Competing Owners

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Keywords: Common Institutional Ownership, Competition, Asset Management, Herding.

JEL Classification: L10, G34, L11, L41

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Abstract

Recent studies argue that institutional common ownership in rival firms may reduce competition in product markets. Yet, empirical evidence is mixed. I re-examine the theoretical foundation for this argument, documenting that competition in the asset management industry acts as a market-based disciplinary mechanism mitigating the adverse effects of common ownership. Empirical evidence supports the model's predictions. While the cross-ownership network currently characterizing the U.S. market for corporate control is sufficiently dense to generate anti-competitive rents, institutional investors' focus on relative performance causes these distortions to be short-lived and localized.

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1. Introduction

Since 1976, assets under management by investment vehicles registered in the United States have grown by a factor of 200, with mutual funds alone reaching an aggregate size of about $22.1 trillion as at the end of 2022 (Khorana and Servaes [2011], Statista [2023]). This unprecedented trend and the consequent unavoidable increasing demand for portfolio diversification have caused many natural competitors to be jointly held by a small set of large institutional investors, raising concerns about the economic soundness of the current lenient regulatory approach towards passive financial investments in multiple firms operating within the same product market.[1] Theory predicts that *diversified* shareholders may indeed prefer a policy of industry value maximization (shareholders' portfolio value maximization) to the neo-classical objective of individual firm value maximization introduced in Fisher (1930) (Hart [1979], Rotemberg [1984], Azar [2017], Azar and Vives [2021]). The emergence of this preference would ultimately result in facilitated cooperation between rival firms, negatively affecting product market competition.[2]

Given its potential adverse consequences for both consumers and society as a whole (Azar and Vives [2019, 2021]), the development of a common ownership network in the U.S. market for corporate control has received extensive scrutiny over the past few years (Azar et al. [2018]). Yet, empirical evidence is mixed, and it is still unclear (1) whether common institutional ownership causes anti-competitive effects,[3] and (2) which economic channels might exacerbate its consequences (Lopez and Vives [2019], Lewellen and Lewellen [2021], Azar and Vives [2021]). Nevertheless, these contrasting findings have attracted substantial media attention,[4] igniting a

[1] Many of these "solely for investment" transactions have been granted a de facto exemption from antitrust liability under Clayton Act § 7 in several leading cases (Gilo [2000]).
[2] See O'Brian and Salop (2000), He and Huang (2017), Anton et al. (2023), Azar et al. (2018), and Backus, Conlon, Sinkinson (2021), among others.
[3] See Gilje et al. (2019), Koch et al. (2019), and Lewellen and Lewellen (2022).
[4] Polarized articles from the popular press can be easily identified. For instance, the *Harvard Business Review*

polarized political debate calling into question whether courts' interpretation of the exemption for stock acquisitions "solely for investment" included in the Clayton Act § 7 is still appropriate in the current competitive environment. Crucially, these discussions have already resulted in several antitrust proposals aimed at breaking up the existing cross-ownership network.[5] Yet, these regulatory remedies challenge shareholder rights that are fundamental to institutional investors' stewardship activities, implying that preventive policy interventions would likely be costly (Rock and Rubinfeld [2017], Dallas [2018]). Shedding light on eventual *market-based* mechanisms that might *prevent* the potential ills of cross-ownership from materializing represents consequently a priority for all relevant constituencies. Identifying such a mechanism would indeed (1) help evaluate the overall effects of policies aimed at mitigating common ownership-related concerns, and (2) help reconcile the contrasting results reported in extant literature.

In this study, I document that competition in the asset management industry acts as a disciplinary mechanism reducing institutional investors' ability to shift firm managers' incentives to internalize product market externalities. Since most institutional investors compete on relative performance (Basak and Pavlona [2013]), strategic interactions between common institutional shareholders generate disagreement, undermining their ability to systematically pressure firm managers to avoid aggressively competing against their rivals. In particular, as long as institutional

published on February 19, 2019 a piece stating that "(Policy proposals constraining the common ownership network) merit substantial consideration. A popular anti-trust movement successfully defeated corporate trusts once in the U.S., so there is hope that meaningful action against resurgent monopolists is possible." [https://hbr.org/2019/02/how-big-a-problem-is-it-that-a-few-shareholders-own-stock-in-so-many-competing-companies]. On April 26, 2019 *The Hill* published a related piece criticizing existing policy proposals by stating that "(i)ndex funds have been a boon to investors with no discernible harm to marketplace competition. A greater danger is inviting unproven conspiracy theories conjured out of statistical thin air to take a seat at the regulatory table."[https://thehill.com/opinion/finance/436287-common-ownership-scare-highlights-flaws-of-economic- research].

[5] Elhauge (2018a) suggests that the application of the Clayton Act § 7 should be extended beyond the case of mergers, providing the U.S. antitrust authority with an instrument to challenge stock acquisitions "solely for investment" when they cause a material increase in common ownership. Similarly, Posner, Morton and Weyl (2018) propose institutional investors should either (1) own no more than 1% of any oligopolistic industry, (2) own only up to 1 firm within an oligopolistic market, or (3) act as entirely passive investors with respect to firm governance.

investors don't hold identical portfolios (the Folk Theorem), the alleged common ownership-induced anti-competitive rents would not be uniformly distributed across all existing shareholders. Consequently, as most institutional investors compete for flows on the ground of relative performance, striving to maximize their assets under management, institutional investors would take into consideration not only the consequences of an eventual common ownership-induced reduction in product market competition (O'Brien and Salop [2000], Azar et al. [2018], Lopez and Vives [2019]) but also its effects on their rivals' performance. That is, as long as competition among a firm's institutional shareholders is sufficiently high, funds benefiting the least from eventual anti-competitive commercial practices would disagree on whether and how pressuring managers to enact them in the first place, ultimately preventing the anti-competitive effects of common ownership from materializing.

I demonstrate that this equilibrium can emerge even from a standard, static oligopoly model with common ownership, in which diversified investors prefer a policy of portfolio-value maximization to profit maximization (O'Brien and Salop [2000]).[6] In this scenario, as long as institutional common owners benchmark their performance against their rivals in an attempt to maximize assets under management (Basak and Pavlona [2013]),[7] the resulting equilibrium competition level would be driven by three distinct forces. First, the Herfindahl-Hirschman Index, capturing the effects of the relative market shares of firms competing in the product market. Second, the anti-competitive effects of common ownership, representing the *magnitude* of the gains that each shareholder would capture by internalizing rents originated from unilateral anti-

[6] Similar models have been derived in Bernheim and Whinston (1985), Flath (1991, 1992), Malueg (1992), Gilo et al. (2010), Foros, Kind and Shaffer (2011), Bebchuck, Kraakman and Triantis (2000), Nain and Wang (2018), Lopez and Vives (2019), among others.

[7] The existence of a strong, positive relation between positive flows and fund performance is a well-established finding in extant literature, both for mutual funds (Chevalier and Ellison, 1997, Sirri and Tufano, 1998), hedge funds (Agrawal, Daniel, and Naik, 2009), and for pension funds (Del Guercio and Tkac, 2002).

competitive practices. Third, the pro-competitive effects induced by competition in the asset management industry, capturing the eventual relative costs originating from the *distributional properties* of these economic rents. These three dimensions interact with each other, ultimately determining firm managers' incentives to compete. All in all, even in a static framework, competition in the asset management industry acts as a market-based disciplinary tool, ultimately mitigating the adverse effects of common ownership and potentially restoring a competitive equilibrium in the underlying product market.

To provide empirical support for the model's predictions, I document that common ownership is associated with higher product market performance – namely higher Lerner index, ROA, ROS, and gross profit margins –in industries in which relevant investors face a low degree of competition in their asset management industry segment, exclusively. However, these anti-competitive rents are short-lived, as they completely disappear following high pro-competitive entry – defined as the entry of 13F institutions with overlapping holdings with respect to incumbent funds exposed to a relevant common ownership network (Wahal and Wang [2011]). That is, institutional investors display a tendency to increase their exposure to firms benefiting the most from the existence of a dense common-ownership network. This endogenous entry in the asset management industry disciplines managers, virtually re-establishing the neoclassical equilibrium under profit maximization.[8]

As institutional investors can rapidly adjust their portfolios, measures of accounting performance might be inappropriate to capture both the anti-competitive effects of common

[8] Importantly, this statistical association speaks volumes about the degree of competition of the U.S. asset management industry, as it suggests that asset management firms respond rapidly to eventual temporary market frictions which might benefit the performance of a limited number of asset management firms. Furthermore, these results show a new factor which might induce institutional industry herding, indicating that this behavior is more likely to impact industry valuations and to cause subsequent stock returns reversals in industries in which common ownership is originating anti- competitive effects (Choi and Sias [2009], Celiker, Chowdhury, and Sonaer [2015]).

ownership and the disciplinary effects of competition in the asset management industry. To mitigate these concerns, I construct every year on January, 1, a portfolio including all firms in the highest decile by common ownership, and in the first decile by entry into the asset management industry, as observed at the end of the previous fiscal year (long portfolio). Similarly, I build every year, on the same date, a portfolio incorporating all firms in the highest decile by both common ownership and institutional investors' entry (short portfolio). As long as (1) these anti-competitive rents are not immediately and fully incorporated into stock prices because of information frictions or investors' limited attention (Gilje et al. [2019]); (2) common ownership generates anti-competitive effects; and (3) increased competition in the asset management industry mitigates these adverse effects; then the realized returns for the firms included in the long portfolio (high common ownership and low entry) should be systematically higher than those for the firms included in the short portfolio (high common ownership and high entry). These potentially unpriced (or mispriced) rents should indeed disappear *faster* for the second group. I find this to be the case. The proposed portfolio generates positive Jensen's alphas (about 7% annualized abnormal returns) for up to 12 months. Furthermore, consistent with the hypothesis that these rents are unsustainable in the long term, I find that the alphas disappear when I hold the portfolio over longer horizons (24, and 36 months). That is, competition in the asset management industry undermines the long-term sustainability of common-ownership induced anti-competitive rents.

The remainder of the paper is organized as follows. Section I offers theoretical foundations for the hypothesis that competition in the asset management industry mitigates the anti-competitive effects of common ownership. Section II discusses the construction of both the MVO and the MHHID measures, and it reports summary statistics for the selected variables. Section III reports

empirical evidence supporting the hypothesis that competition in the asset management industry mitigates the anti-competitive effects of common ownership. Finally, Section IV concludes.

