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Flows, Financing Decisions, and Institutional Ownership of the U.S. Equity Market

Law Working Paper N° 749/2024
January 2024

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Abstract

This Article analyzes the relationship between flows to institutional investment managers, corporate financing decisions, and institutional ownership of U.S. public equity. In so doing, it provides new evidence about the drivers of institutional investor growth in equity ownership over the past two decades. Contrary to conventional narrative, we find that equity capital flows into the "Big Three" investment managers have slowed in recent years, with substantial differences between each institution. We also present a framework to understand how fund characteristics and corporate actions such as stock buybacks and equity issuances combine to shape the evolution of institutional ownership, including that of the Big Three. Our evidence reveals why certain institutions win and lose in the contest for flows and implicates important legal conversations including the impact of stock buybacks, mergers between investment managers, and the governance risks presented by the rise of index investing.

Keywords: index funds, passive investing, institutional investors, ETFs, Big Three, stewardship, engagement, shareholder activism, corporate voting, ownership concentration, institutional investors, antitrust, M&A, stock buybacks, corporate finance, law and economics

JEL Classifications: G23, G34, K22

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Abstract

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I. Introduction

Rising institutional ownership of U.S. equity is one of the most significant capital market developments of the past fifty years.[1] For decades, scholars across law and finance have charted the growth and rising concentration of the investment management industry and reflected on the consequences for investors and the broader economy. Recent scholarship has focused on the three investment managers that specialize in passive investing—the so called "Big Three" of Vanguard, BlackRock, and State Street Global Advisors. Scholars and industry participants have viewed their rapid accumulation of assets with alarm, predicting that these institutions will soon exercise effective control of the U.S. equity market.[2]

The Big Three's growth in equity ownership has generated scholarly concern across disciplines. The prospect of a small number of individuals "even potentially controlling most of the economy" could "pose[] a legitimacy and accountability issue of the first order – one might even call it a small "c" constitutional challenge."[3] Beyond accountability problems, there is the risk that investment managers with large ownership stakes across competing firms may bring about anticompetitive

[1] Luis A. Aguilar, *Institutional Investors: Control, Liquidity, and Systematic Risks*, SEC. EXCH. COMM'N (Apr. 19, 2013), https://www.sec.gov/news/speech/2013-spch041913laahtm ("[T]he proportion of U.S. public equities managed by institutions has risen steadily over the past six decades, from about 7 or 8% of market capitalization in 1950, to about 67% in 2010."); Jacob Greenspon, *How Big a Problem Is It That a Few Shareholders Own Stock in So Many Competing Companies?*, HARV. BUS. REV. (Feb. 19, 2019), https://hbr.org/2019/02/how-big-a-problem-is-it-that-a-few-shareholders-own-stock-in-so-many-competing-companies (noting that institutional investors own 80% of all stock in the S&P 500—a figure that has skyrocketed since the 1990s); E. Phillip Davis & Benn Steil, INSTITUTIONAL INVESTORS (MIT Press 2001) ("Undoubtedly, one of the most important developments in financial markets in recent years has been the institutionalization of saving associated with the growth of pension funds, life insurance companies, and mutual funds.").

[2] John C. Coates, IV, *The Future of Corporate Governance Part I: The Problem of Twelve* 10–12 (Harv. Pub. L. Working Paper No. 19-07, 2018) [hereinafter "*The Future of Corporate Governance*"] ("If current growth rates continued…, the entire U.S. market would be held by such funds no later than 2030. But even if the trend flattens, the majority of most companies will soon be owned by indexed funds."); John C. Coates, IV, THE PROBLEM OF TWELVE: WHEN A FEW FINANCIAL INSTITUTIONS CONTROL EVERYTHING (2023) [hereinafter "PROBLEM OF TWELVE"]; Lucian A. Bebchuk & Scott Hirst, *Big Three Power, and Why it Matters*, HARV. L. SCH. F. ON CORP. GOVERNANCE (Dec. 13, 2022), https://corpgov.law.harvard.edu/2022/12/13/big-three-power-and-why-it-matters/ [hereinafter "*Big Three Power*"]; Lucian A. Bebchuk & Scott Hirst, *The Specter of the Giant Three*, 99 B.U. L. REV. 721, 723 (2019) [hereinafter "*Scepter of the Giant Three*"]; John C. Bogle, *Bogle Sounds a Warning on Index Funds*, WALL ST. J. (Nov. 29, 2018), https://www.wsj.com/articles/bogle-sounds-a-warning-on-index-funds-1543504551.

