausibility of compensation as an anticompetitive mechanism. *Boston University Law Review*, 99(6):2373–2413.

Xie, J. and Gerakos, J. (2020). The anticompetitive effects of common ownership: the case of paragraph IV generic entry. *AEA Papers and Proceedings*, 110:569–572.

Zhu, Q. (2020). The missing new funds. *Management Science*, 66(3):1193–1204.

Tables and Figures

Table 1: Summary Statistics

This table reports the summary statistics for fund characteristics as well as the measure of fund common ownership presence (defined in Section 2.2). There are 377,343 fund-month observations, except for rolling estimates of alphas which have 326,927 observations.

Variable Name	Mean	SD	P25	P50	P75
Total Net Assets (TNA, $M)	1153.687	2673.564	77.500	267.100	922.150
Monthly Net Returns (%)	0.704	4.633	-1.684	1.062	3.454
Monthly 6-Factors Alpha (%)	-0.100	3.560	-0.973	-0.124	0.731
Age (years)	14.542	12.478	6.019	11.918	18.759
Monthly Flow (% of TNA)	0.090	4.839	-1.457	-0.497	0.736
Annual Expense (%)	1.035	0.575	0.800	1.100	1.386
Management Fee (%)	0.602	0.386	0.421	0.681	0.850
Annual Turnover (%)	67.555	73.153	19.000	49.000	91.000
Number of Stocks Held	101.000	152.000	43.000	65.000	101.000
Portfolio Concentration (IC, log)	5.971	1.232	5.325	5.904	6.483
Quarterly Return Volatility (%)	8.916	6.625	5.739	7.465	10.152
Quarterly Idiosyncratic Volatility (%)	2.369	4.552	1.343	1.864	2.753
CO (%)	0.225	0.930	0.000	0.002	0.029

Table 2: Top CO Funds

Top five CO funds are selected based on CO measure as of the end of year 2000, 2005, 2010, 2015, and 2018. Management fee, expense ratio, and TNA are measured as of the end of each of the years.

Year	Asset Manager: Fund Name	CO (%)	Management Fee (%)	Expense Ratio (%)	Fund TNA ($B)
	Seligman Communications and Information Fund, Inc.	0.837	0.822	1.621	6.537
	Franklin Strategic Series: Franklin Small Cap Growth Fund	0.638	0.448	0.939	12.851
2000	Firsthand Funds: The Technology Value Fund	0.622	1.824	1.830	3.301
	The Munder Funds, Inc.: NetNet Fund	0.538	1.097	2.335	3.664
	Franklin Strategic Series: Franklin Biotechnology Discovery Fund	0.398	0.560	1.090	1.342
	Fidelity Puritan Trust: Fidelity Low-Priced Stock Fund	0.704	0.676	0.880	36.721
	HomeState Group: Emerald Select Banking & Finance Fund	0.588	1.094	1.815	0.297
2005	FBR Funds: FBR Small Cap Financial Fund	0.512	0.960	1.460	0.432
	Fidelity Mt Vernon Street Trust: Fidelity Growth Company Fund	0.366	0.730	0.970	27.415
	John Hancock Investment Trust II: John Hancock Regional Bank Fund	0.360	0.754	1.427	2.114
	Fidelity Mt Vernon Street Trust: Fidelity Growth Company Fund	0.499	0.637	0.807	37.341
	Federated Equity Funds: Federated Kaufmann Fund	0.309	1.351	2.037	7.486
2010	John Hancock Investment Trust II: John Hancock Regional Bank Fund	0.230	0.790	1.427	0.677
	Fidelity Select Portfolios: Biotechnology Portfolio	0.143	0.560	0.870	1.038
	Growth Fund of America, Inc	0.139	0.271	0.727	161.799
	Fidelity Select Portfolios: Biotechnology Portfolio	2.683	0.548	0.730	14.942
	John Hancock Investment Trust II: John Hancock Regional Bank Fund	0.326	0.774	1.363	0.833
2015	Fidelity Advisor Series VII: Fidelity Advisor Biotechnology Fund	0.196	0.548	1.148	3.781
	Federated Equity Funds: Federated Kaufmann Fund	0.141	1.352	1.999	5.513
	T Rowe Price Small-Cap Value Fund, Inc	0.136	0.637	0.819	7.204
	Fidelity Select Portfolios: Biotechnology Portfolio	1.422	0.542	0.720	6.512
	John Hancock Investment Trust II: John Hancock Regional Bank Fund	0.334	0.748	1.377	1.113
2018	T Rowe Price Small-Cap Value Fund, Inc	0.221	0.640	0.760	8.523
	Federated Equity Funds: Federated Kaufmann Fund	0.127	0.000	0.000	5.529
	PRIMECAP Odyssey Funds: PRIMECAP Odyssey Aggressive Growth Fund	0.119	0.000	0.000	9.204

Table 3: Factor Loadings of Fund Portfolios

This table reports the factor loadings in the 6-factor model for each decile fund portfolio sorted by CO measure. The difference in the loadings on the size between the high and low portfolio is significantly positive. These results show that the CO measure might be correlated with size investment styles.

CO Bin	β^M	$t(\beta^M)$	β^{SMB}	$t(\beta^{SMB})$	β^{HML}	$t(\beta^{HML})$	β^{RMW}	$t(\beta^{RMW})$	β^{CMA}	$t(\beta^{CMA})$	β^{UMD}	$t(\beta^{UMD})$
Low	0.961	67.956	-0.060	-3.177	-0.035	-1.796	0.066	2.963	0.039	1.322	-0.012	-0.987
2	0.965	58.309	-0.067	-4.396	-0.005	-0.295	0.058	3.026	-0.028	-1.240	-0.010	-0.882
3	0.985	84.731	-0.044	-2.648	-0.006	-0.270	0.064	3.764	-0.030	-1.331	0.004	0.262
4	0.982	73.734	-0.012	-0.680	-0.021	-0.903	0.061	3.078	-0.012	-0.429	0.006	0.597
5	1.003	58.506	0.069	0.872	-0.041	-1.364	0.105	1.539	0.067	0.911	0.031	1.805
6	0.997	44.089	0.004	0.197	-0.012	-0.392	0.052	2.418	0.013	0.386	0.006	0.332
7	1.003	55.939	0.022	1.676	-0.005	-0.201	0.022	1.239	0.014	0.477	0.018	0.908
8	1.006	54.762	0.046	2.038	-0.019	-0.628	0.001	0.030	-0.014	-0.405	0.001	0.058
9	0.976	49.133	0.100	4.337	-0.027	-0.848	-0.068	-1.986	0.019	0.446	0.020	1.074
High	0.964	42.878	0.114	3.798	-0.008	-0.265	-0.020	-0.369	0.007	0.132	-0.007	-0.754
HML	0.003	0.147	0.173	5.157	0.028	0.955	-0.086	-1.842	-0.032	-0.738	0.005	0.340

Table 4: Portfolio Sorting

This table presents the performance of decile fund portfolios formed on the basis of fund CO measure. The portfolios are value weighted by fund TNA, rebalanced at the end of each quarter, and held for one quarter. The HML is the long-short portfolio formed by buying the high decile portfolio and selling the low one. All portfolio returns and return volatility are in percentages represented as a monthly rate. Panel A reports the portfolio sorting results for the gross returns while Panel B reports the net-of-expenses returns. All t-statistics are Newey-West corrected up to three lags.