2. Competing owners and firms' performance in a standard oligopoly model

In a standard oligopoly model with no common ownership between firms operating within the same industry, a firm's shareholders would typically agree upon the objective that the firm should pursue: profit maximization (Hart [1979]). However, this might not be the case when investors hold partial ownership interests in multiple competing firms (Hansen and Lott [1996]). When diversified investors hold stakes in firms operating in imperfectly competitive product markets, industry value maximization might indeed emerge as a more reasonable objective function (Schmalz [2018]). It is thus theoretically conceivable that the density and the structure of the cross-ownership network shape managerial incentives, consequently determining the resulting equilibrium competition level in the underlying product market.[9]

This setting has been studied extensively in the industrial organization literature. Gordon (2003), Azar (2011), and Azar (2016) document that such anti-competitive effects might materialize even in cases in which shareholders are not completely diversified, in which their portfolios differ from each other, and where consumers are also relevant shareholders. In all these scenarios, shareholders prefer that individual firm managers jointly pursue corporate policies similar to those pursued by a monopolist who maximizes a weighted average of individual utilities.

While similar conclusions can be reached under different strategic settings, a vast majority of the theoretical literature has modeled the competitive effects of common ownership as a static Cournot model in which firms maximize a weighted average of their shareholders' interests.[10] This

[9] Malueg (1992) demonstrates that common ownership anti-competitive effects depend critically upon the shape of the demand function. High convexity might indeed preclude the sustainability of a cooperative equilibrium.
[10] See O'Brien and Salop (2000) and Koch et al. (2019) for an exhaustive literature review.

setting is particularly appealing, as it can provide an economically sound measure capturing the extent to which firms' most powerful owners are also owners of natural competitors – namely a modified version of the Herfindahl-Hirschman index. In particular, among these theoretical studies, Bresnahan and Salop (1986) and O'Brien and Salop (2000) have been extensively used as the economic foundation for several recent empirical papers assessing the anti-competitive effects of common ownership (Azar et al. [2018], Xie and Grakos [2018], Lowry and Lewellen [2022], Kin et al. [2019], among others). These models analyze the strategic interactions of F firms competing a' la Cournot, under the assumption that I investors hold shares in multiple rivals operating in the relevant product market. In this setting, investor i's total returns can be defined as $\pi^i = \sum_{j=1}^{F} \beta_{i,j}\pi_j$, where $\beta_{i,j}$ represents the cash flows rights investor i is entitled to from firm j performance, π_j. O'Brien and Salop (2000) model shareholders' influence on insiders' incentives by assuming that managers maximize a weighted sum of each shareholder's returns. Weights are assigned based on each investor's control over the firm, implying that managers' attention to a given shareholder's needs is proportional to her control rights. In particular, the underlying economic intuition is that a manager may be less constrained from aggressively pursuing a growth strategy at the expense of rivals if its shareholders have marginal exposure to the performance of a firm's peers. Conversely, as shareholders' holdings in multiple firms in an industry increase, the negative effects of a price war on their portfolio value would be exacerbated by their own ownership network. Thus, such investors would attempt to refrain a firm from increasing capacity or starting price wars in such a market.

By defining the control share (voting rights) of firm j held by shareholder i as $\gamma_{i,j}$,[11] O'Brien and Salop (2000) state firm j's managerial objective function as follow:

$$\max_{q_j} \Pi_j = \max_{q_j} \sum_{i=1}^{I} \gamma_{i,j} \sum_{j=1}^{F} \beta_{i,f} \pi_f = \max_{q_j} \sum_{i=1}^{I} \gamma_{i,j} \sum_{j=1}^{F} \beta_{i,j} [P(Q) q_j - C_j q_j] \quad (1)$$

By isolating firm j's profits, it is possible to observe that this maximization problem is equivalent to maximizing firm j profits, plus a linear combination of the competitors' profits in which relevant shareholders hold cash flow rights:

$$\max_{q_j} \Pi_j = \max_{q_j} \left[\pi_j + \sum_{k \neq j}^{F-1} \frac{\sum_{i=1}^{I} \gamma_{i,j} \beta_{i,k}}{\sum_{i=1}^{I} \gamma_{i,j} \beta_{i,j}} [P(Q) q_k - C_k q_k] \right] \quad (2)$$

Firm j's manager will thus optimize the firm performance, while weighting the gains and losses accrued to each diversified shareholder based upon its degree of control over the firm. In other words, if the portfolio losses accruing to the other firms included in firm j's most powerful shareholders' portfolio are greater than the benefits they can extract from firm j competing aggressively in its market, then such a strategy would not find support among the firm's principals.

As discussed in O'Brien and Salop (2000) and Azar et al. (2018), the solution to this extended Cournot model produces a modified version of the HHI index, labeled as the Modified Herfindahl Index (MHHI):

$$MHHI = \sum_{j=1}^{F} {s_j}^2 + \sum_{j=1}^{F-1} \sum_{k \neq j=1}^{F-1} s_k s_j \frac{\sum_{i=1}^{I} \gamma_{i,k} \beta_{i,k}}{\sum_{i=1}^{I} \gamma_{i,j} \beta_{i,j}} \quad (3)$$

Consistent with the classic Cournot model, $\sum_{j=1}^{F} {s_j}^2$ represents a measure of industry consolidation constructed to be proportional to the share-weighted sum of the margins of all firms operating in

[11] $\gamma i,f$ might represents both legal control on the firm, namely the percentage of voting shares held by investor i, as well as any form of indirect control on the firm (e.g. reputational based control)

a given product market (the HHI). The residual component, $\sum_{k\neq j}^{F-1}\sum_{k\neq j}^{F-1} s_k s_j \frac{\sum_{i=1}^{I}\gamma_{i,j}\beta_{i,k}}{\sum_{i=1}^{I}\gamma_{i,j}\beta_{i,j}}$ labeled MHHI delta (MHHID), and it captures the marginal contribution of common ownership to the effective level of concentration characterizing a product market.[12] The MHHI can thus be decomposed as follow:

$$MHHI = HHI + MHHID = \sum_{j=1}^{F} {s_j}^2 + \sum_{k\neq j}^{F-1}\sum_{k\neq j}^{F-1} s_k s_j \frac{\sum_{i=1}^{I}\gamma_{i,k}\beta_{i,k}}{\sum_{i=1}^{I}\gamma_{i,j}\beta_{i,j}} \quad (4)$$

This decomposition makes the O'Brien and Salop (2000) MHHI an extremely attractive measure of product market competition. Its economic interpretation within a Cournot framework is straightforward, and the marginal contribution of its two components can be easily disentangled.[13] Its extensive use in the empirical literature is thus not surprising. However, this model presumes that institutional investors do not interact with each other, and that the distributional properties of the materialized competitive rents have no economic implications. Since the common-ownership network characterizing the U.S. market for corporate control gravitates around large institutional investors, rather than around individual investors or corporate entities holding financial stakes in their rivals, this assumption might be problematic.

[12] Importantly, the model is static in nature and it does not presume any explicit or tacit collusion. Rather, the derived MHHI should be consider as a proxy for the degree of internal competition characterizing a market, rather than a model of cooperation induced by common ownership networks. With respect to the channels through which this effect might materialize, Importantly, as noted in Azar et al. (2016, 2018), the anti-competitive effects of common ownership captured in the MHHID can occur "organically" as managers' attempts to enjoy a quiet life might coincide with common owners' preferences for less aggressive competitive behaviors within the product market. Alternatively, if common owners have sufficient strengths to influence the activity of a firm's board of directors, than they will exercise pressure to reduce the CEO's pay-performance sensitivity to deflate incentives to compete. Schmaltz et al. (2018) document evidences consistent with this hypothesis.

[13] As discussed in the Online Appendix of Azar et al. (2018), "consider two firms that have 50% market share each. The HHI is equal to 5,000 on a scale from 0 (perfect competition) to 10,000 (monopoly). If the firms are separately owned, MHHI delta is equal to 0 and MHHI equals HHI, 5,000. If the two shareholders swap 3 50% of their shares, they now both receive 50% of the profits from each firm, and thus would want the two firms to act as if they were two divisions of a monopoly. The HHI is still 5,000 because the two firms are still formally independent, but the effective market concentration, reflected by a MHHI of 10,000, is identical to that of a monopoly."

Institutional investors seek to maximize their relative performance compared to an endogenously defined benchmark and to their rivals, rather than to maximize their absolute performance.[14] Furthermore, their single most important goal is to maximize assets under management, whose changes are a function of funds' flows-performance sensitivity. The existence of a strong, positive relation between positive flows and fund performance is indeed a well-established finding in extant literature for mutual funds (Chevalier and Ellison, 1997, Sirri and Tufano, 1998), hedge funds (Agrawal, Daniel, and Naik, 2009), and pension funds (Guercio and Tkac, 2002). The distribution of common ownership induced rents is thus critical. The existence of competitive forces within the asset management industry should pressure fund managers to avoid cooperative equilibria in which rival funds capture most of these collusive gains, as in these scenarios they would be perceived as relatively underperforming funds.

To document this effect, I derive a model of overlapping ownership a' la Salop and O'Brien (2000) accounting for competition between existing shareholders. In order to model the hidden cost originating from the distributional properties of eventual collusive gains, I redefine shareholders' objective function as one of portfolio value maximization (as in O'Brien and Salop, 2000), relative to their peers' expected performance. That is, I define the value function for shareholder i as follows:

$$u_i = \pi_i + \rho_i \overline{\pi_{-i}} \tag{5}$$

Where $\overline{\pi_{-i}}$ is the expected performance of fund i's peers, which under simplifying assumption can be defined as $\overline{\pi_{-i}} = \frac{\sum_{a \neq i}^{I-1} \pi_a}{I-1}$.[15] ρ_i represents a fund-specific sensitivity to the market

[14] Or, in the case of passive investors, they seek to mimic an ex-ante identified benchmark.
[15] The model can easily accommodate different benchmarks. However, for the sake of simplicity, I assume that each institutional investor equally weight the competitive importance of all its peers.

performance. Note that in the extreme case of no sensitivity to peers' performance, this "competitive factor" would be equal to zero and the model would collapse into the O'Brien and Salop (2000) equilibrium in which institutional investors do not perceive rivals' performance as an economic cost. Similarly to the previously discussed baseline case, I assume managers maximize a weighted sum of each shareholder's relative returns, where weights are assigned based on each investor's control over the firm. In this setting, firm j's manager optimization problem can be formalized as follows:

$$\max_{q_j} \Pi_j = \max_{q_j} \sum_{i=1}^{I} \gamma_{i,j} \sum_{j=1}^{F} \left[\beta_{i,j}\pi_j - \rho_i \overline{\pi_{-i}}\right] \tag{6}$$

While a detailed solution to this simple optimization problem is provided in the Online Appendix, the resulting competition level in the underlying product market is now captured in an augmented version of O'Brien and Salop (2000) MHHI, which I named the Adjusted Modified Herhindahl-Hirschman Index (AMHHI):

$$AMHHI = HHI + AMHHID = \sum_{j=1}^{F} {s_j}^2 + \sum_{k\neq j}^{F-1} \sum_{j=1}^{F} s_k s_j \frac{\sum_{i=1}^{I} \gamma_{i,k}\left[\beta_{i,k} - \rho_i \overline{\beta_{-i,k}}\right]}{\sum_{i=1}^{I} \gamma_{i,j}\left[\beta_{i,j} - \rho_i \overline{\beta_{-i,j}}\right]} \tag{7}$$

Where $\overline{\beta_{-i,k}}$ is the average cash flow rights held by investor i's peers in firm k.