[3] Coates, *The Future of Corporate Governance*, *supra* note 2, at 10–12.

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conduct and higher consumer prices.[4] Some scholars have further contended that the rise of largely passive blockholders will lead to an underinvestment of stewardship and monitoring of portfolio companies, harming investors and the broader economy.[5] A core thread running through these conversations is that the Big Three will continue to grow as investors flee actively managed funds and invest in the passively managed mutual funds in which these investment managers specialize.[6]

This Article provides a detailed account of institutional ownership of the U.S. stock market and its growth over the past two decades. In so doing, it develops a more complete account of the growth of institutional investment managers, revealing that previously unrecognized institution-specific and market-level factors can entrench institutional ownership, including that of the Big Three. As such, our framework challenges the conventional narrative of institutional growth—the idea that institutions increase in size and ownership when investors move dollars from one investment fund to another.[7] We refer to these flows as "reallocational flows" and argue that they are only part of the story. Indeed, our framework shows how decisions made by mutual funds and the corporations that they invest in can accelerate the growth of certain institutions relative to others.

Of course, institutions may exhibit differential growth in ownership due to the difference in return on the assets under management relative to the market return. Less obviously, fees paid by investors, typically captured by a fund's expense ratio, affect an institution's growth in ownership. Fees paid to an investment manager affect institutional ownership through two channels. The first is direct, through the growth in ownership that occurs when fees are lower. More specifically, when investors pay a higher fee, there are fewer assets available for the fund to invest in, holding all else equal. The

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[4] *See*, *e.g.*, José Azar, Martin C. Schmalz & Isabel Tecu, *Anticompetitive Effects of Common Ownership*, 73 J. FIN. 4, 5–7 (2018); Einer Elhauge, *Horizontal Shareholding*, 129 HARV. L. REV. 1267, 1270–74 (2015). *But see* Edward B. Rock & Daniel L. Rubinfeld, *Does Common Ownership Explain Higher Oligopolistic Profits?* 1–4 (N.Y.U. L. and Econ. Rsch. Paper No. 20-18, 2020).

[5] Dorothy S. Lund, *The Case Against Passive Shareholder Voting*, 43 J. CORP. L. 493, 497–99 (2017); Lucian A. Bebchuk & Scott Hirst, *Index Funds and the Future of Corporate Governance: Theory, Evidence, and Policy*, 119 COLUM. L. REV. 8, 11 (2019); Jill E. Fisch, THE UNCERTAIN STEWARDSHIP POTENTIAL OF INDEX FUNDS (2020). *But see* Jill E. Fisch, Assaf Hamdani & Steven Davidoff Solomon, *The New Titans of Wall Street: A Theoretical Framework for Passive Investors*, 168 U. PENN. L. REV. 17 (2019); Edward B. Rock & Marcel Kahan, *Index Funds and Corporate Governance: Let Shareholders be Shareholders* (N.Y.U. L. and Econ. Rsch. Paper No. 18-39, 2018); Alon Brav, Andrey Malenko & Nadya Malenko, *Corporate Governance Implications of the Growth in Indexing* (Eur. Corp. Governance Inst. — Fin. Working Paper No. 849/2022, 2023).