Panel A: Gross Returns

CO Bin	SD	Sharpe Ratio	r_t	$t(r_t)$	α^{FF6F}	$t(\alpha^{FF6F})$	α^{FS}	$t(\alpha^{FS})$	α^{PS}	$t(\alpha^{PS})$	α^{Q5}	$t(\alpha^{Q5})$	a^{BM}	$t(a^{BM})$
Low	4.079	0.328	0.378	1.298	-0.052	-1.151	-0.028	-0.639	-0.023	-0.450	-0.062	-1.517	0.001	0.037
2	4.117	0.349	0.406	1.385	-0.008	-0.189	0.003	0.067	0.001	0.031	-0.028	-0.727	0.024	0.680
3	4.190	0.346	0.409	1.374	-0.027	-0.676	-0.026	-0.648	-0.013	-0.266	-0.054	-1.468	0.041	1.039
4	4.195	0.344	0.408	1.349	-0.041	-0.999	-0.044	-1.134	-0.020	-0.452	-0.054	-1.433	0.031	0.761
5	4.392	0.414	0.510	1.662	-0.014	-0.274	-0.012	-0.250	0.030	0.441	-0.039	-0.822	0.141	1.437
6	4.281	0.388	0.467	1.504	0.002	0.034	-0.008	-0.178	0.011	0.185	-0.018	-0.359	0.092	1.988
7	4.329	0.361	0.441	1.416	-0.029	-0.641	-0.038	-1.018	-0.030	-0.665	-0.027	-0.666	0.054	1.200
8	4.472	0.395	0.496	1.560	0.038	0.719	0.032	0.600	0.025	0.423	0.040	0.908	0.131	2.424
9	4.451	0.409	0.511	1.599	0.056	1.162	0.029	0.766	0.023	0.531	0.054	1.161	0.126	1.877
High	4.396	0.446	0.549	1.737	0.089	1.827	0.071	1.411	0.065	1.148	0.060	1.330	0.166	2.311
HML	1.046	0.570	0.171	2.969	0.140	3.470	0.099	1.965	0.089	1.896	0.123	3.162	0.164	2.939

Panel B: Net-of-Expenses Returns

CO Bin	SD	Sharpe Ratio	r_t	$t(r_t)$	α^{FF6F}	$t(\alpha^{FF6F})$	α^{FS}	$t(\alpha^{FS})$	α^{PS}	$t(\alpha^{PS})$	α^{Q5}	$t(\alpha^{Q5})$	a^{BM}	$t(a^{BM})$
Low	4.080	0.255	0.296	1.014	-0.134	-2.975	-0.110	-2.562	-0.105	-2.044	-0.144	-3.492	-0.081	-2.104
2	4.122	0.280	0.327	1.115	-0.086	-1.986	-0.076	-1.669	-0.077	-1.656	-0.106	-2.704	-0.054	-1.593
3	4.193	0.282	0.335	1.120	-0.101	-2.590	-0.101	-2.554	-0.087	-1.855	-0.129	-3.494	-0.034	-0.863
4	4.198	0.281	0.334	1.101	-0.114	-2.801	-0.118	-3.072	-0.093	-2.081	-0.127	-3.370	-0.043	-1.048
5	4.395	0.353	0.438	1.422	-0.086	-1.693	-0.085	-1.838	-0.041	-0.603	-0.111	-2.342	0.069	0.705
6	4.283	0.324	0.392	1.259	-0.073	-1.294	-0.084	-1.790	-0.064	-1.133	-0.093	-1.831	0.017	0.371
7	4.332	0.297	0.364	1.166	-0.105	-2.357	-0.115	-3.105	-0.107	-2.346	-0.104	-2.535	-0.023	-0.521
8	4.474	0.330	0.416	1.307	-0.041	-0.777	-0.048	-0.917	-0.054	-0.919	-0.040	-0.913	0.052	0.964
9	4.453	0.343	0.430	1.345	-0.024	-0.490	-0.052	-1.414	-0.058	-1.355	-0.026	-0.554	0.045	0.682
High	4.397	0.386	0.478	1.511	0.019	0.384	0.000	0.000	-0.005	-0.090	-0.010	-0.221	0.095	1.334
HML	1.047	0.608	0.182	3.165	0.152	3.742	0.110	2.188	0.100	2.135	0.134	3.441	0.176	3.138

Table 5: Fama-MacBeth Regression

This table shows the results of the Fama-MacBeth cross-sectional regressions. The dependent variables are monthly raw returns, Fama-French 6-factor alpha, Ferson-Schadt alpha, Pastor-Stambaugh alpha, q-factor alpha, or benchmark-adjusted returns all represented as monthly returns in percentages. Returns are measured before expenses in Panel A and after expenses in Panel B, represented as a percentage. The main independent variable is the fund-level common ownership presence measured by CO, represented as a percentage. The control variables are lagged one-month log TNA, lagged one-year expense ratio, lagged one-year turnover ratio, lagged one-month flows, lagged one-year age and lagged one-month fund returns. All independent variables are winsorized at the 1% and 99% levels. $***$, $**$, $*$ denote significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Gross Returns						
Dependent Var:	r_t	$\hat{\alpha}^{FF6F}$	α^{FS}	α^{PS}	$\hat{\alpha}^{Q5}$	a^{BM}
	(1)	(2)	(3)	(4)	(5)	(6)
CO	3.604***	2.209***	2.277***	1.897**	2.543***	2.978***
	(1.394)	(0.755)	(0.878)	(0.756)	(0.794)	(1.028)
Constant	0.704***	-0.072	0.091	0.103	-0.118	0.084
	(0.244)	(0.062)	(0.088)	(0.070)	(0.100)	(0.116)
Controls	✓	✓	✓	✓	✓	✓
Observations	377,340	326,927	326,927	326,927	326,927	377,340
R^2	0.826	0.131	0.147	0.142	0.177	0.271
Panel B: Net-of-expenses Returns						
Dependent Var:	r_t	$\hat{\alpha}^{FF6F}$	α^{FS}	α^{PS}	$\hat{\alpha}^{Q5}$	a^{BM}
	(1)	(2)	(3)	(4)	(5)	(6)
CO	3.585**	2.188***	2.259**	1.878**	2.526***	2.978***
	(1.394)	(0.755)	(0.878)	(0.756)	(0.794)	(1.028)
Constant	0.699***	-0.078	0.086	0.098	-0.124	0.084
	(0.244)	(0.062)	(0.088)	(0.070)	(0.100)	(0.116)
Controls	✓	✓	✓	✓	✓	✓
Observations	377,340	326,927	326,927	326,927	326,927	377,340
R^2	0.827	0.130	0.147	0.141	0.177	0.271

Table 6: Alternative Explanations

This table presents the monthly fund performance sorted first by funds' industry concentration (institutional presence) and then by their CO measure (3×5 conditional sorts, first sorting by IC (CS) then by CO). The monthly net-of-expense returns are value-weighted by fund TNA. The HML within each IC (CS) portfolio is the long-short portfolio formed by buying the top quintile CO sub-portfolios and selling the bottom ones. All t-statistics are Newey-West adjusted.

Panel A: Industry Concentration

Ranked by IC	Ranked by CO	r_t	$t(r_t)$	α^{FF6F}	$t(\alpha^{FF6F})$	α^{FS}	$t(\alpha^{FS})$	α^{PS}	$t(\alpha^{PS})$	α^{Q5}	$t(\alpha^{Q5})$	a^{BM}	$t(a^{BM})$
	Low	0.269	0.937	-0.140	-4.294	-0.120	-3.901	-0.130	-3.726	-0.151	-5.008	-0.105	-3.123
Low	High	0.512	1.701	-0.023	-0.375	0.007	0.095	0.066	0.557	-0.122	-1.314	0.146	1.061
	HML	0.243	2.340	0.117	2.474	0.127	1.842	0.197	1.809	0.029	0.346	0.250	2.062
	Low	0.343	1.146	-0.094	-1.965	-0.099	-2.235	-0.082	-1.685	-0.115	-2.509	-0.038	-0.947
Medium	High	0.420	1.318	-0.074	-1.347	-0.081	-1.556	-0.073	-1.398	-0.074	-1.500	0.039	0.656
	HML	0.076	1.333	0.020	0.420	0.017	0.340	0.009	0.206	0.041	0.915	0.078	1.421
	Low	0.413	1.361	0.002	0.034	0.030	0.414	0.009	0.127	-0.039	-0.612	0.031	0.437
High	High	0.469	1.324	0.074	1.131	0.016	0.263	-0.047	-0.774	0.094	1.459	0.077	0.763
	HML	0.056	0.672	0.072	1.156	-0.015	-0.202	-0.056	-0.843	0.133	2.030	0.047	0.576