As previously discussed, the equilibrium competition level captured by the AMHHI collapses in the one that would have been predicted by the O'Brien and Salop (2000) MHHI when no strategic interactions between shareholders exist. That is, if ρ_i = 0 for all the relevant institutional investors, the AHMMI is equal to the MHHI.

This finding contributes to our understanding of the anti-competitive effects of common ownership along three critical dimensions. First, it is important to note that the AMHHI delta is not strictly positive. Its sign depends upon the ownership network characterizing a given industry.

Thus, common ownership might induce pro-competitive effects, independently from the shape of the underlying demand function (Malueg [1992], Vives and Lopez [2019], Azar and Vives [2021]). Second, the existence of potentially large anti-competitive rents is *insufficient* to grant the materialization of a common ownership induced anti-competitive equilibrium (Lewellen and Lewellen [2022]). Indeed, the distributional properties of these eventual rents play a crucial role in determining the achievability of such a cooperative equilibrium.[16] Third, assessing the anti-competitive effects of common ownership independently from the strategic interaction taking place between the existing shareholders provides a myopic picture which might lead to misleading conclusions. Models of horizontal mergers among asset management firms might thus not represent the best economic foundations to assess the anti-competitive effects of institutional investors induced common ownership, as they affect two interconnected economic measures in the same directions – common ownership and competition in the asset management industry.

All in all, the proposed model documents that the existence of the anti-competitive effects of common ownership depends critically upon the degree of competition characterizing the asset management industry. Relevant shareholders' behaviors are indeed disciplined by competitive forces, and, as long as all investors do not hold the market portfolio, incentives to pressure managers to avoid aggressive commercial practices are unlikely to materialize.

As common ownership and competition in the asset management industry have been increasing simultaneously over the last two decades, these two forces might ultimately counterbalance each other (Anton et al. [2023], Wahal and Wang [2011], Khorana and Servaes [2011]). That is, a market-based solution to the anti-competitive effects of common ownership

[16] This tension might contribute to explaining the puzzle identified in Lewellen and Lewellen (2022), where they document that while dollar cash-flows to institutions from promoting anticompetitive practices can be substantial, they tend to be small in the more concentrated industries where the ability to influence firm behavior should be the greatest.

might already be in place. However, its effectiveness is a crucial empirical question, which I tackle in the next sections of this study.

3. Data and Summary Statistics

3.A. Measuring the competitive effects of common ownership.

I gather institutional ownership data from the Thomson Reuters Institutional (13F) Holdings database, which reports quarterly equity holdings for all institutional investors with over $100 million in assets under management.[17] Similarly to Azar et al. (2018), I disregard shareholdings with voting and non-voting shares below 0.5%.[18] Quarterly data are aggregated at the fund-firm-year level to generate a measure of average exposure to a given security.

While several proxies of cross-ownership have been proposed in the literature, my primary measure of common institutional ownership among industry competitors is the Modified Hirschman- Herfindahl Index (MHHI). This measure has been extensively used in the literature, as it is rooted in economic theory and it allows one to easily disentangle the competitive effects due to the degree of consolidation of the underlying product market (the HHI) from those due to the eventual anti-competitive effects of common ownership (MHHID). Furthermore, the previously proposed theoretical framework suggests that the MHHID is sensitive to the degree of competition characterizing the relevant portion of the asset management industry. By using this measure I can thus indirectly test the economic soundness of the previously derived AMHHID.

$$MHHID = \sum_{k \neq j}^{F-1} \sum_{k \neq j}^{F-1} s_k s_j \frac{\sum_{i=1}^{I} \gamma_{i,k} \beta_{i,k}}{\sum_{i=1}^{I} \gamma_{i,j} \beta_{i,j}} \quad (8)$$

[17] As indicated in Ben-David, Granzoni, Moussawi, and Sedunov (2021), a data integrity issue caused the underestimation of institutional ownership levels reported in this dataset. I am thankful to the Wharton Research Data Service (WRDS) for posting a revised version of this dataset on June 11, 2018.
[18] All results hold if I impose a more conservative threshold – namely 5%.

To operationalize the formula reported in Equation (8), I define the control weights for institutional investor i in firm j ($\gamma_{i,j}$) as the sum of the percentage of its sole voting shares (SOLE) and its shared voting shares (SHARED).[19] Cash flow rights $\beta_{i,k}$ are defined as the total percentage of shares institutional investor i holds in firm k (SHARES). In the baseline specifications, market shares s_j are based upon Fama French 48 industry definitions.[20]

Consistent with observations reported in Anton et al. (2023) and Kini et al. (2023), common ownership in the U.S. has been systematically increasing over the last 20 years. As described in Figure I and Table II, Panel A, the MHHID has risen from about 300 MHHI points in 2000 to 607 MHHI points in 2019, economy-wide.[21] This unprecedented increase in the U.S. common ownership network density provides an economic foundation for antitrust-based concerns about this unprecedented consolidation in the market for corporate control, whose consequences deserve scrutiny.

[Figure I about here]

3.B. Measuring competition in the asset management industry.

Despite the impressive growth experienced by the asset management industry (Khorana and Servaes [2011]), little direct evidence exists in the literature concerning the forces shaping strategic interactions between asset management firms (Wahal and Wang [2011]). The struggle of the academic literature to capture competitive effects within this

[19] Several papers assume $\gamma_{i,j}$ to be equal to $\beta_{i,k}$. This assumption is often referred to as the "proportional control" assumption. However, this has been shown to be extremely problematic and poorly suited to describe corporate controls. The set up use in the paper is costly from a data perspective, but it overcomes these important concerns (Backus, Conlon, Sinkinson [2021]). However, as discussed in Dennis, Gerardi and Schenone (2018), it is possible that the reported 13F data on voting rights are not accurate. Replicating all results by assuming that an investors' voting rights are equal to its cash flow rights does not affect the results.

[20] SIC codes are obtained from the CRSP dataset.

[21] Consistent with Anton et al. (2023), the MHHID for the manufacturing sector (SIC 2000-3999) is significantly higher than 1000 MHHI points, providing an external validation for the reported estimates.

unique product market is well represented by U.S. courts still heavily endorsing the Gartenberg guidelines,[22] under which the SEC concluded *40 years ago* that mutual funds do not compete on price.[27] However, evidence suggesting that the asset management industry has recently developed competitive characteristics is rapidly accumulating, both in the academic literature (e.g. Hubbard et al. [2010], Wahal and Wang [2011], Hortacsu and Syverson [2004], Khorana and Servaes [2004], Coates and Hubbard [2007]), as well as in the popular press.[28]

Since measuring the intensity of price- and non-price competition in this industry is challenging, I follow Wahal and Wang (2011) and tackle this issue from a different perspective. Rather than focusing on competition *levels*, I exploit free-entry in the asset management industry as a shock to incumbents' strategic behaviors. The large increase in the number of mutual funds has been extensively documented in the literature, moving from about 850 as at the time of the Gartenberg ruling (1982) to more than 7,500 in 2023. However, to assess the competitive effects of entry it is critical to determine the degree to which an entrant competes with the incumbents, which is complicated under product differentiation. (Berry and Reiss [2007]). Wahal and Wang (2011) propose to regard an asset management firm's (i.e. mutual fund's) portfolio as the offered product, whereby the fees are the charged price. In this simple framework, institutional investors' stock holdings can be thought of as key "inputs", implying that the degree of substitutability between two institutional investors (i.e., mutual funds) depends upon the similarity between the entrant and the incumbent's portfolios. That is, institutional investors gaining for the first time exposure to a given product market by acquiring stakes in firms operating in it generates

[22] Gartenberg v. Merril Lynch Asset Management, 694 F.2d 923 (2d Cir. 1982).

competitive pressures on incumbent institutional investors with overlapping holdings. As managers compete on relative performance and strive to outperform their peers (substitutes), this endogenous entry has been shown to materially impact asset managers' behaviors (Wahal and Wang [2011], Khorana and Sarvaes [1999]).

To operationalize this idea, I follow Wahal and Wang (2011) and build a measure of "Market Value of Overlap" (MVO). This measure is defined as the firm-year average ratio of the market value of an overlapping security's holding in the entrant's portfolio to the market value of the same security in the incumbent institutional investor's portfolio. Empirically:

$$MVO_{f,t} = \frac{1}{\delta_{f,t}F}\sum_{i=1}^{I}\sum_{j=1}^{\Gamma}\frac{\mathrm{P}_{j,t}S^{E}_{j,t}}{\mathrm{P}_{j,t-1}S^{I}_{j,t-1}} * \frac{\mathrm{P}_{j,t-1}S^{I}_{j,t-1}}{\sum_{\mathrm{f}=1}^{F}\mathrm{P}_{f,t-1}S^{I}_{f,t-1}} \quad (9)$$

Where $\delta_{f,t}$ is the number of institutional investors holding a stake in firm f. Γ is the number of overlapping holdings between each entrant-incumbent pair. Pj,t is the per share price of an overlapping security j at time t. $S^{E}_{j,t}$ ($S^{I}_{j,t}$) is the number of shares of a security j held by an incumbent institutional investor (purchased by an entrant). The first term in the double summation term captures the ratio of the dollar value of the overlap between an entrant and an incumbent. The second term represents the relative importance (weight) of each security in the incumbent's portfolio.

The interpretation of the MVO is straightforward. As discussed in Wahal and Wang (2011), a higher value of MVO indicates higher entry of institutional investors with overlapping holdings. Consequently, as free entry should be on average more pronounced in industries with a lower

degree of competition (Lilien and Yoon [1990], Wahal and Wang [2011]),[23] a high level of MVO in year t indicates low competitive levels for existing shareholders in year t and higher relative changes in competition between year t and year t+1.[24]

The stability of the MVO measure described in Figure II emphasizes the fundamental difference between this proxy and a measure based upon the total number of new entrants, exclusively. Indeed, as documented in Wahal and Wang [2011] and Hubbard et al. (2010), the number of new asset management firms has been steadily increasing over time. However, competition-relevant entry depends critically upon the entrant and the incumbent's degree of substitutability, thus requiring a more elaborate proxy to capture its time-series dynamics.