[6] *See*, *e.g.*, Bebchuk & Hirst, *Specter of the Giant Three*, *supra* note 2, at 726 ("Based on our analysis of recent trends, we conclude that the Big Three will likely continue to grow into a 'Giant Three,' and that the Giant Three will likely come to dominate voting in public companies."); Coates, PROBLEM OF TWELVE, *supra* note 2 ("The bottom line of this preliminary causal analysis is that the main forces leading to the slow but sustained rise of indexed investing are likely to persist into the future.").

[7] *See, e.g.,* Ronald J. Gilson & Jeffrey N. Gordon, *The Agency Costs of Agency Capitalism: Activist Investors and the Revaluation of Governance Rights*, 113 COLUM. L. REV. 863, 878–86 (2013) (discussing the rise of institutional ownership as driven by investors reallocating capital to mutual funds); Coates, *The Future of Corporate Governance*, *supra* note 2, at 11.

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second and indirect effect occurs through the fee's impact on flows. If fees are lower (so that the fund generates a higher net return), then that higher relative performance will encourage reallocational flows, up to the point where fund abnormal performance net of fees equals zero.[8]

We also explain how firm payout policy, and the resulting distributions and their reinvestment by mutual funds, affects institutional ownership. Because dividends cannot be reinvested in the aggregate,[9] investors that reinvest can do so only by purchasing shares from non-reinvesting shareholders, whose ownership consequently falls. If an investor is defaulted into the reinvestment of their dividends (a common feature of mutual funds[10]), the combined effect of dividend distributions and their high rate of reinvestment is to entrench the institution's ownership of the portfolio company.

Corporate decisions to either distribute or raise equity capital, which we term "balance sheet effects," provide a second mechanism that drives differential growth in institutional ownership. Consider, for example, corporate repurchases. When a firm repurchases its own shares via a stock buyback, only some investors sell their shares. The investors that do not are left holding a larger proportion of the firm whose market value has declined due to the buyback. It follows that institutional investment managers that tend not to sell during buybacks (notably, those specialize in passive funds[11]) and do not experience contemporaneous outflows will see their ownership stake increase when there are aggregate net buybacks in the market. Other corporate distributions that have

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[8] Jonathan B. Berk & Richard C. Green, *Mutual Fund Flows and Performance in Rational Markets*, 112 J. POL. ECON. 1269, 1269–70 (2004) (providing a model of rational active management in which managers charge a fee that is proportional to the assets under management and investors attempt to learn managerial skill from realized fund returns. With decreasing returns to scale, a skilled manager sees inflows and her fund grows up to the point where the abnormal performance net of fees is zero. In equilibrium, fund managers extract their entire value added and highly skilled managers manage larger funds and earn more fees.) Brad M. Barber, Terrance Odean & Lu Zheng, *Out of Sight, Out of Mind: The Effects of Expenses on Mutual Fund Flows*, 78 J. BUS. 2095, 2097 (2005) (studying mutual fund flows from 1970 to 1999 and finding "a significant negative relation between fund flows and front-end-load fees").

[9] *Cf.* Jesse M. Fried, Paul Ma & Charles C.Y. Wang, *Stock Investors' Returns are Exaggerated*, HARV. L. SCH. F. ON CORP. GOVERNANCE (Nov. 22, 2021), https://corpgov.law.harvard.edu/2021/11/22/stock-investors-returns-are-exaggerated/.

[10] *See* note 58–60 *infra* and accompanying text (showing that the reinvestment rate is 90% for mutual funds). The exception is ETFs, which almost always give distributions to investors in cash (on a daily or quarterly basis), and are less likely to give a free reinvestment option to investors. FIDELITY INVESTMENTS, FIDELITY VIEWPOINTS: MARKET SENSE (2022); BLACKROCK, ISHARES CORE S&P 500 ETF PROSPECTUS (2022); STATE STREET, SPDR ETF PROSPECTUS (2022) (all on file with authors). Instead, the reinvestment of ETF dividends usually requires assistance from the investor's broker or a third party, and often entails a fee. VANGUARD, S&P 500 ETF Prospectus (2022) (on file with authors).