Panel B: Common Selection

Ranked by CS	Ranked by CO	r_t	$t(r_t)$	α^{FF6F}	$t(\alpha^{FF6F})$	α^{FS}	$t(\alpha^{FS})$	α^{PS}	$t(\alpha^{PS})$	α^{Q5}	$t(\alpha^{Q5})$	a^{BM}	$t(a^{BM})$
	Low	0.243	0.807	-0.210	-4.056	-0.210	-4.375	-0.184	-3.440	-0.233	-4.745	-0.120	-2.744
Low	High	0.304	0.923	-0.159	-1.955	-0.214	-2.826	-0.174	-1.847	-0.212	-2.894	-0.053	-0.607
	HML	0.061	0.815	0.051	0.902	-0.004	-0.068	0.009	0.123	0.020	0.330	0.067	0.859
	Low	0.342	1.171	-0.082	-2.097	-0.057	-1.478	-0.058	-1.319	-0.096	-2.591	-0.055	-1.743
Medium	High	0.451	1.464	0.009	0.154	0.011	0.176	0.007	0.139	0.016	0.341	0.057	1.053
	HML	0.108	2.418	0.091	1.928	0.067	1.427	0.065	1.705	0.112	2.802	0.112	2.384
	Low	0.475	1.569	0.055	0.715	0.100	1.263	0.062	0.863	0.077	0.932	0.071	1.035
High	High	0.690	2.013	0.176	2.029	0.203	2.111	0.128	1.509	0.204	1.968	0.289	2.132
	HML	0.215	2.012	0.121	1.517	0.102	1.115	0.066	0.789	0.127	1.655	0.218	2.146

Table 6: Alternative Explanations (con't)

This table presents the monthly fund performance sorted first by funds' propensity to invest in high CO firms (COSP) and then by their CO measure (3×5 conditional sorts, first sorting by COSP then by CO). The monthly net-of-expense returns are value-weighted by fund TNA. The HML within each COSP portfolio is the long-short portfolio formed by buying the top quintile CO sub-portfolios and selling the bottom ones. All t-statistics are Newey-West adjusted.

Panel C: Stock Picking Ability													
Ranked by COSP	Ranked by CO	r_t	$t(r_t)$	α^{FF6F}	$t(\alpha^{FF6F})$	α^{FS}	$t(\alpha^{FS})$	α^{PS}	$t(\alpha^{PS})$	α^{Q5}	$t(\alpha^{Q5})$	a^{BM}	$t(a^{BM})$
	Low	0.624	1.902	0.048	0.564	0.080	0.928	0.080	0.911	0.050	0.698	0.237	1.856
Low	High	0.634	1.668	0.093	1.203	0.062	0.888	-0.017	-0.253	0.153	2.266	0.241	1.613
	HML	0.010	0.099	0.045	0.724	-0.019	-0.228	-0.097	-1.189	0.103	1.745	0.004	0.047
	Low	0.390	1.304	-0.086	-1.116	-0.059	-0.755	-0.039	-0.455	-0.099	-1.411	-0.005	-0.079
Medium	High	0.399	1.204	-0.021	-0.371	-0.068	-1.439	-0.076	-1.407	-0.015	-0.294	0.024	0.404
	HML	0.009	0.154	0.064	1.201	-0.010	-0.149	-0.038	-0.630	0.084	1.697	0.029	0.563
	Low	0.256	0.885	-0.124	-3.795	-0.107	-3.600	-0.126	-3.970	-0.144	-4.201	-0.113	-3.741
High	High	0.452	1.580	-0.023	-0.430	0.004	0.059	0.055	0.539	-0.132	-1.748	0.065	0.637
	HML	0.197	1.967	0.101	2.195	0.111	1.665	0.181	1.877	0.012	0.191	0.179	1.780

Table 7: Persistence

Panel A reports CO rank for each decile fund portfolios according to their lagged n year CO. For example, the lag 2 column shows the CO rank of the decile portfolios sorted by their past CO in the lagged two years. Panel B reports the long-term performance measured by Fama-French 6 factor net-of-fee alpha of each decile portfolio sorted by their lagged n year CO, using a calendar time portfolio approach. All t-statistics are Newey-West adjusted.

Panel A: CO Persistence												
CO Bin	CO_{t-1}	$t(CO_{t-1})$	CO_{t-2}	$t(CO_{t-1})$	CO_{t-3}	$t(CO_{t-3})$	CO_{t-4}	$t(CO_{t-4})$	CO_{t-5}	$t(CO_{t-5})$	CO_{t-6}	$t(CO_{t-6})$
Low	4.914	35.176	6.203	50.933	6.885	70.839	7.289	86.484	7.569	104.058	7.765	131.877
2	4.693	41.514	6.021	58.138	6.831	79.019	7.257	95.603	7.598	128.327	7.811	164.721
3	4.926	49.753	6.111	57.318	6.855	70.661	7.393	87.558	7.756	108.422	8.006	142.331
4	5.418	65.791	6.212	76.973	6.868	85.651	7.308	110.384	7.602	139.982	7.841	197.207
5	6.039	93.225	6.693	98.799	7.240	117.190	7.607	135.529	7.913	165.767	8.077	197.849
6	6.731	144.151	7.205	139.273	7.649	151.051	7.919	178.084	8.137	222.783	8.295	271.373
7	7.464	192.884	7.892	161.694	8.140	180.858	8.278	203.531	8.398	213.592	8.447	229.383
8	8.249	343.960	8.394	327.423	8.535	314.103	8.670	327.913	8.746	386.861	8.804	444.231
9	8.958	624.045	8.949	611.716	8.911	512.682	8.905	440.926	8.925	509.168	8.914	556.801
High	9.800	486.992	9.667	381.763	9.522	302.041	9.421	296.331	9.389	348.028	9.389	430.627
HML	4.885	32.325	3.465	25.128	2.636	22.739	2.132	20.851	1.820	21.016	1.624	24.324

Panel B: Performance Persistence												
CO Bin	CO_{t-1}	$t(CO_{t-1})$	CO_{t-2}	$t(CO_{t-1})$	CO_{t-3}	$t(CO_{t-3})$	CO_{t-4}	$t(CO_{t-4})$	CO_{t-5}	$t(CO_{t-5})$	CO_{t-6}	$t(CO_{t-6})$
Low	-0.082	-2.014	-0.091	-2.345	-0.095	-2.558	-0.097	-2.553	-0.100	-2.651	-0.100	-2.699
2	-0.087	-2.073	-0.090	-2.203	-0.093	-2.273	-0.098	-2.358	-0.099	-2.379	-0.101	-2.390
3	-0.122	-3.164	-0.120	-3.125	-0.121	-3.127	-0.119	-3.104	-0.119	-3.088	-0.118	-3.069
4	-0.124	-2.940	-0.124	-2.908	-0.124	-2.904	-0.114	-2.703	-0.113	-2.680	-0.114	-2.733
5	-0.091	-2.084	-0.085	-1.931	-0.086	-1.968	-0.080	-1.824	-0.076	-1.654	-0.079	-1.715
6	-0.083	-1.433	-0.082	-1.546	-0.084	-1.631	-0.086	-1.726	-0.085	-1.748	-0.082	-1.735
7	-0.111	-2.476	-0.104	-2.215	-0.098	-2.188	-0.099	-2.211	-0.100	-2.247	-0.100	-2.248
8	-0.045	-0.806	-0.048	-0.911	-0.048	-0.904	-0.050	-0.932	-0.048	-0.891	-0.045	-0.839
9	-0.070	-1.761	-0.063	-1.398	-0.062	-1.323	-0.063	-1.320	-0.062	-1.283	-0.059	-1.243
High	0.016	0.307	0.016	0.301	0.013	0.236	0.013	0.250	0.013	0.241	0.015	0.290
HML	0.098	2.553	0.107	3.016	0.108	3.078	0.111	3.266	0.113	3.393	0.115	3.382

Table 8: Fund Fees

This table presents panel regressions studying the relation between CO and fund fees. The observations are at the fund-year level. The dependent variables are annualized fees and expenses reported in CRSP, represented in percentages. The main independent variableis the fund-level common ownership presence measured by CO, represented as a percentage. The regressions control for lagged one-year log TNA, turnover ratio, flows, age and returns. In columns (1) and (3), the regressions incorporate year fixed effects, while in columns (2) and (4) the regressions include fund family-by-year fixed effects. All continuous variables are winsorized at the 1% and 99% levels. Robust standard errors are clustered by fund and year. $***$, $**$, $*$ denote significance at the 1%, 5%, and 10% levels, respectively.