[Figure II about here]

3.C. Measuring competition in the asset management industry.

I merge the created variables to the Compustat/CRSP merged database. The resulting sample includes U.S. domestic firms, exclusively, with a CRSP share code of either 10 or 11. I further require that sample firms have non-missing, non-negative total assets and sales, and non-missing values for the Lerner Index, ROA, ROS, and Gross Profit Margin (GPM hereinafter), and for key control variables including book leverage, Tobin's Q, capital expenditures, firm liquidity, sales growth, R&D expenses, total institutional ownership and HHI. All variables are defined in Table A.I., in the Appendix. The resulting sample includes 23,420 observations for the period 2000-2019. Table I, Panel C, reports descriptive statistics for the variables used in the proposed tests, which are comparable to those reported in other recent studies (e.g. Kini et al. [2023] and Lowry and Lewellen [2021]).

[23] Assuming comparable barrier to entry across different *product markets*.
[24] As reported in Table I, Panel B, the predicted level of the MVO measure is comparable with those reported in Wahal and Wang (2011), providing external support for the validity of the reported estimates.

[Table I about here]

4. Empirical analyses: competing owners and product market outcomes

4.A. Common ownership and accounting performance.

I begin my analysis by assessing whether a strong association between institutional common ownership and firm performance can be identified in the data by estimating the following regression model:

$$Performance_{i,t} = \alpha + \beta_1 MHHID_{i,t} + \beta_2 X + \tau t + \vartheta i + \varepsilon_{i,t} \quad (10)$$

I use four different performance indicators – namely the Lerner Index, ROA, ROS, and the GPM, for which detailed definitions are provided in Table A.I., in the appendix. X is a matrix of firm-level control variables. In particular, I control for firms' investment opportunities through Tobin's Q and sales growth; for whether a firm is reporting a financial loss (negative net income, as per Ball and Shivakumar [2006]); for financial constraints, as captured by book leverage and firm liquidity (Dunchin [2010]); for capital expenditures and R&D investments (Chemmanur and Tian [2018]); for advertising expenses (Joshi and Hanseens [2010]); for the level of institutional ownership (He and Huang [2017]), and for the HHI index.[25] All firm-level control variables are lagged with respect to the performance indicator to avoid mechanical correlations causing bias in the estimated coefficients. The specification includes year and firm fixed effects, and standard errors are clustered by firm.[26] As reported in Table II, Panel A, common ownership is positively associated with all the performance indicators tested. However, the association is statistically significant at conventional levels only for ROA and GPM.

[Table II about here]

These weak results echo extant literature's inconclusiveness, calling for further analyses

[25] Detailed definitions are provided in Table A.I, in the Appendix.
[26] All results are robust to the use of a two-ways clustering at the industry-year level.

aimed at identifying the underlying drivers of this relation.

As previously discussed, I posit that competition in the asset management industry might influence institutional common owners' ability to generate anticompetitive rents in the underlying product market. To assess if this is the case, I estimate Equation (9) separately for product markets in which relevant institutional investors are expected to face the lowest level of competition (10th decile of MVO in year t, Low AMI Competition hereinafter, Panel B) and for those in which relevant institutional investors are exposed to the highest level of competition (1st decile of MVO in year t, High AMI Competition hereinafter, Panel C).[27] A clear pattern immediately emerges. For all the selected performance indicators, common ownership is strongly, and positively associated with performance when the relevant portion of the asset management industry displays low levels of internal competition. Conversely, no effects can be identified when the relevant institutional investors face a high degree of competition.[28]

If the hypothesis that competitive entry in the asset management industry undermines the long-term sustainability of eventual common ownership induced anti-competitive rents is correct, I should find that the identified association between the MHHID measure and firm performance disappears in the following fiscal year. To test this hypothesis I estimate Equation (9) on the subsample of firms whose shareholders are exposed to high entry in the previous fiscal year (10th decile by the lagged value of MVO). As reported in Table III, the previously estimated rents are completely reabsorbed: no statistically significant relation between MHHID and firm performance can be identified in this setting.

[27] Similar results can be identified using quintile, rather than decile. To avoid redundancy, quintile based estimates are provided in the Online Appendix.

[28] Consistent results are identified when I augment Model (9) by including a High AMI Competition dummy and its interaction with the MHHID variable (Table II, Panel D). All estimates are robust to controlling for the GGL measure of common owners' attention developed in Gilje et al. (2019).

[Table III about here]

Taken together, these results provide empirical support for the notion that competition in the asset management industry acts as a market-based disciplinary device preventing the long-term sustainability of anti-competitive commercial practices. However, the robustness of the identified results needs to be assessed. First, since the validity of any measure of competition hinges on the underlying definition of product market, I replicate the results reported in Table II and Table III after constructing both the MHHI and the MVO measures based on different industry definitions. As shown in Table IV, Panel A and Panel B, results are robust to identifying the boundaries of a product market by using either 3-digit SIC definitions, or 2-digit SIC definitions.[29]

[Table IV about here]

Lowry and Lewellen (2021) argue that high institutional ownership firms (industries) are more resilient to large, industry- or economy-wide shocks. Since high institutional ownership is correlated to high industry common ownership, the association between the MHHID and firm performance might thus be an econometric artifact originating from outlier observations clustering during the financial crisis. Since similar concerns are important for entry and competition in the asset management industry, I replicate in Table V my baseline results (1) after dropping observations from the recent financial crisis, and (2) explicitly controlling for its economic consequences with a crisis dummy.[30] Results are robust to the use of these conservative specifications, confirming that the disciplinary effects of competition in the asset management industry are not specific to the recent financial crisis.

[Table V about here]

[29] To avoid redundancy, I report estimates based on ROA, exclusively. Consistent results can be identified using the Lerner Index, ROS or GMP as the dependent variable.
[30] The crisis period is assumed to cover the period from fiscal year start 2007 to fiscal year end 2009.

Lopez and Vives (2019) and Kini et al. (2023) document that innovation spillovers might mitigate the anti-competitive effects of common ownership. If institutional investors' exposure to a product market and innovation spillovers are highly correlated, it might thus be the case that the MVO measure is simply proxying for the latter. In order to control for this potential confounding channel, I augment my baseline specification with a high-tech industry dummy and its interaction with the MHHID.[31] Under the assumption that innovation spillovers should be the most pronounced in high-tech markets, this conservative specification should allow me to identify whether these two economic channels are redundant with respect to each other. As shown in Table VI, results hold, suggesting that the anti-competitive effects of common ownership interact with the degree of competition in the relevant portion of the asset management industry beyond the innovation spillover channel (Lopez and Vives [2019] and Kini et al. [2023]).

[Table VI about here]

All in all, competition in the asset management industry seems to act as a counterbalancing mechanism undermining the long-term sustainability of common ownership induced anti-competitive rents. However, it is important to recognize that market shares (which contribute to the formulation of both MHHI delta and HHI) are potentially endogenous to firms' performance. In particular, as discussed in Azar et al. (2018), an investor with a holding in one firm, only, would increase his stake if he anticipates an increase in firm profitability. This effect would result in a decrease in common ownership, leading to a negative relation between the MHHI delta measure and firms' profitability. Similarly, institutional investors' entry into (increase in exposure to) a

[31] High-Tech industry includes SIC 28 Chemicals and Allied Products, SIC 35 Industrial and Commercial Machinery and Computer Equipment, SIC 36 Electronics and Electrical Equipment, SIC 37 Transportation Equipment, SIC 38 Measuring, Analyzing and Controlling Instruments; Photographic, Medical and Optical Goods, SIC 48 Communications, SIC 73 Business Services or SIC 87 Engineering, Accounting, Research, Management and Related Services (Hall and Vopel [1996]).

product market might be driven by higher expected future performance. Thus, endogeneity might bias the marginal effect of the MVO measure downwards.

Several identification strategies have been proposed in extant empirical literature to break down this latent endogeneity problem. However, Lowry and Lewellen (2021) provide compelling arguments against the use of (1) additions to the S&P500 and (2) reconstitutions of the Russell 1000/2000 indices as instruments for common ownership. Furthermore, Berger (2021) argues against the use of mutual funds outflows as a source of exogenous variation in this setting, ultimately leaving on the table the use of mergers between large financial institutions as a staggered, valid shock. However, these large transactions affect performance not only through a shift in common ownership but also by reducing the degree of competition characterizing the relevant fraction of the asset management industry. Consequently, these shocks are likely to produce significantly inflated estimates for the anti-competitive effects of common ownership, especially during the financial crisis (Lowry and Lewellen [2021]). Thus, the validity of this instrument might be weaker than previously thought. Nonetheless, for the sake of comparability, I begin my analyses by replicating the most conservative approach proposed in Lewellen and Lowry (2021). Building on their work, I identify firms whose common ownership network was shocked by a major merger between financial institutions, and I match these treated firms on market capitalization with control units that are selected from the same industry (Fama-French 48).[32] Table VII, Panel A, reports these difference in difference specifications. Consistent with Lewellen and Lowry (2021), the estimated average treatment effect of common ownership on firm performance is indistinguishable from zero. However, the anti-competitive effects of common

[32] I am thankful to Katharina Lewellen and Michelle Lowry for publishing the list of mergers between institutional investors which caused material effects on the common ownership network in an underlying product market. This list can be found in Lewellen and Lowry (2021).

ownership re-emerge if I condition the estimates on the degree of competition of the relevant portion of the asset management industry (Table VII, Panel B).

[Table VII about here]

4.B. Common ownership and stock market returns.

The reported estimates support the proposition that competition in the asset management industry mitigates the anti-competitive effects of common ownership, acting as a market-based disciplinary mechanism undermining managers' ability to sustain anti-competitive practices in the underlying product market. However, since asset management firms are able to rapidly adjust their portfolios, measures of accounting performance might be unable to fully capture both the anti-competitive effects of common ownership and the disciplinary effects of competition in the asset management industry.