[11] Active funds can freely participate in buybacks; by contrast, passive funds generally do not sell into buybacks but instead wait until the buyback has been completed to determine the effect on the portfolio and the necessary rebalancing. *See* Robin Wigglesworth, *US Share Buybacks Punch Below Their Weight*, FIN. TIMES (Mar. 1, 2017), https://www.ft.com/content/5550aa1e-fdce-11e6-8d8e-a5e3738f9ae4. If the effect of the buyback is to render the passive fund overweight in the underlying company, that passive fund will ultimately sell shares to rebalance. This rebalancing usually occurs with some delay. Open market buybacks are generally accounted for after the company completes its data reconciliation effort, on a quarterly or monthly basis. Center for Research in Security Prices, CRSP CROSS REFERENCE GUIDE (2022).

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a similar effect on ownership are cash financed acquisitions and going private transactions. Likewise, aggregate equity issuances via initial and seasoned equity offerings can impact ownership depending on the degree to which institutions participate in such offerings and the magnitude of contemporaneous inflows they receive. The overall impact of corporate aggregate distributions depends on the magnitude of such distributions and their covariation with institutional-level flows.

This last point reveals an important insight—when evaluating the growth of an investment manager's ownership of the market, one cannot consider its inflows in isolation, *i.e.*, without accounting for aggregate market flows.[12] For example, an institution with zero dollars of inflows in a certain year may still feature growing ownership of the market if the market has shrunk due to net corporate distributions. Indeed, as we show in Part III.C, in years where the aggregate market flows were negative due to net stock buybacks, zero or slightly positive inflows can lead to a large increase in investment manager ownership.[13]

As this discussion suggests, our framework generates several insights about institutional growth, and why certain institutions (and those that specialize in passively managed mutual funds in particular) have grown faster than others. We also use our framework to establish the most complete picture of institutional and market flows since 2000, combining data from several sources in the process. Unlike earlier studies that rely on third party data, we hand collect data on institutional ownership, distributions, fees, and reinvestment of dividends and capital gains directly from SEC filings. The picture that emerges from the data is likewise counter to conventional wisdom. Specifically, we reveal a slower pace of growth of the Big Three's ownership of the market than the conventional narrative suggests, with substantial differences between each institution.[14] In particular, BlackRock's scaled flows[15] are only slightly positive on average following its acquisition of BGI in 2009, while State Street

[12] Previous scholarly research studying the rise of the Big Three examines the dollar value of flows and assets under management. *See generally* Bebchuk & Hirst, *Specter of the Giant Three*, *supra* note 2; Bebchuk & Hirst, *Big Three Power*, *supra* note 2; Coates, PROBLEM OF TWELVE, *supra* note 2; Jan Fichtner, Eelke M. Heemskerk & Javier Garcia-Bernardo, *Hidden Power of the Big Three? Passive Index Funds, Re-Concentration of Corporate Ownership, and New Financial Risk*, 19 BUS. & POL. 298 (2017).

[13] *See* notes 76–78 *infra*.

[14] This is consistent with Adriana Robertson and Dorothy Lund's book chapter, arguing that the Big Three term masks differences between institutions. Dorothy S. Lund & Adriana Robertson, *Giant Asset Managers: The Big Three, and Index Investing* (Univ. S. Cal. CLASS Rsch. Paper No. 23-13, 2023).

[15] As will be discussed, we scale the dollar flows by the size of the institution's assets under management to better capture the growth of the institution over time. *See* Section II.X *infra*.

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exhibits scaled flows that are slightly negative over the past decade.[16] Vanguard's scaled flows remain positive, although we find a steady decline approaching zero in recent years. Fidelity—which is excluded from the Big Three, despite its large size and share of inflows into passive funds—likewise exhibits more outflows than inflows. By contrast, smaller asset managers like Geode, JP Morgan, and T. Rowe have exhibited increasing ownership over the past few years. These results suggest that the market is more robust than the conventional narrative would suggest, and that the Big Three are not quite "eating the world."[17]

More important, our analysis points to multiple factors—the size of fees, corporate payout policy, dividend reinvestment, corporate financing decisions, and asset manager M&A—that will shape the future growth of the Big Three and other large investment managers. For example, in order for Big Three to achieve the alarming ownership levels that some scholars have predicted,[18] their flows will need to be consistently higher than market flows—a feat that becomes exceedingly more difficult as an institution grows to encompass a larger share of the market.