Dependent Var:	Expense Ratio (%)		Management Fee (%)	
	(1)	(2)	(3)	(4)
CO	4.908***	2.628***	2.623***	1.285***
	(0.865)	(0.585)	(0.563)	(0.408)
Controls	✓	✓	✓	✓
FE: Year	✓		✓	
FE: Fund Family × Year		✓		✓
Observations	35,852	35,852	35,852	35,852
R^2	0.267	0.659	0.141	0.648

Table 9: Turnover

This table presents the performance of fund portfolios sorted first by fund turnover ratio and then by CO measure (3×5 sorts). The numbers in the parentheses in the first and second columns are the average turnover ratio and log of CO (×10,000) of the corresponding portfolios, respectively. The monthly returns are value-weighted according to fund TNA. All t-statistics are Newey-West adjusted. The low turnover is 9.23%, medium is 46.3%, and high is 145% per annum.

Rank by Turnover	Ranked by CO	r_t	$t(r_t)$	α^{FF6F}	$t(\alpha^{FF6F})$	α^{FS}	$t(\alpha^{FS})$	α^{PS}	$t(\alpha^{PS})$	α^{Q5}	$t(\alpha^{Q5})$	a^{BM}	$t(a^{BM})$
	Low	0.333	1.147	-0.102	-2.404	-0.077	-1.763	-0.061	-1.227	-0.142	-3.655	-0.045	-1.178
Low	High	0.477	1.582	-0.013	-0.238	0.004	0.075	0.025	0.463	-0.026	-0.542	0.088	1.454
	HML	0.144	2.723	0.089	2.183	0.081	1.968	0.086	2.584	0.116	2.665	0.133	2.677
	Low	0.313	1.068	-0.108	-3.127	-0.090	-2.615	-0.094	-2.373	-0.111	-3.388	-0.068	-2.064
Medium	High	0.546	1.647	0.059	0.800	0.067	0.767	0.057	0.490	-0.030	-0.328	0.165	1.381
	HML	0.233	2.081	0.167	2.970	0.157	1.893	0.151	1.376	0.082	0.959	0.233	2.228
	Low	0.328	1.072	-0.066	-1.128	-0.080	-1.445	-0.107	-2.044	-0.072	-1.154	-0.042	-0.727
High	High	0.309	0.786	-0.094	-1.312	-0.184	-2.597	-0.259	-3.443	-0.071	-0.754	-0.061	-0.411
	HML	-0.019	-0.152	-0.028	-0.411	-0.104	-1.529	-0.153	-2.179	0.001	0.015	-0.019	-0.171

Table 10: Voting Behavior

This table presents the results of the linear probability model that relates a mutual fund voting decision on proposals to the fund's common ownership presence. In Panel A, the dependent variable is an indicator variable that equals one if a fund votes against management recommendation. In columns (1) and (2), the sample consists of the contentious votes (i.e., when ISS and management disagree). In columns (3) and (4), the sample consists of the consensus votes (i.e., when there is an agreement between ISS and management). In Panel B, from columns (1) to (3), the dependent variables are indicator variables that, (1) set to one if funds vote against stock plans or stock option plans, (2) set to one if funds vote for CO-directors, and (3) set to one if funds vote for ratifying an auditor, and zero otherwise. The sample restricts to the corresponding proposal types. In Panel C, the dependent variable is the log of portfolio weighted average executives' pay-performance sensitivity (delta) in portfolio firms held by a fund in a year, similar to the analysis Antón et al. (2022). In all panels, the key independent variable is lagged one-year CO measure represented as a percentage and the control variables are lagged one-year TNA, expense ratio, turnover ratio, flows, age and fund returns. All independent variables are winsorized at the 1% and 99% levels. In Panel A, all regressions include fund-family-by-year and proposal type fixed effects. In Panel B, all regressions include fund family-by-year fixed effects, and in columns (1) to (3) which studies fund-by-specific proposals (where there can be multiple proposals within a fund-portfolio company-year tuple) we also include individual proposal fixed effects, and column (4) aggregates portfolio proposals into a fund-year observation studying executive pay-performance sensitivity. The robust standard errors are clustered at the fund-by-year level. ∗∗∗, ∗∗, ∗ denote significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Active Voting

Dependent Var:	Vote against Management			
Sample =	Contentious Proposals		Consensus Proposals	
Proposal Sponsor =	Management	Shareholder	Management	Shareholder
	(1)	(2)	(3)	(4)
CO	0.382**	-0.143	0.0003	-0.146
	(0.167)	(0.168)	(0.015)	(0.092)
Controls	✓	✓	✓	✓
FE: Fund Family × Year	✓	✓	✓	✓
FE: Proposal Type	✓	✓	✓	✓
Mean of Dep Var	0.52	0.49	0.02	0.06
Observations	210,137	282,307	7,121,201	147,472
Observation level	Fund-Proposal	Fund-Proposal	Fund-Proposal	Fund-Proposal
R^2	0.479	0.504	0.207	0.322

Panel B: Voting on Specific Proposal Types

Dependent Var:	Vote against Stock Plans	Log of Average Delta in Portfolio Firms	Vote for CO-Directors	Vote for Ratify Auditor
	(1)	(2)	(3)	(4)
CO	0.277***	-23.240***	0.223**	0.017
	(0.107)	(2.436)	(0.083)	(0.029)
Controls	✓	✓	✓	✓
FE: Fund Family × Year	✓	✓	✓	✓
FE: Proposal	✓		✓	✓
Mean of Dep Var	0.18	5.90	0.91	0.98
Observations	255,414	35,506	106,970	775,217
Observation level	Fund-Proposal	Fund-Year	Fund-Proposal	Fund-Proposal
R^2	0.492	0.674	0.404	0.344

Online Appendix

A Variable Definition

1. **Fund Return:** The after-fee monthly returns are obtained from the CRSP Survivorship Bias Free Mutual Fund Database. When a portfolio has multiple share classes, we aggregate them into weighted average fund return using the lagged TNA of share class as the weights.

2. **Risk-Adjusted Fund Return:** We use different factor models to compute the fund alphas (i.e., the Fama-French 6-factor model, Ferson-Schadt conditional model, Paster-Stambaugh liquidity model, Hou-Xue-Zhang q5-factor model).

3. **Benchmark-Adjusted Return:** For each fund, we obtain its benchmark index and the monthly index return from Morningstar. If a fund's benchmark is not available, S&P 500 Index will be assigned as the benchmark index for that fund. Benchmark-adjusted returns are computed as the difference between fund actual return and benchmark index return.

4. **Total Net Assets (TNA):** We obtain the total net assets on the share class level from the CRSP Mutual Fund Database. For each fund in each month, we sum up the share class TNA to the fund level.

5. **Fund Age:** The number of years that a fund survives.

6. **Fund Flows:** Fund flows are computed using the following equation: $flow_{f,t} = (TNA_{f,t} - TNA_{f,t-1}(1 + R_{f,t}))/(TNA_{f,t-1})$, where $TNA_{f,t}$ and $TNA_{f,t-1}$ are the total net assets for fund f in month t and $t-1$, respectively; and $R_{f,t}$ is the cumulative fund return at month t.

7. **Expense Ratio:** The expense ratio is on annual basis and sourced from CRSP Mutual Fund Database.