To address these important concerns, I employ a monthly portfolio regression approach to assess whether firms' stock market performance is sensitive to (1) the existence of common ownership induced economic rents and (2) to the counter-balancing force induced by changes in competition in the asset management industry (Kothari and Warner [2006]). Following this approach, I build a double-sorted long-short portfolio by matching (1) firms operating in a high common-ownership environment and being exposed to a low level of entry in the relevant portion of the asset management industry over the previous fiscal year (firms in the 10th decile by MHHID, and in the 1st decile by MVO – long portfolio), with those operating in a high common ownership environment, but being exposed to a high level of entry in the relevant portion of the asset management industry over the previous fiscal year (firms in the 10th decile by MHHID, and in the 10th decile by MVO – short portfolio). I build each portfolio at the beginning of each fiscal year, using either an equal-weighted (Table VIII, Panel A) or a value-weighted approach (Table VIII,

Panel B). I hold these portfolios for different horizons (6, 12, 24, or 36 months), and I compute Jensen's alphas based upon either the Fama-French 4 Factors model, the Fama-French 3 Factors model, or the Market model.

The central premise underlying this test is that if (1) common ownership generates anti-competitive effects; (2) increased competition in the asset management industry in the form of entry mitigates these adverse effects; and (3) as long as these two effects are not immediately and fully incorporated into stock prices because of information frictions or investors' limited attention (Gilje et al. [2019]); then the realized returns for the treated firms (high common ownership and low entry) would be systematically higher than those for the control firms (high common ownership and high entry). These potentially unpriced (or mispriced) rents should indeed disappear faster for the second group. I find this to be the case. All specifications reported in Table VIII confirm that this strategy is indeed profitable, up to the 12 months horizon exclusively. The proposed sortings generate positive and robust annualized abnormal returns ranging between 6% and 8%, providing further strong support for the idea that (1) while common ownership induced economic rents might temporarily exist, (2) the competitive nature of the U.S. asset management industry acts as a market-based disciplinary mechanism preventing these adverse effects from being sustainable in the long term.

[Table VIII about here]

To test for the possibility that the identified Jensen's alphas originate from unobserved risk factors, rather than from the direct disciplinary effect of pro-competitive entry in the asset management industry, I rebuild the proposed long-short portfolios by selecting firms in the lowest, rather than in the highest decile by common ownership. The underlying economic intuition for this test is that since these firms are unlikely to benefit from common ownership induced anti-

competitive rents, sorting firms based on their exposure to pro-competitive entry of institutional investors should deliver no Jensen's alpha. In this case, no economic rents can indeed be re-absorbed through the common ownership channel. As shown in Table VIII, Panel C (Value Weighted portfolio), and Panel D (equal-weighted portfolio), I find this to be the case. These findings provide support for the validity of the proposed economic channel, further validating the hypothesis that competition in the asset management industry undermines the long-term sustainability of the anti-competitive effects of common ownership while having no direct abnormal effects on firms' market performance. Furthermore, these results are consistent with the argument that asset managers are - on average - unable to systematically pick stocks (industries) generating abnormal returns in the near future (Ippolito [1989], Ferson and Schadt [1996], Carhart [1997], Berk and Green [2004], Baker et al. [2010], and Chen et al. [2013]).

4.C. Common ownership in the time-series.

As a final test, I posit that if the proposed economic channel is correct, the existence of anticompetitive rents within a given product market should attract institutional investors' attention, and thus, entry. That is, the MVO measure should be systematically positively associated with the existence of eventual anti-competitive rents, after controlling for other relevant industry characteristics. As such rents are ultimately unobservable, I follow a similar empirical strategy to the one proposed in Lattanzio and Thomas (2019) to estimate an industry-year proxy for the intensity of these eventual anticompetitive gains (losses). In particular, I augment the model described in Equation (9) by adding two sets of indicator variables. As shown in Equation (9), the first set includes interaction of fiscal year dummies with the MHHID measure. The coefficient on these interactions captures the time-series variation in the sample-wide anti-competitive effects of common ownership. The second set includes a triple interaction term, computed as the product of

MHHID, fiscal-year specific dummies, and an indicator variable set equal to 0 for industry k (based on the Fama-French 48), and 1 for all the other industries for which observations are available. That is, I estimate the following model for each Fama-French 48 industry k:[33]

$$Perfomance\ Indicator_{i,t} = \alpha + \beta_1 MHHID_{i,t} + \sum_{t=2}^{T} (\gamma_t * \tau_t * MHHID_{i,t}) + \sum_{t=2}^{T} (\phi_t * \tau_t * MHHID_{i,t} * industry_{-k}) + \epsilon_{i,t} \quad (11)$$

The estimation period for each industry k ranges from t=1 to t=T, where t=1 (t=T) is the first (last) year in which at least one firm operating in the relevant market is included in the used sample. The coefficients γ capture the year-specific level of eventual common ownership induced rents, excluding observations from industry k. That is, the magnitude of eventual anti-competitive effects of common ownership is captured by the coefficient β_1, for the fiscal year in which the industry first enters the sample (t=1). For the following fiscal years, these rents are captured by the sum of the coefficients $\beta_1 + \phi_t$, where t>1. This estimation procedure produces a complete cross-sectional and time-series distribution for the magnitude (and sign) of eventual industry-wide effects of common ownership. As described in Table IX, Panel A, the estimated rents are, on average, positive and statistically significant. Consistent with previous results, splitting the sample by the degree of competition faced by the relevant institutional investors produces the usual pattern, providing further support for the hypothesis that competition in the asset management industry mitigates the anti-competitive effects of common ownership. Before moving to multivariate tests, I analyze which industries have been systematically exposed to the anti-competitive (pro-competitive) effects of common ownership. Despite sample differences, the estimates proposed in

[33] The year-specific indicator for the first period is excluded from the term $\sum (\gamma\ x\ \tau_t\ x\ MHHID_{i,t})\ T$ t=2 to avoid multicollinearity issues.

this study are comparable to the within-industry analyses reported in Koch et al. (2021). As reported in Table IX, Panel B, particularly important is the fact that for the air transportation industry (SIC code 4500-4599 and Fama French 48 industry # 40) common ownership (the MHHID) has been systematically positively associated with firms' accounting performance over the period 2000-2018. These findings provide further external validity for the estimates reported in Azar et al. (2018), suggesting that the proposed estimation procedure is producing economically reasonable results.

[Table IX about here]

The time-series distribution of the average common ownership induced rents produces striking results (Figure III). Consistent with these adverse effects being unsustainable over the long term, the time-series dynamics mean-revert around zero over the period 2000-2019. Critically, the only period during which common ownership is strongly associated with firms' performance is represented by the recent financial crisis, during which large liquidity frictions and government interventions undermined capital markets efficiency, shaking the asset management industry. Consistent with Lewellen and Lowry (2021), my results suggest caution in interpreting eventual associations estimated using samples heavily relying on the period 2007-2010.

[Figure III about here]

The availability of these industry-level rents allows me to assess whether their existence systematically predicts institutional investors' propensity to increase their exposure to these product markets. The underlying economic intuition is that if common ownership generates anti-competitive rents, this would allow benefiting funds to out-performs their peers. This situation would incentivize herding behaviors, which would ultimately undermine the long-term sustainability of the adverse effects of common ownership (Wermers [1999], Choi and Sias [2009],

Celiker, Chowdhury, and Sonaer [2015]). To test this hypothesis, I regress the MVO measure on the lagged (and thus "observable") common-ownership induced rents. I include controls for the lagged, industry-year mean MHHID, capturing the institutional determinants of institutional investors' entry (Khorana and Sarvaes [1999]), as well as the industry-year mean level of all the control variables included in previous tests. As reported in Table X, all estimates include year and industry (Fama-French 48) fixed effects, and standard errors are clustered by industry.

[Table X about here]

The reported findings document that the temporary existence of common ownership induced anti-competitive rents attracts institutional investors entry. This positive and robust association speaks loudly about the degree of competition in the U.S. asset management industry, as funds seem to respond quickly to eventual temporary market frictions which might benefit the performance of a limited number of asset management firms.

5. Conclusions and policy implications

In this study, I document that competition in the asset management industry acts as a market-based disciplinary device mitigating the adverse competitive effects of common ownership. While the dense cross-ownership currently characterizing the U.S. market for corporate control might indeed generate anti-competitive rents within an underlying product market, institutional investors' focus on relative performance causes these distortions to be short-lived and localized.

As regulatory remedies currently on the table are based upon the concept of introducing allocative frictions in the asset management industry to constrain (or break) the existing common ownership network (Elhauge [2018a, 2018b], Posner et al. [2018]), regulators should be aware that such preventive initiatives might produce the unintended consequence of exacerbating the economic costs of common ownership. Indeed, limiting institutional investors' ability to hold

diversified portfolios might establish local oligopolies in the asset management industry, constraining market forces' ability to restore a competitive equilibrium within the underlying product market. Thus, future policy actions should not ignore the strict interdependence between the adverse effects of cross-ownership and the competitive environment characterizing the asset management industry.

Appendix

TABLE A.I
VARIABLES DEFINITION

Variable Name	Definition
HHI	Following Grullon, Larkin and Michaely (2018), the Herfindahl index is built. This proxy is based on Compustat data, and it is computed as the sum of the squared ratios of firm sales to total industry sales (sale).
Institutional Ownership	The percentage of ownership of a firm held by its institutional owners, as measured based on their equity ownership disclosed in their 13F holdings reports from Thomson Reuters, weighted by the firm's market capitalization.
R&D Investments	Research and Development expense (xrd) divided by total sales (sale).
Capital Expenditures	Capital expenditures, measured as CAPEX (capx) divided by total assets (at).
Firm Liquidity	Current assets (act) minus current liabilities (lct) divided by the value of total assets (at).
Book Leverage	Long-term debt (dltt) divided by book equity. Book equity is defined as in Fama French (1992)
Loss	A dummy variable set equal to one if a firm has negative net income (ni) during a fiscal year, zero otherwise.
Sales Growth	The natural log of the value of sales (sale) in millions in year t divided by the value of sales (sale) in millions in year t-1.
Advertisement	The ratio of advertisement expenditures (xad) to total sales (sale).
Total Assets	The natural log of the value of total assets (t) in millions.
Tobin's Q	Market value of assets (at - book equity + market equity (prcc_f*csho)) divided by the book value of assets (at). Book equity and this measure, in general, follows Fama French (1992).
Lerner Index	Operating Income before depreciation (oibdp) scaled by total sale (sale).
Gross Profit Margin	Total sales (sale) minus cost of goods sold (cogs) divided by total sales (sale)
ROA	Operating Income before depreciation (oibdp) divided by book value of assets (at).
ROS	Net Income (ni) divided by total sales (sale).