In providing a more complete account of institutional growth, the Article points to several avenues for future scholarly inquiry, with important policy implications. For one, an important debate has considered whether mandating limits on corporate stock buybacks would facilitate greater corporate investment.[19] Out analysis reveals a previously unrecognized connection between stock buybacks and the entrenchment of institutional investment managers that specialize in index funds. Therefore, an unintended consequence of limitations on buybacks may be to slow the growth of these giant asset managers.

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[16] This picture is consistent with regular attention from activist shareholders, and Nelson Peltz of Trian in particular, who pushed the asset manager to grow the business via an acquisition in 2020. Justin Baer & Cara Lombardo, *Invesco in Talks to Merge with State Street's Asset-Management Business*, WALL ST. J. (Sept. 26, 2021), https://www.wsj.com/articles/invesco-in-talks-to-merge-with-state-streets-asset-management-business-11631829425; Chris Flood, Michael MacKenzie & James Fontanella-Khan, *Does State Street Need a Deal to Save its ETF Business?*, FIN. TIMES (Oct. 4, 2021), https://www.ft.com/content/2429963d-34af-4cbd-9bd1-ea9cf22d5ae2.

[17] *See* Jason Zweig, *Are Index Funds Eating the World?*, WALL ST. J. (Aug. 26, 2016), https://www.wsj.com/articles/BL-MBB-52849 ("BlackRock and Vanguard, already own at least 5% of more than 2,600 and 1,800 companies worldwide, respectively."); *see also* Lund & Robertson, *supra* note 14, at 13–16.

[18] *See* Coates, *The Future of Corporate Governance*, *supra* note 2, at 13 (suggesting that the Big Three would take over the market by 2030); Bebchuk & Hirst, *Scepter of the Giant Three*, *supra* note 2, at 2 (estimating that "the share of votes that the Big Three would cast at S&P 500 companies could well reach about 34% of votes in the next decade, and about 41% of votes in two decades").

[19] For an example of the political conversation, see Andrew Ross Sorkin et al., *The Trillion-Dollar Debate Over Share Buybacks*, N.Y. TIMES (Mar. 4, 2023), https://www.nytimes.com/2023/03/04/business/biden-buffett-debate-share-buybacks.html; Joe Biden, *How Short-Termism Saps the Economy*, WALL ST. J., (Sept. 27, 2016), http://www.wsj.com/articles/how-short-termism-saps-the-economy-1475018087. For an example of the scholarly debate, *see* Jesse M. Fried & Charles C.Y. Wang, *Short Termism and Capital Flows*, 8 REV. CORP. FIN. STUD. 207, 208 (2019).

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In addition, our analysis shows that M&A activity in the asset management industry has been a potent source of growth in ownership. In particular, BlackRock saw a large jump in ownership after it acquired BGI in 2009, and consolidation in the asset management industry via M&A has continued since that time, involving many of the largest investment managers.[20] Such consolidation is predicted to continue: A 2023 global survey of institutional investment managers found that "almost three-quarters of asset managers are considering acquiring or merging with a competitor…."[21] Although the DOJ and FTC generally focus on risk of harm to consumers of the merged companies (in this example, investors who choose investment products),[22] mergers between investment management giants may harm competition in a different way, as the common ownership literature cautions.[23] More broadly, as this discussion reveals, debates about the Big Three interact with many other policy conversations, and those who are concerned about the rise of giant investment managers should understand the myriad factors that contribute to their growth.