8. **Turnover Ratio:** The turnover ratio is on annual basis and obtained from CRSP Mutual Fund Database

9. **Fund Institutional Presence:** For each stock held by a fund, we first compute the number of unique institutional investors of the stock. The list of institutional investors is sourced from Thomson Reuters Institutional Holdings (13F) Database. We calculate the weighted average fund institutional presence using the portfolio weights of the stocks held by the fund in quarter $t-1$.

10. **Idiosyncratic Volatility:** The standard deviation of the residuals obtained from the Carhart's four-factor model. For each month, we regress the daily fund returns on the four factors.

11. **Return Volatility:** The standard deviation of fund daily returns, measured within each quarter.

12. **CO:** The measure of fund common ownership strategy. See detailed definition in Section 2.2.

13. **IC:** KSZ's Industry concentration measure, measured by log of $\sigma(w_{i,f,t} - \bar{w}_{i,t})$.

B CO Measure

B.1 CO Measure & Common Owners' Profits

In this appendix, we show that our prediction on the association between common ownership strategy presence and fund performance has sound theoretical foundation. First, $\kappa_{m,n}$ is the key pairwise component used by Azar et al. (2018) in the Modified HHI which captures the extent to which competitors m and n are connected by common ownership and control links. In the framework of Rotemberg (1984), Backus et al. (2019) further define such component as the profit weights that firm m places on its competitors n's profits. In a similar fashion, our measure is also developed on the pairwise profit weights. The difference is that we aggregate the fund-specific profit weights to the fund level, to capture a fund's common ownership presence. Furthermore, we augment this measure by using a more precise competition linkage provided by Hoberg and Phillips (2016).

Second, to illustrate that the common ownership strategy and mutual fund performance might be positively associated, we provide the following simple oligopoly scenario where there are only two industry competitors m and n facing Cournot competition. We assume that both firms face the same product market demand curve:

$$P = A - Q.$$

Thus, the profit function of the firms is expressed as:

$$\begin{aligned}\Pi_m &= q_m(A - q_m - q_n) \\ \Pi_n &= q_n(A - q_m - q_n),\end{aligned}$$

where we denote firm profit as π and product quantity as q. Following Backus et al. (2019), the firms' objective function can be written as:

$$\begin{aligned}&\max_{q_m} q_m(A - q_m - q_n) + \kappa_{m,n} q_n(A - q_m - q_n) \\ &\max_{q_n} q_n(A - q_m - q_n) + \kappa_{n,m} q_m(A - q_m - q_n).\end{aligned}$$

The solution is

$$\begin{aligned}q_m &= \frac{-\kappa_{m,n} q_n - q_n + A}{2} \\ q_n &= \frac{-\kappa_{n,m} q_m - q_m + A}{2}\end{aligned}$$

Note that $\kappa_{m,n}$ and $\kappa_{n,m}$ can be different in theory. But for simplicity, we assume the two are equal, which indicates that the ownership structure is identical in both firms. Under this assumption, the firms' optimal product quantity is the same and equal to $\frac{A}{3+\kappa}$. Plugging this optimal quantity back to the firm profit function, we can obtain both firms' optimal profits as $\frac{A^2(1+\kappa)}{(3+\kappa)^2}$. When $0 \leq \kappa \leq 1$, the firm profit is increasing on κ.

In the case where fund f is the only common owner, $\kappa_{m,n}$ is the same as the fund-specific profit weight $\kappa_{f,m}$. Finally, fund f's profit Π_f from holding in B_m and B_n dollar value in firm m and n is computed as:

$$\Pi_f = \frac{B_m}{M_m}\pi_m + \frac{B_n}{M_n}\pi_n = B_m \frac{A^2(1+\kappa)}{M_m(3+\kappa)^2} + B_n \frac{A^2(1+\kappa)}{M_n(3+\kappa)^2}.$$

where M_m and M_n are the market value of firm m and n. Then, we proceed to define fund

f's profit per unit π_f as fund f's profit Π_f divided by fund f's total net assets TNA_f, which can be expressed as:

$$\pi_f = \frac{\Pi_f}{TNA_f} = \frac{\frac{B_m}{M_m}\pi_m + \frac{B_n}{M_n}\pi_n}{TNA_f} = w_m \frac{A^2(1+\kappa)}{M_m(3+\kappa)^2} + w_n \frac{A^2(1+\kappa)}{M_n(3+\kappa)^2}.$$

where w_m and w_n are the investment weight of fund f on firm m and n. Note that the fund's profitability can be interpreted as an increasing function of κ (when $0 \leq \kappa \leq 1$). Our measure of fund-level common ownership presence (CO) captures the same elements with a similar functional feature. Thus, we expect that there is a positive relationship between our measure of fund common ownership presence and fund level profitability.

B.2 Alternative Measures of Fund-Level Common Ownership

Backus et al. (2020) extract the relative investor concentration component from the profit weight. They have

$$\begin{aligned}
\kappa_{m,n} &= \frac{\sum_{\forall s} \gamma_{s,m}\beta_{s,n}}{\sum_{\forall s} \gamma_{s,m}\beta_{s,m}} \\
&= \frac{\sum_{\forall s} \beta_{s,m}\beta_{s,n}}{\sum_{\forall s} \beta_{s,m}^2} \\
&= \frac{\sum_{\forall s} \beta_{s,m}\beta_{s,n}}{\sqrt{\sum_{\forall s} \beta_{s,m}^2} \cdot \sqrt{\sum_{\forall s} \beta_{s,n}^2}} \cdot \frac{\sqrt{\sum_{\forall s} \beta_{s,n}^2}}{\sqrt{\sum_{\forall s} \beta_{s,m}^2}},
\end{aligned}$$

where $\frac{\sum_{\forall s} \beta_{s,m}\beta_{s,n}}{\sqrt{\sum_{\forall s} \beta_{s,m}^2} \cdot \sqrt{\sum_{\forall s} \beta_{s,n}^2}} = cos(\beta_{s,m}, \beta_{s,n})$. They decompose profit weights into two components: overlapping ownership and relative IHHI or relative investor concentration. Mathematically, overlapping ownership is the cosine of the angle between the positions that investors hold in m and those that investors hold in n so that it has the nice property that $cos(\beta_{s,m}, \beta_{s,n}) \in [0, 1]$. Economically, the cosine distance represents the overlapping ownership which leads to the incentive of a firm to maximize the profits of another firm. A zero cosine distance corresponds with no common owners while a cosine distance of one corresponds to identical shareholding structure. We calculate weighted-average of pairwise cosine distance measure for each fund quarter to capture fund-level common ownership presence. Replacing the previous profit weight measure with this new overlapping ownership measure yields the alternative measure:

$$CO_p^{Cosine} = \sum_m w_{p,m} \frac{\sum_{\forall n \neq m} \gamma_{p,m} \beta_{p,n}}{\sqrt{\sum_{\forall s} \gamma_{s,m} \beta_{s,m}} \cdot \sqrt{\sum_{\forall s} \gamma_{s,n} \beta_{s,n}}}$$

C Additional Empirical Results

C.1 Property of Fund Common Ownership

Figure C.1 shows the histogram of the CO measure, documenting that the distribution looks similar to a log-normal distribution. However, we do not use the log transformation in our main analyses to retain the theoretical consistency with our measurement derivation, similar to how we consider relations of market-level variables with HHI or changes in the HHI, rather than taking its log transformation. Nonetheless, our main results in the paper are also robust to taking the log transformation.

Figure C.1: Distribution of CO Measure

The figure below shows the histogram of the CO measure multiplied by 10,000, and the horizontal axis is shown on a log scale with base 10. We winsorize the measure at the 1% and 99% levels.