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Figure I
Mean MHHI Delta in the U.S. – Fama-French 48 Industries

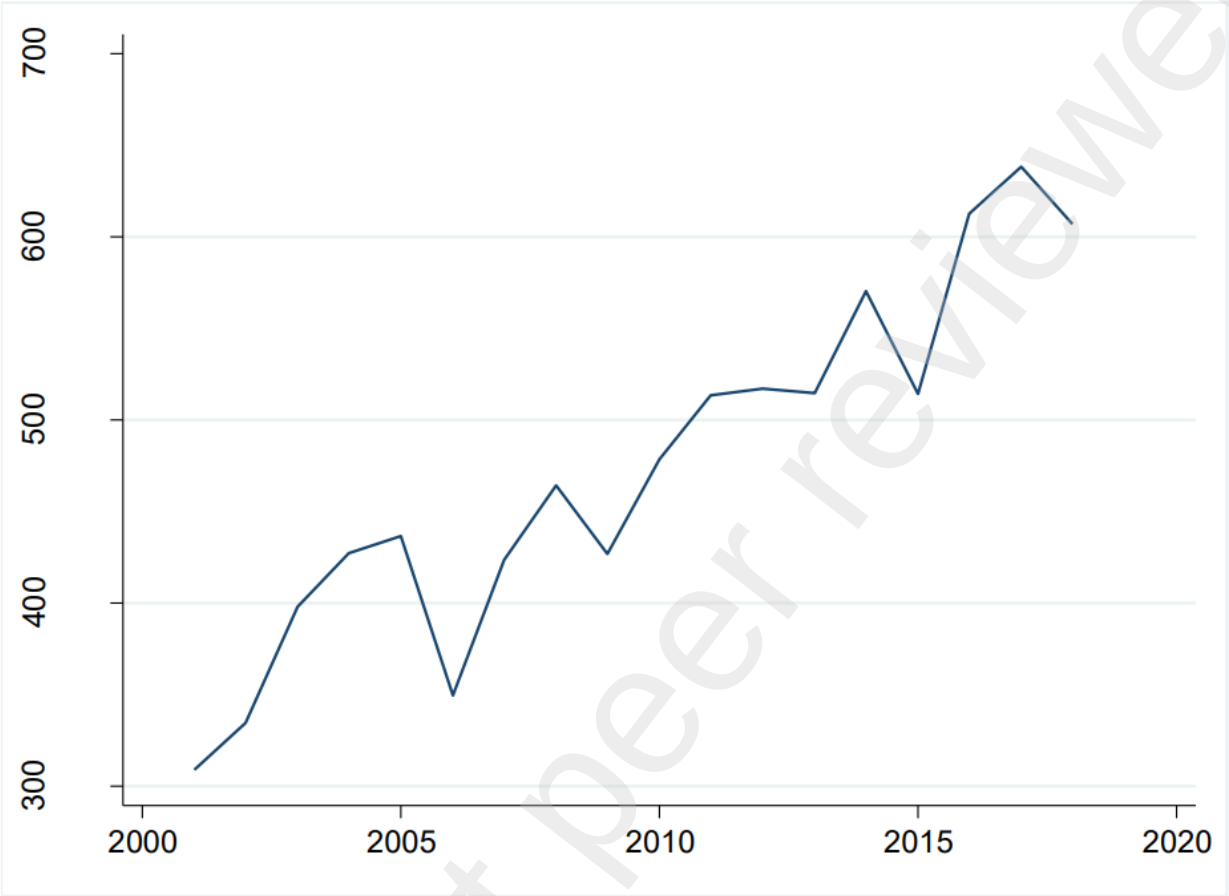

Figure I documents the time-trend dynamics for the MHHID measure, as estimated based upon Fama- French 48 industry definitions.

Figure II
Mean MVO in the U.S. – Fama-French 48 Industries

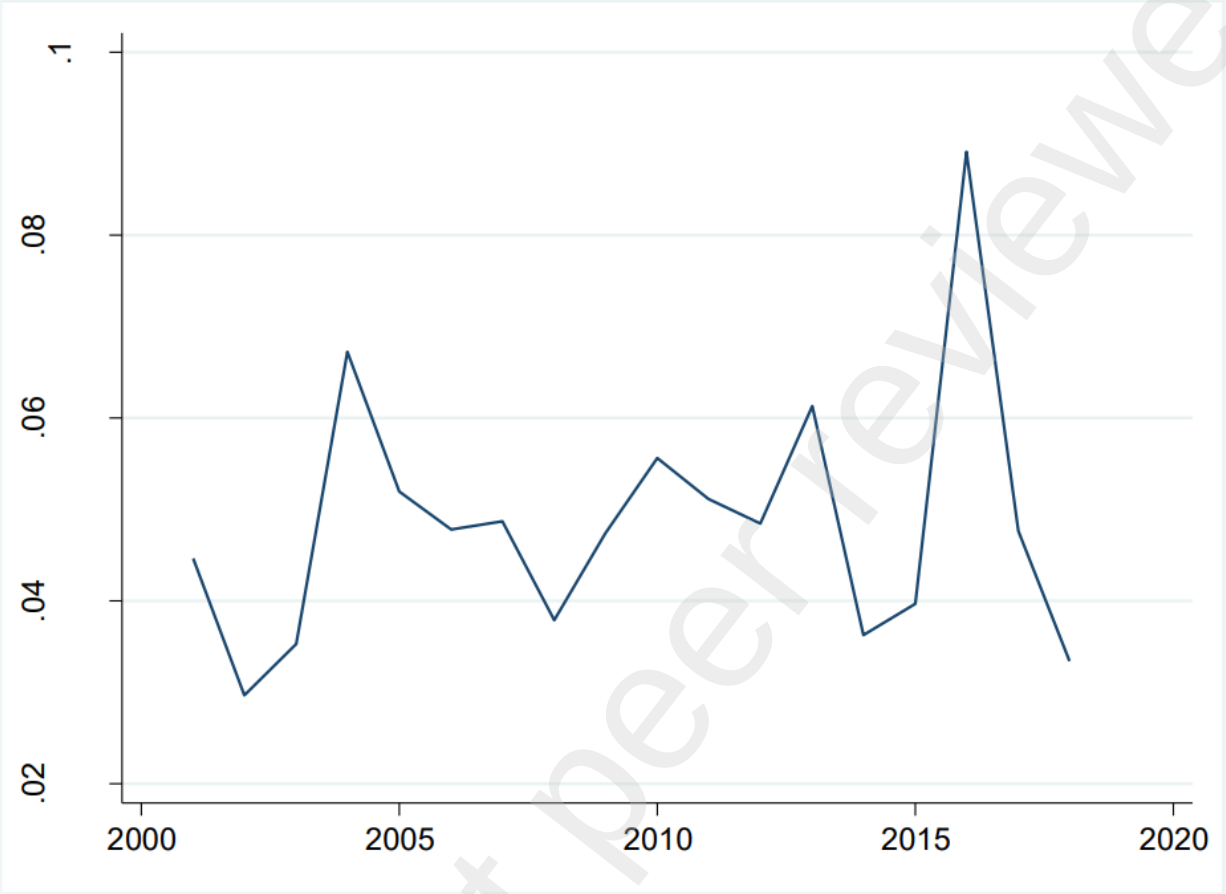

Figure II documents the time-trend dynamics for the MVO measure, as estimated based upon Fama-French 48 industry definitions.

Figure III
Common ownership induced anti-competitive rents in the U.S. – Fama-French 48 Industries

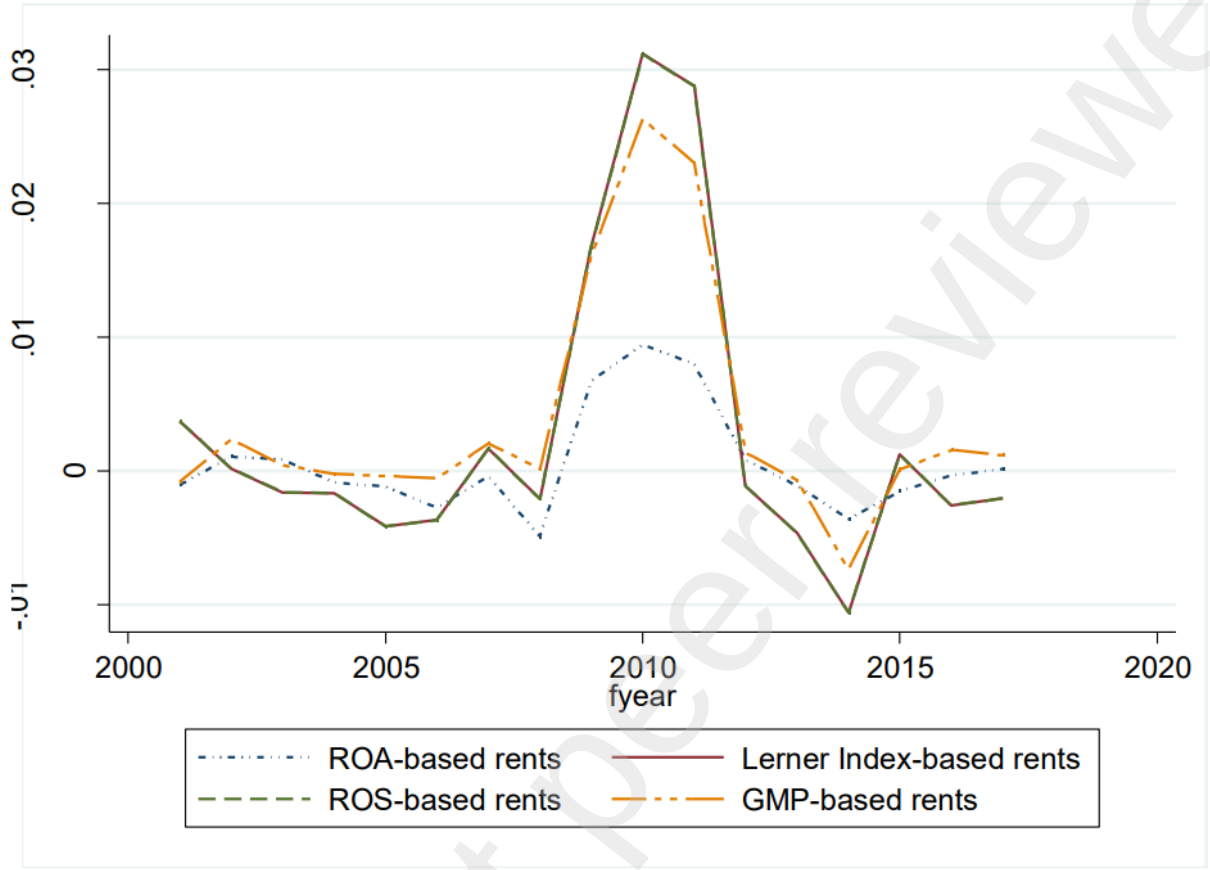

Figure III documents the time-trend dynamics for the common-ownership induced rents, as estimated based upon the model reported in Equation (10).

TABLE I
SUMMARY STATISTICS

Table I reports summary statistics for the variables defined in Appendix A. The full sample includes 23,420 firm-year observations over the period 2000-2019. All accounting variables are winsorized at the 1% on both tails.

Panel A: Common Ownership					
Variable Name	N	Sample Mean	2005	2010	2015
MHHID (FF48)	23,420	458.52	436.44	478.56	514.19
Panel B: Entry in the Asset Management Industry					
MVO (FF48)	23,420	0.0482	0.0519	0.0556	0.0396
Panel C: Financial and Accounting Variables					
Total Assets	23,420	6.3165	5.9783	6.4504	6.6920
Lerner Index	23,420	0.1194	0.0932	0.1214	0.1323
ROA	23,420	0.0901	0.1076	0.1173	0.0910
ROS	23,420	0.0078	0.0049	0.0041	0.0107
Gross Profit Margin	23,420	0.0061	0.0045	0.0043	0.0089
Book Leverage	23,420	20.6600	0.1772	0.1779	0.2355
Capital Expenditures	23,420	0.0501	0.0527	0.0420	0.0493
Loss	23,420	0.1425	0.1186	0.1004	0.1326
Firm Liquidity	23,420	0.2555	0.2781	0.2697	0.2376
Sales Growth	23,420	0.1690	0.0355	0.0504	0.0033
R&D Investments	23,420	0.1017	0.1140	0.0748	0.0921
Institutional Ownership	23,420	0.6790	0.6642	0.6906	0.7501
Amihud (2002)	22,570	0.1687	0.2196	0.2893	0.1423
HHI (FF48)	23,420	480.74	453.59	515.94	488.00
Tobin's Q	23,420	2.1295	2.2813	2.0625	2.2040

TABLE II
COMMON OWNERSHIP AND FIRM PERFROMANCE

Table II reports regressions of four different performance indicators on the MHHID measure. All variables are defined in Table A.I, in the Appendix. All specifications include firm and fiscal year fixed effects. Industry measures are based upon the Fama French 48 industry classification. Standard errors are clustered at the firm level. All firm level independent variables are lagged to avoid mechanical relations with the dependent variable. Panel A and Panel D report estimates for the full sample. Panel B reports estimates based on firms in the 10th decile by the MVO measure. Panel C reports estimates based on firms included in the 1st decile by the MVO measure. Additional Controls include Tobin's Q, sales growth; a loss dummy, book leverage, firm liquidity, capital expenditures, R&D investments, advertising expenses, institutional ownership, and the HHI index. *, **, and *** indicates statistical significance at the 10%, 5% and 1% level, respectively.

Panel A: Common Ownership and Firm Performance - Average Treatment Effect

VARIABLES	(1) ROA_t	(2) Lerner $Index_t$	(3) ROS_t	(4) GPM_t
MHHIDt	0.0714***	0.0701	0.0703	0.0889**
	(0.0269)	(0.0660)	(0.0660)	(0.0378)
Additional Controls	Yes	Yes	Yes	Yes
Firm FE & Year FE	Yes	Yes	Yes	Yes
Observations	23,420	23,420	23,420	23,420
Adjusted R-squared	0.632	0.643	0.697	0.662

Panel B: Common Ownership and Firm Performance - Low AMI Competition

VARIABLES	(1) ROA_t	(2) Lerner $Index_t$	(3) ROS_t	(4) GPM_t
MHHID t	0.0341***	0.0046**	0.0434*	0.0902**
	(0.0081)	(0.0024)	(0.0253)	(0.0453)
Additional Controls	Yes	Yes	Yes	Yes
Firm FE & Year FE	Yes	Yes	Yes	Yes
Observations	2,050	2,050	2,050	2,050
Adjusted R-squared	0.8636	0.7964	0.7979	0.8778

Panel C: Common Ownership and Firm Performance - High AMI Competition				
VARIABLES	(1) ROA_t	(2) Lerner $Index_t$	(3) ROS_t	(4) GPM_t
$MHHID_t$	0.0021	0.0806	0.0676	0.0131
	(0.0074)	(0.2259)	(0.2230)	(0.0187)
Additional Controls	Yes	Yes	Yes	Yes
Firm FE & Year FE	Yes	Yes	Yes	Yes
Observations	2,129	2,129	2,129	2,129
Adjusted R-squared	0.7021	0.839	0.838	0.6586

Panel D: Common Ownership and Firm Performance - High AMI Competition				
VARIABLES	(1) ROA_t	(2) Lerner $Index_t$	(3) ROS_t	(4) GPM_t
$MHHID_t$	0.0749***	0.0424	-0.0218	0.093**
	(0.0273)	(0.0656)	(0.0467)	(0.0386)
High AMI $Competition_t$	0.0026	-0.003	0.0345	0.0023
	(0.0038)	(0.0101)	(0.0467)	(0.0060)
$MHHID_t$ x High AMI $Competition_t$	-0.1340**	-0.0135*	-0.0143*	-0.0216*
	(0.0587)	(0.0069)	(0.0098)	(0.0121)
Additional Controls	Yes	Yes	Yes	Yes
Firm FE & Year FE	Yes	Yes	Yes	Yes
Observations	23,420	23,420	23,420	23,420
Adjusted R-squared	0.7173	0.7712	0.6586	0.2904

TABLE III

ENTRY IN THE ASSET MANAGEMENT INDUSTRY AND COMMON OWNERSHIP

Table III reports regressions of four performance indicators on the MHHID measure for the sample of firms whose shareholders faced highly competitive relevant entry over the previous fiscal year (10^{th} decile by MVO). All variables are defined in Table A.I, in the Appendix. All specifications include firm and fiscal year fixed effects. Industry measures are based upon the Fama French 48 industry classification. Standard errors are clustered at the firm level. All firm level independent variables are lagged to avoid mechanical relations with the dependent variable. Additional Controls include Tobin's Q, sales growth; a loss dummy, book leverage, firm liquidity, capital expenditures, R&D investments, advertising expenses, institutional ownership, and the HHI index. *, **, and *** indicates statistical significance at the 10%, 5% and 1%, respectively.

VARIABLES	(1) ROA_t	(2) Lerner $Index_t$	(3) ROS_t	(4) GPM_t
$MHHID_t$	0.0217	0.1177	0.1194	0.0947
	(0.1326)	(0.1653)	(0.1655)	(0.1617)
Additional Controls	Yes	Yes	Yes	Yes
Firm FE & Year FE	Yes	Yes	Yes	Yes
Observations	1,964	1,964	1,964	1,964
Adjusted R-squared	0.7423	0.8994	0.7995	0.7944

TABLE IV
ROBUSTNESS TEST: DIFFERENT INDUSTRY DEFINITIONS

Table IV reports regressions of ROA on the MHHID measure. All variables are defined in Table A.I, in the Appendix. All specifications include firm and fiscal year fixed effects. Industry measures are based upon the SIC 2 digits classification in Column (1) and Column (3), and on the SIC 3 digits classification in Column (2) and in Column (4). Standard errors are clustered at the firm level. All firm level independent variables are lagged to avoid mechanical relations with the dependent variable. Panel A, Column (1) and Column (2), report estimates based on firms in the 10th decile by the MVO measure. Panel A. Column (4) and Column (5), report estimates based on firms included in the 1st decile by the MVO measure. Panel B reports estimates for the sample of firms whose shareholders faced highly competitive relevant entry over the previous fiscal year (10th decile by MVO). Additional Controls include Tobin's Q, sales growth; a loss dummy, book leverage, firm liquidity, capital expenditures, R&D investments, advertising expenses, institutional ownership, and the HHI index. *, **, and *** indicates statistical significance at the 10%, 5% and 1% level, respectively.

Panel A: Current Competition in the asset management industry

	(1)	(2)	(3)	(4)
		ROA_t		
VARIABLES	Low AMI Competition$_t$		High AMI Competition$_t$	
$MHHID_t$	0.0340**	0.0486**	0.023	0.0512
	(0.0132)	(0.0262)	(0.0758)	(0.0931)
Industry Classification	SIC 2	SIC 3	SIC 2	SIC 3
Additional Controls	Yes	Yes	Yes	Yes
Firm FE & Year FE	Yes	Yes	Yes	Yes
Observations	2,050	2,050	2,129	2,129
Adjusted R-squared	0.7025	0.8994	0.7025	0.7944

Panel B: Increase in competition in the asset management industry

	(1)	(2)
	ROA_t	
VARIABLES	High Entry$_{t,t-1}$	
$MHHID_t$	0.0218	-0.0112
	(0.1133)	(0.0106)
Industry Classification	SIC 2	SIC 3
Additional Controls	Yes	Yes
Firm FE & Year FE	Yes	Yes
Observations	1,964	1,964
Adjusted R-squared	0.7413	0.7423

TABLE V
ROBUSTNESS TEST: THE EFFECTS OF THE FINANCIAL CRISIS

Table V reports regressions of ROA on the MHHID measure. All variables are defined in Table A.I, in the Appendix. All specifications include firm and fiscal year fixed effects. Industry measures are based upon the Fama-French 48 definitions. Observations from the financial crisis (2007-2009) are dropped from the sample for the estimates reported in Column 2, Column 4, Panel A, and Column 2, Panel B. Standard errors are clustered at the firm level. All firm level independent variables are lagged to avoid mechanical relations with the dependent variable. Panel A, Column (1) and Column (2), report estimates based on firms in the 10th decile by the MVO measure. Panel A. Column (4) and Column (5), report estimates based on firms included in the 1st decile by the MVO measure. Panel B reports estimates for the sample of firms whose shareholders faced highly competitive relevant entry over the previous fiscal year (10th decile by MVO). Additional Controls include Tobin's Q, sales growth; a loss dummy, book leverage, firm liquidity, capital expenditures, R&D investments, advertising expenses, institutional ownership, and the HHI index. *, **, and *** indicates statistical significance at the 10%, 5% and 1% level, respectively.