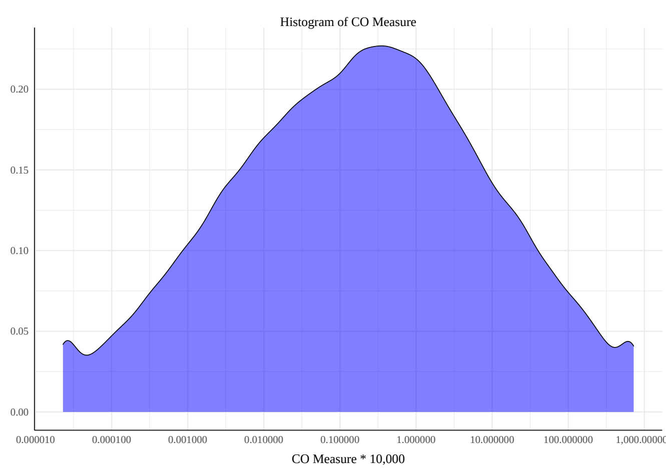


Table C.1: Autocorrelation of CO

This table shows the results of the panel regressions studying at the autocorrelations of CO measures within firms across time. The dependent variables CO_t and the main independent variables is CO_{t-1}, where we consider three different CO measures. The first measure (CO) is our main CO measure. The second measure (CO^{FF}) is computed in the same way as the main CO measure except that industry peers are identified by the Fama-French 12 industry classifications. The third is the overlapping ownership measure (CO^{Cosine}), which is calculated in the same way as the main CO measure expect that the firms' pairwise profit weights are further divided by relative investor ownership concentration. All regressions include fund fixed effects and standard errors are clustered by fund. All variables are winsorized at the 1% and 99% levels. $***$, $**$, $*$ denote significance at the 1%, 5%, and 10% levels, respectively.

Dependent Var:	CO_t		
CO Measure =	CO	CO^{FF}	CO^{Cosine}
	(1)	(3)	(4)
CO_{t-1}	0.809***	0.736***	0.842***
	(0.019)	(0.037)	(0.017)
Observations	118,543	118,543	118,543
R^2	0.928	0.894	0.9644

Table C.2: CO Bin Transition Matrix

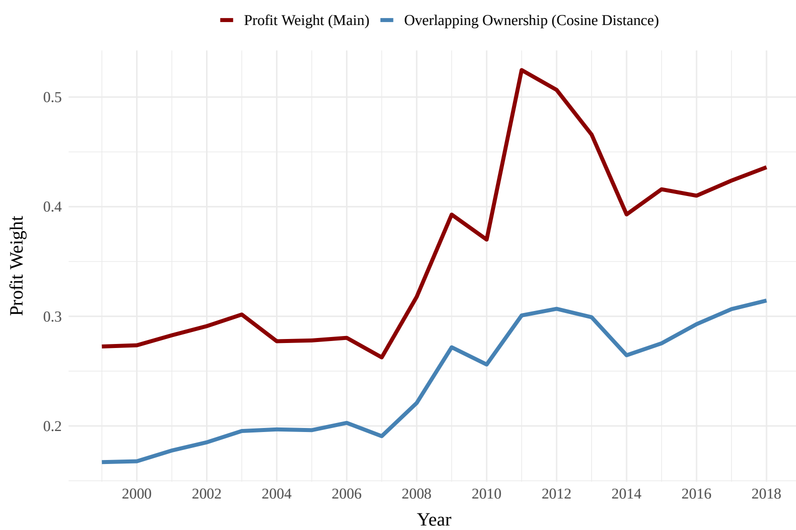
This table presents the quarterly transition matrix based on decile of CO measure in percent points. Each row is the CO Bin_{t-1} from the previous quarter. Values are rounded to the nearest basis point.

	CO Bin_t									
CO Bin_{t-1}	1	2	3	4	5	6	7	8	9	10
1	86.56	11.54	1.23	0.42	0.12	0.07	0.02	0.01	0.01	0.02
2	10.18	73.51	14.02	1.65	0.35	0.18	0.04	0.04	0.04	0.00
3	0.70	13.96	67.51	15.61	1.60	0.37	0.19	0.05	0.00	0.01
4	0.16	1.34	15.69	64.36	15.77	2.02	0.46	0.16	0.05	0.00
5	0.03	0.26	1.46	15.88	64.16	15.78	1.96	0.35	0.09	0.03
6	0.02	0.16	0.43	1.72	16.07	63.54	16.44	1.34	0.28	0.00
7	0.00	0.04	0.17	0.27	1.71	16.37	64.94	15.20	1.19	0.10
8	0.00	0.01	0.05	0.08	0.28	1.47	15.63	69.57	12.61	0.29
9	0.01	0.02	0.01	0.03	0.08	0.22	0.75	12.77	77.85	8.27
10	0.01	0.00	0.01	0.00	0.02	0.06	0.13	0.33	8.32	91.13

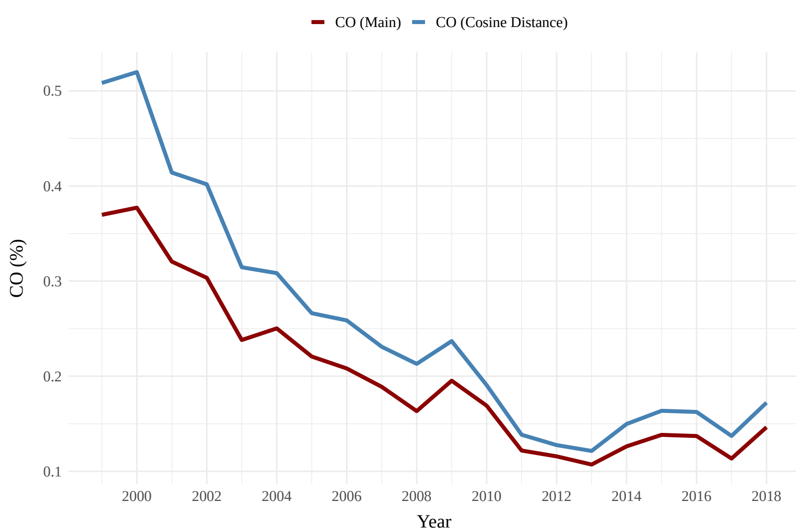
Figure C.2: Time Series of Fund-level Profit Weights and Common Ownership

In Panel A, the red line plots the average firm-pairwise profit weights, $k_{m,n}$, defined in Section 2.2, while the blue line plots the average overlapping ownership, $cos(\beta_{s,m}, \beta_{s,n})$, described in Appendix B.2. The gap between the two lines measures the relative investor concentration (Backus et al., 2019). In Panel B, the red line plots the average fund common ownership measure, CO, defined in Section 2.2, while the blue line plots the average fund overlapping ownership measure, CO^{Cosine}, defined in Appendix B.2.

Panel A: Average Firm-Pairwise Profit Weights



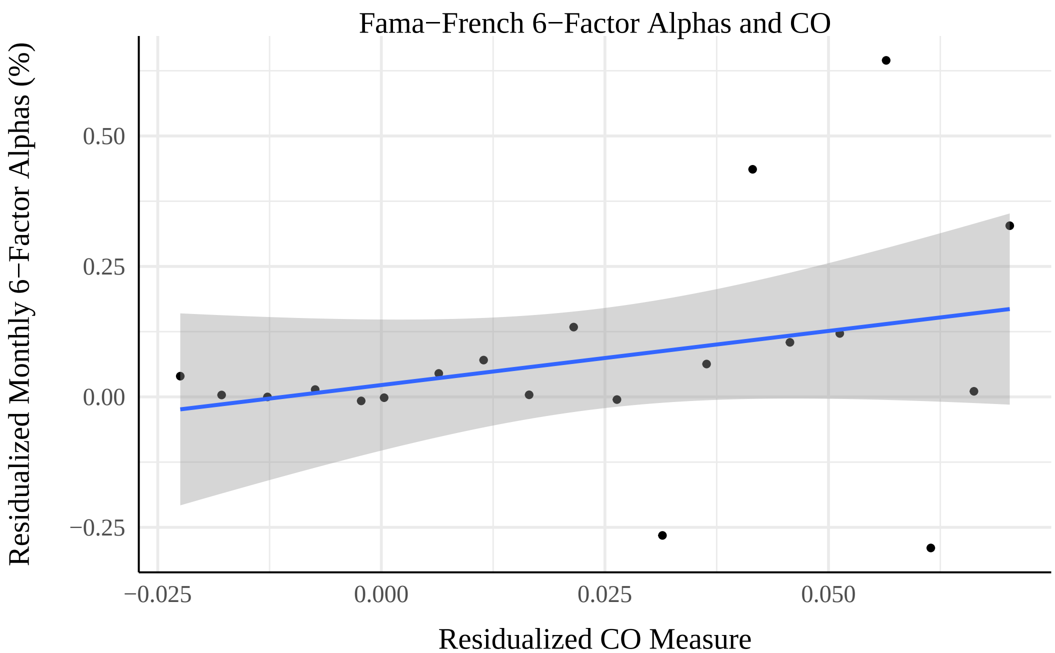
Panel B: Average Fund Common Ownership



C.2 Time-Series Return Plots

Figure C.3: $\hat{\alpha}^{FF6F}$ and CO

The figure below shows the bin scatter plot of the Fama-French 6-factor monthly alphas and CO. Both variables are residualized with respect to control variables in a linear regression specification including year-month fixed effects. The control variables are lagged one-year log TNA, expense ratio, turnover ratio, flows, age and fund returns. The 20 bins are split based on quantiles of the residualized CO measure, and then both x- and y- variable values are means of the residualized CO measure and residualized Fama-French 6-factor monthly alpha.



C.3 Alternative Construction of Fund Common Ownership

Table C.3: Alternative CO Measure Rankings

This table reports the monthly net-of-expenses returns of decile portfolios sorted by alternative CO measures. In Panel A, funds are sorted by CO measure with profit weight constructed based on the Fama-French 12 industry classification (CO^{FF}), while in Panel B funds are sorted by CO measure with profit weight constructed by cosine distance (CO^{Cosine}). All t-statistics are Newey-West adjusted up to three-month lags.

Panel A: CO Measure With Profit Weight Constructed By FF 12 Industry Classification (CO^{FF})														
CO Bin	SD	Sharpe Ratio	r_t	$t(r_t)$	α^{FF6F}	$t(\alpha^{FF6F})$	α^{FS}	$t(\alpha^{FS})$	α^{PS}	$t(\alpha^{PS})$	α^{Q5}	$t(\alpha^{Q5})$	a^{BM}	$t(a^{BM})$
Low	4.127	0.223	0.262	0.900	-0.150	-4.291	-0.122	-3.536	-0.138	-3.748	-0.149	-4.375	-0.119	-3.659
2	4.168	0.276	0.326	1.098	-0.099	-3.021	-0.091	-2.628	-0.091	-2.271	-0.128	-4.285	-0.048	-1.309
3	4.208	0.262	0.313	1.044	-0.117	-3.359	-0.122	-3.665	-0.111	-2.896	-0.135	-4.400	-0.053	-1.541
4	4.228	0.256	0.308	1.006	-0.124	-3.441	-0.135	-4.134	-0.115	-3.103	-0.144	-3.650	-0.061	-1.531
5	4.352	0.363	0.445	1.462	-0.062	-1.387	-0.060	-1.361	-0.030	-0.487	-0.087	-2.058	0.072	0.773
6	4.297	0.299	0.363	1.169	-0.099	-2.112	-0.109	-2.885	-0.099	-2.209	-0.113	-2.585	-0.022	-0.507
7	4.376	0.295	0.365	1.161	-0.086	-2.083	-0.109	-3.134	-0.107	-2.579	-0.090	-1.919	-0.017	-0.354
8	4.462	0.325	0.409	1.276	-0.041	-0.696	-0.056	-1.013	-0.059	-0.927	-0.037	-0.760	0.055	0.933
9	4.453	0.312	0.392	1.216	-0.033	-0.733	-0.068	-1.693	-0.085	-2.028	-0.034	-0.739	0.027	0.481
High	4.383	0.403	0.496	1.574	0.016	0.312	0.005	0.100	0.009	0.150	-0.015	-0.330	0.105	1.392
HML	1.124	0.732	0.234	3.462	0.165	3.880	0.127	2.533	0.147	2.699	0.134	3.390	0.224	3.484
Panel B: CO Measure With Profit Weight Constructed By Cosine Distance (CO^{Cosine})														
CO Bin	SD	Sharpe Ratio	r_t	$t(r_t)$	α^{FF6F}	$t(\alpha^{FF6F})$	α^{FS}	$t(\alpha^{FS})$	α^{PS}	$t(\alpha^{PS})$	α^{Q5}	$t(\alpha^{Q5})$	a^{BM}	$t(a^{BM})$
Low	4.023	0.300	0.341	1.179	-0.088	-1.630	-0.061	-1.053	-0.056	-0.925	-0.119	-2.298	-0.038	-0.801
2	4.145	0.266	0.312	1.059	-0.090	-1.978	-0.086	-1.832	-0.088	-1.820	-0.107	-2.592	-0.060	-1.772
3	4.195	0.269	0.320	1.066	-0.122	-2.748	-0.122	-2.954	-0.102	-2.014	-0.144	-3.377	-0.051	-1.249
4	4.267	0.276	0.334	1.087	-0.112	-2.854	-0.130	-3.648	-0.108	-2.583	-0.120	-2.994	-0.031	-0.638
5	4.364	0.388	0.476	1.526	-0.043	-0.711	-0.040	-0.694	-0.007	-0.097	-0.077	-1.370	0.092	0.955
6	4.246	0.309	0.372	1.218	-0.084	-1.782	-0.094	-2.355	-0.075	-1.570	-0.095	-2.132	-0.003	-0.061
7	4.356	0.287	0.353	1.126	-0.103	-2.184	-0.117	-3.144	-0.112	-2.496	-0.110	-2.376	-0.028	-0.625
8	4.406	0.312	0.388	1.230	-0.060	-1.063	-0.065	-1.172	-0.063	-1.003	-0.054	-1.128	0.034	0.629
9	4.540	0.321	0.411	1.262	-0.011	-0.280	-0.046	-1.242	-0.079	-2.041	-0.015	-0.381	0.032	0.475
High	4.379	0.398	0.489	1.550	0.012	0.237	-0.003	-0.049	0.001	0.022	-0.016	-0.357	0.102	1.384
HML	1.022	0.504	0.148	2.335	0.100	2.012	0.058	0.958	0.057	1.042	0.103	2.276	0.140	2.212

Table C.4: CO measure based on only 13F and both 13F & 13D

This table reports the monthly net-of-expenses returns of decile portfolios sorted by alternative CO measures. In Panel A, funds are sorted by CO measure with profit weight measure based on 13F holding data, while in Panel B funds are sorted by CO measure with profit weight measure based 13F and 13D holding data. All t-statistics are Newey-West adjusted up to three-month lags.

Panel A: CO measure with profit weight based on only 13F holding data														
CO Bin	SD	Sharpe Ratio	r_t	$t(r_t)$	α^{FF6F}	$t(\alpha^{FF6F})$	α^{FS}	$t(\alpha^{FS})$	α^{PS}	$t(\alpha^{PS})$	α^{Q5}	$t(\alpha^{Q5})$	a^{BM}	$t(a^{BM})$
Low	4.043	0.255	0.293	1.019	-0.135	-3.284	-0.108	-2.764	-0.105	-2.235	-0.153	-4.069	-0.091	-2.430
2	4.093	0.288	0.334	1.145	-0.073	-1.901	-0.057	-1.446	-0.063	-1.523	-0.100	-2.864	-0.036	-1.107
3	4.168	0.283	0.334	1.135	-0.099	-2.660	-0.098	-2.534	-0.082	-1.820	-0.128	-3.818	-0.038	-1.038
4	4.209	0.263	0.314	1.031	-0.133	-3.230	-0.138	-3.688	-0.112	-2.519	-0.147	-3.796	-0.061	-1.635
5	4.392	0.351	0.435	1.413	-0.080	-1.695	-0.080	-1.676	-0.042	-0.619	-0.101	-2.324	0.066	0.666
6	4.253	0.316	0.379	1.231	-0.088	-1.674	-0.091	-1.943	-0.072	-1.299	-0.112	-2.415	-0.005	-0.098
7	4.318	0.309	0.378	1.214	-0.085	-1.853	-0.098	-2.583	-0.087	-1.878	-0.091	-2.251	0.000	-0.004
8	4.479	0.307	0.389	1.218	-0.066	-1.754	-0.075	-2.014	-0.087	-2.275	-0.049	-1.297	0.039	0.771
9	4.454	0.336	0.422	1.316	-0.031	-0.614	-0.053	-1.255	-0.058	-1.183	-0.030	-0.637	0.030	0.487
High	4.406	0.393	0.486	1.535	0.025	0.497	0.005	0.097	0.000	0.000	-0.005	-0.106	0.102	1.396
HML	1.087	0.623	0.194	3.206	0.160	3.696	0.113	2.201	0.105	2.175	0.147	3.648	0.193	3.219