Panel A: Current Competition in the asset management industry

	(1)	(2)	(3)	(4)
			ROA_t	
VARIABLES	Low AMI Competition$_t$		High AMI Competition$_t$	
$MHHID_t$	0.0340**	0.0486**	0.023	0.0512
	(0.0132)	(0.0262)	(0.0758)	(0.0931)
Crisis Observations	Dummy Control	Dropped	Dummy Control	Dropped
Additional Controls	Yes	Yes	Yes	Yes
Firm FE & Year FE	Yes	Yes	Yes	Yes
Observations	2,050	1,825	2,129	1,695
Adjusted R-squared	0.712	0.7119	0.7021	0.7104

Panel B: Increase in competition in the asset management industry

	(1)	(2)
	ROA_t	
VARIABLES	High Entry$_{t,t-1}$	
$MHHID_t$	0.0217	-0.0045
	(0.1132)	(0.0128)
Crisis Observations	Dummy Control	Dropped
Additional Controls	Yes	Yes
Firm FE & Year FE	Yes	Yes
Observations	1,964	1,920
Adjusted R-squared	0.7425	0.7104

TABLE VI
ROBUSTNESS TEST: INNOVATION SPILLOVERS

Table VI reports regressions of four performance indicators on the MHHID measure and its interaction with the High-tech industry dummy. All variables are defined in Table A.I, in the Appendix. All specifications include firm and fiscal year fixed effects. Industry measures are based upon the Fama-French 48 definitions. Standard errors are clustered at the firm level. All firm level independent variables are lagged to avoid mechanical relations with the dependent variable. Panel A reports estimates based on firms in the 10th decile by the MVO measure. Panel A. Column (4) and Column (5), report estimates based on firms included in the 1st decile by the MVO measure. Panel B reports estimates for the sample of firms whose shareholders faced highly competitive relevant entry over the previous fiscal year (10th decile by MVO). Additional Controls include Tobin's Q, sales growth; a loss dummy, book leverage, firm liquidity, capital expenditures, R&D investments, advertising expenses, institutional ownership, and the HHI index.*, **, and *** indicates statistical significance at the 10%, 5% and 1% level, respectively.

Panel A: Low competition in the asset management industry

VARIABLES	(1) ROA_t	(2) Lerner $Index_t$	(3) ROS_t	(4) GPM_t
$MHHID_t$	0.0472**	0.0722*	0.0621**	0.0617*
	(0.0235)	(0.0339)	(0.0338)	(0.0332)
$MHHID_t$ x High Tech Industry	-0.0146	-0.0156	-0.0176	-0.0156
	(0.0133)	(0.0199)	(0.0207)	(0.0199)
Additional Controls	Yes	Yes	Yes	Yes
Firm FE & Year FE	Yes	Yes	Yes	Yes
Observations	2050	2050	2050	2050
Adjusted R-squared	0.7119	0.9386	0.9391	0.8595

Panel B: High in competition in the asset management industry				
VARIABLES	(1) ROA_t	(2) Lerner $Index_t$	(3) ROS_t	(4) GPM_t
$MHHID_t$	0.0529	0.0887	0.0899	0.0864
	(0.0454)	(0.0749)	(0.0749)	(0.0747)
$MHHID_t$ x High Tech Industry	-0.0159	-0.0141	-0.0142	-0.0027
	(0.0469)	(0.05975)	(0.5979)	(0.0061)
Additional Controls	Yes	Yes	Yes	Yes
Firm FE & Year FE	Yes	Yes	Yes	Yes
Observations	1964	1964	1964	1964
Adjusted R-squared	0.7443	0.8997	0.8998	0.795

TABLE VII

DIFFERENCE IN DIFFERENCE ANALYSES – LARGE MERGERS BETWEEN FINANCIAL INSTITUTIONS

Table VII reports DiD tests estimated over the 6 years surrounding large mergers between financial institutions. The events are as reported in Lewellen and Lewellen, and treated firms are matched to control firm conditional on operating in the same industry and on being the closest by market capitalization. All variables are defined in Table A.I, in the Appendix. Industry measures are based upon the Fama-French 48 definitions. Standard errors are clustered at the firm level. Additional Controls include Tobin's Q, sales growth; a loss dummy, book leverage, firm liquidity, capital expenditures, R&D investments, advertising expenses, institutional ownership, and the HHI index.*, **, and *** indicates statistical significance at the 10%, 5% and 1% level, respectively.

Panel A: Difference in Difference Test

VARIABLES	(1) ROA_t	(2) Lerner $Index_t$	(3) ROS_t	(4) GPM_t
Treated	0.00571**	0.0143	0.0142	0.00470
	(0.00271)	(0.00900)	(0.00901)	(0.00540)
Post	-0.00441	-0.0166	-0.0162	0.00303
	(0.00310)	(0.0101)	(0.0101)	(0.00473)
Treated x Post	0.00649	0.0114	0.0118	0.0151*
	(0.00498)	(0.0192)	(0.0192)	(0.00915)
Additional Controls	Yes	Yes	Yes	Yes
Observations	14,187	14,187	14,187	14,187
Adjusted R-squared	0.372	0.213	0.213	0.288

Panel B: Conditional Difference in Difference Test

VARIABLES	(1) ROA_t	(2) Lerner $Index_t$	(4) ROS_t	(5) GPM_t
Treated	0.00571**	0.0143	0.0142	0.00470
	(0.00271)	(0.00900)	(0.00901)	(0.00540)
Post	-0.00441	-0.0166	-0.0162	0.00304
	(0.00310)	(0.0101)	(0.0101)	(0.00473)
Treated x Post	0.00701	0.00609	0.00652	0.0119
	(0.00522)	(0.0208)	(0.0209)	(0.00973)
Treated x Post x Low AMI $Competition_t$	0.0448**	0.0461**	0.0455**	0.0276**
	(0.0192)	(0.0221)	(0.0221)	(0.0137)
Additional Controls	Yes	Yes	Yes	Yes
Observations	14,187	14,187	14,187	14,187
Adjusted R-squared	0.372	0.213	0.213	0.288

TABLE VIII
PORTFOLIO REGRESSIONS

Table VIII reports estimates for calendar-time portfolio regressions estimated via the Fama- French 3 Factors Model (Column 2), or the Fama-French 4 Factors Model (Column 3), or the Market Model (Column 4)). The "long portfolio" includes all firms for which MHHID measure is in the highest decile and the MVO is in the lowest decile, as at the end of the previous fiscal year. Similarly, the "short portfolio" includes all firms in the highest decile by both the MHHID and the MVO measure, as at the end of the previous fiscal year. Panel A and Panel B reports the alphas for the resulting hedged portfolio built by shorting the Short portfolio and by going long the Long portfolio. All portfolios are built on January 1st. The holding period is reported in number of months. All standard errors are heteroskedasticity robust. *,**, and *** indicate statistical significance at the 10%, 5% and 1% level, respectively.

Panel A: Value Weighted Portfolio – High Common Ownership			
Holding Period	Fama-French 3	Fama-French 4	Market Model
(0;6)	0.0064**	0.0076**	0.0059**
(0;12)	0.0056*	0.0072**	0.0072**
(0;24)	0.0012	0.0028	0.0029
(0;36)	0.0021	0.0030	0.0031
Panel B: Equal Weighted Portfolio – High Common Ownership			
Holding Period	Fama-French 3	Fama-French 4	Market Model
(0;6)	0.0060**	0.0071**	0.0049*
(0;12)	0.0055*	0.0069**	0.0064*
(0;24)	0.0019	0.0024	0.0022
(0;36)	0.0021	0.0030	0.0027
Panel C: Value Weighted Portfolio – Low Common Ownership			
Holding Period	Fama-French 3	Fama-French 4	Market Model
(0;6)	0.0004	-0.0002	0.0007
(0;12)	0.0012	0.0014	0.0022
(0;24)	0.0008	0.0016	0.0017
(0;36)	0.0019	0.0011	0.0014
Panel D: Equal Weighted Portfolio – Low Common Ownership			
Holding Period	Fama-French 3	Fama-French 4	Market Model
(0;6)	0.0009	0.0011	0.0007
(0;12)	0.0014	0.0009	0.0012
(0;24)	0.0014	0.0014	0.0017
(0;36)	0.0017	0.0015	0.0020

TABLE IX
COMMON OWNERSHIP INDUCED ANTI-COMPETITIVE RENTS

Table IX reports summary statistics for the estimated common ownership induced anti-competitive rents using the model described in the paper in Equation (10). Industries are classified accordingly to the Fama-French 48 definitions. The rents assessed in Panel B are based on the ROA-based rents. All variables are defined in Appendix A. *, **, and *** indicates statistical significance at the 10%, 5% and 1% level, respectively.

Panel A: Common ownership induced anti-competitive rents

Score	Mean	Low AMI Competition	High AMI Competition
ROA-based rents	0.0254**	0.0351*	-0.0116**
Lerner-based rents	0.00294	0.0095**	-0.0314**
ROS-based rents	0.0379***	0.0541**	-0.0114**
GPM-based rents	0.0318***	0.0375***	-0.0587***

Panel B: Within-Industry Rents

Industries reporting positive rents	Industries reporting negative rents
Apparel (#10)	Medical Equipment (#12)
Health Care (#11)	Petroleum and Natural Gas (#30)
Chemicals (#14)	Telecom (#32)
Construction Materials (#17)	Personal Services (#33)
Transportation (#40)	Electronic Equipment (#36)
Retail (#42)	
Restaurants, Hotels, Motels (#43)	

TABLE X
ANTI-COMPETITIVE EFFECTS OF COMMON OWNERSHIP AND INSTITUTIONAL INVESTORS' ENDOGENOUS ENTRY

Table X reports estimates of a regression of the MVO measure on the anti-competitive effects of common ownership. The model is estimated via weighted OLS, where weights are assigned based upon the aggregate market capitalization of each industry. All variables are defined in Table A.I, in the Appendix. Industry measures are based upon the Fama-French 48 definitions. All specifications include industry and fiscal year fixed effects. Standard errors are clustered at the industry level. Additional Controls include industry-year mean for Tobin's Q, sales growth; a loss dummy, book leverage, firm liquidity, capital expenditures, R&D investments, advertising expenses, institutional ownership, the MHHID and the HHI index.*, **, and *** indicates statistical significance at the 10%, 5% and 1% level, respectively.

	(1)	(2)	(3)	(4)
VARIABLES		MVO_t		
ROA-based $rent_{t-1}$	0.1057**			
	(0.0562)			
Lerner Index-based $rents_{t-1}$		0.1248**		
		(0.0464)		
ROS-based $rents_{t-1}$			0.17.25*	
			(0.1015)	
GPM-based $rents_{t-1}$				0.1420**
				(0.0524)
Industry and Year FE	Yes	Yes	Yes	Yes
Additional Controls	Yes	Yes	Yes	Yes
Observations	337	337	337	337
Adjusted R-squared	0.3543	0.4728	0.4287	0.513