Panel B: CO measure with profit weight based on 13F & 13D holding data														
CO Bin	SD	Sharpe Ratio	r_t	$t(r_t)$	α^{FF6F}	$t(\alpha^{FF6F})$	α^{FS}	$t(\alpha^{FS})$	α^{PS}	$t(\alpha^{PS})$	α^{Q5}	$t(\alpha^{Q5})$	a^{BM}	$t(a^{BM})$
Low	4.047	0.256	0.294	1.026	-0.134	-3.262	-0.108	-2.726	-0.103	-2.195	-0.151	-4.095	-0.088	-2.390
2	4.089	0.291	0.337	1.155	-0.071	-1.837	-0.055	-1.390	-0.061	-1.485	-0.097	-2.773	-0.034	-1.030
3	4.175	0.284	0.337	1.140	-0.097	-2.587	-0.095	-2.430	-0.081	-1.781	-0.127	-3.788	-0.036	-0.918
4	4.206	0.267	0.318	1.044	-0.129	-3.009	-0.136	-3.488	-0.111	-2.420	-0.143	-3.639	-0.056	-1.481
5	4.388	0.350	0.433	1.410	-0.080	-1.718	-0.080	-1.712	-0.042	-0.618	-0.103	-2.365	0.064	0.648
6	4.256	0.314	0.378	1.227	-0.089	-1.708	-0.092	-1.943	-0.074	-1.336	-0.114	-2.491	-0.007	-0.146
7	4.322	0.302	0.369	1.181	-0.095	-2.049	-0.105	-2.747	-0.096	-2.039	-0.097	-2.387	-0.003	-0.078
8	4.483	0.313	0.396	1.240	-0.056	-1.456	-0.068	-1.813	-0.081	-2.113	-0.044	-1.126	0.043	0.815
9	4.451	0.338	0.424	1.324	-0.029	-0.582	-0.050	-1.195	-0.056	-1.141	-0.027	-0.597	0.033	0.542
High	4.406	0.392	0.485	1.533	0.024	0.476	0.004	0.076	-0.001	-0.012	-0.006	-0.123	0.101	1.383
HML	1.086	0.615	0.191	3.165	0.157	3.648	0.112	2.174	0.102	2.137	0.145	3.589	0.190	3.173

C.4 Panel Regressions

Table C.5: Panel Regressions

This table shows the results of the panel regressions. The dependent variables are monthly raw returns, Fama-French 6-factor alpha, Ferson-Schadt alpha, Pastor-Stambaugh alpha, q-factor alpha, or benchmark-adjusted returns all represented as monthly returns in percentages. Returns are measured before expenses in Panel A and after expenses in Panel B. The main independent variables are the common ownership presence measured by CO. The control variables are lagged one-month log TNA, expense ratio, turnover ratio, flows, age and fund returns. All independent variables are winsorized at the 1% and 99% levels. We include year-month fixed effects and cluster the standard errors at the fund and year levels. ∗∗∗, ∗∗, ∗ denote significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Gross Returns						
Dependent Var:	r_t	$\hat{\alpha}^{FF6F}$	α^{FS}	α^{PS}	$\hat{\alpha}^{Q5}$	a^{BM}
	(1)	(2)	(3)	(4)	(5)	(6)
CO	2.093*	1.952***	2.125***	1.579**	2.340***	2.097*
	(1.192)	(0.641)	(0.633)	(0.637)	(0.775)	(1.008)
Observations	377,340	326,927	326,927	326,927	326,927	377,340
Controls	✓	✓	✓	✓	✓	✓
$\sigma(\varepsilon)$	2.019	1.68	2.12	1.68	1.783	2.02
R^2	0.779	0.071	0.067	0.069	0.066	0.147
Panel B: Net-of-Expenses Returns						
Dependent Var:	r_t	$\hat{\alpha}^{FF6F}$	α^{FS}	α^{PS}	$\hat{\alpha}^{Q5}$	
	(1)	(2)	(3)	(4)	(5)	(6)
CO	2.070*	1.923***	2.098***	1.552**	2.314***	2.070*
	(1.191)	(0.635)	(0.632)	(0.634)	(0.773)	(1.007)
Observations	377,340	326,927	326,927	326,927	326,927	377,340
Controls	✓	✓	✓	✓	✓	✓
$\sigma(\varepsilon)$	2.19	1.68	2.12	1.68	1.83	2.02
R^2	0.779	0.070	0.066	0.069	0.065	0.146

C.5 Fund Common Ownership and Fund Flows

Since fund managers' reward is impacted by fund inflows, we examine whether CO measure could affect future fund flows. Column (1) in Appendix Table C.6 presents the estimated monthly panel regressions of fund flows on CO measure with year-month fixed effects. The coefficient of CO measure is 4.754, suggesting that a one-standard-deviation increase in CO measure is associated with a 4.27 bps increase in fund flows, which is economically significant relative to the unconditional mean (of 0.09% of total net assets). In column (2), the results of the panel regressions with funds and year-month fixed effects show a qualitatively similar and even a more positive relation. In column (3), we examine the moderating effect of CO on the flow-performance sensitivity. To this end, we replace CO_{t-1} with High CO, set to one if fund CO is above the median CO in a month. Following Sirri and Tufano (1998), we find that fund flows are more sensitive to the high CO funds with bad past performance, indicating that investors may be concerned of the certain risks and, hence, less loyal to the high CO funds when the funds perform poorly. On the other hand, we find that fund flow is less sensitive to past performance for high CO funds that perform better, which may be the reason why the performance of CO strategy is persistent.

Table C.6: CO and Fund Flows

This table presents panel regressions studying the relation between CO and fund flows. The observations are at the fund-month level. The dependent variables are estimated monthly fund flows. In columns (1) and (2), the key indepdent variables are (1) CO_{t-1}, the lagged one-month fund common ownership measure, and (2) $Return_{t-1}$, the lagged one-month fund returns. In column (3), Low, Medium, and High Return are lagged fund return variables in percentile rank defined as of Sirri and Tufano (1998). All regressions incorporate unreported control variables including lagged one-month log TNA, expense ratio, turnover ratio, flows, and age. All continuous variables are winsorized at the 1% and 99% levels. Robust standard errors are clustered by fund and year. $***$, $**$, $*$ denote significance at the 1%, 5%, and 10% levels, respectively.

	Fund Flows (% TNA)		
Dependent Var:	(1)	(2)	(3)
CO_{t-1}	4.754***	9.682***	
	(1.426)	(3.197)	
$Return_{t-1}$	0.176***	0.165***	
	(0.018)	(0.019)	
High CO			-0.267*
			(0.120)
Low Return			1.720**
			(0.638)
Low Return × High CO			2.395***
			(0.648)
Medium Return			0.594***
			(0.131)
Medium Return × High CO			-0.233*
			(0.118)
High Return			5.972***
			(0.416)
High Return × High CO			-1.439**
			(0.564)
Controls	✓	✓	✓
FE: Year-Month	✓	✓	✓
FE: Fund		✓	
Observations	377,340	377,340	377,340
R^2	0.140	0.210	0.141