The paper proceeds as follows. Part II provides background on the growth of institutional investor ownership of U.S. capital markets and introduces our framework for how fund characteristics and corporate actions combine to shape institutional investment manager ownership. Part III describes our data collection and presents our results: the most complete picture of institutional ownership of the U.S. equity market over the past two decades. Part IV highlights the implications of our analysis for law and legal scholarship. Part V concludes.

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[20] To take a few prominent examples: In 2016, State Street acquired GE Asset Management; in 2019, Janus merged with Henderson; in 2019, Invesco acquired Oppenheimer (the third acquisition by Invesco since 2016); in 2020, Franklin Templeton acquired Legg Mason; and in 2021, Vanguard made its first acquisition of Just Invest. Sarah Krous & Anne Steele, *State Street to Acquire GE Asset Management for Up to $485 Million*, WALL ST. J. (Mar. 30, 2016), https://www.wsj.com/articles/state-street-to-acquire-ge-asset-management-1459337436; Chris Flood & Steve Johnson, *Vanguard makes first acquisition with Just Invest deal*, FIN. TIMES (July 13, 2021), https://www.ft.com/content/fdcdeb98-d3d8-4f95-aa5a-32fb54daea53; Mackenzie & Fontanella-Khan, *M&A in 2021: Asset Management Primed for Consolidation*, FIN. TIMES (Jan. 24, 2021), https://www.ft.com/content/4d38b100-07de-400e-95b4-3199837ea044; Andrew Jones & Ian Wenik, *Invesco Seals Deal for Oppenheimer Funds*, CityWire (Oct 18, 2018), https://citywire.com/pro-buyer/news/invesco-seals-deal-for-oppenheimerfunds/a1166618. Also in 2021, "Morgan Stanley snared Boston's Eaton Vance in a surprise $7bn deal in October that added $500bn in assets and raised the bank's asset management arm to $1.2bn." Mackenzie & Fontanella-Khan, supra note 20.

[21] Arjun Neil Alim, *One in Six Asset Management Groups to Disappear by 2027, Says PwC*, FIN. TIMES (July 9, 2023), https://www.ft.com/content/24ca8149-816e-4263-816b-30be7ea52c0c.

[22] *See generally* DEP'T OF JUST. & FED. TRADE COMM'N, DRAFT MERGER GUIDELINES (2023), https://www.justice.gov/d9/2023-07/2023-draft-merger-guidelines_0.pdf. .

[23] The DOJ's 2023 proposed merger guidelines stated that they agency would consider whether partial acquisitions that result in something less than control of the company lead to competitive harm, thus embracing concerns about common ownership and anticompetitive behavior. *See id.* at 27 (2023).

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II. Institutional Investment Manager Ownership of the U.S. Equity Market

This Part provides our framework for mapping the growth of institutional investment manager ownership of the U.S. equity market. It begins by describing how intuitional ownership has risen dramatically since 1960 and provides the conventional account of the causes. It next describes our framework that shows that previously unrecognized factors—including dividend reinvestment and corporate financing decisions—contribute to the growth of institutions over time and benefit certain institutions more than others.

A. Background

For the past fifty years, the defining feature of U.S. capital markets has been rising institutional ownership. In the early 1970s, institutions held less than 20% of the equity market; today, they control more than 68%.[24] Early scholarship focusing on this market sea change was optimistic: perhaps the rising ownership of sophisticated institutional investment managers, and the corresponding crowding out of rationally apathetic individual investors, would improve the governance of firms.[25] Since then, the tenor of the conversation has grown more pessimistic. Some have argued that large institutional investment managers suffer from their own collective action problems and tend toward rational apathy as well.[26] Not only that, some scholars have argued that investment manager governance activities are plagued by conflicts of interest because the corporate managers those institutions were expected to monitor had the power to direct the investment of lucrative corporate retirement plans.[27]

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[24] Fichtner et al., *supra* note 12, at 303. We document in Panel D of Table 2 that by 2022, median institutional ownership for firms in our sample is 67%.

[25] *See*, *e.g.*, Bernard S. Black, *Agents Watching Agents: The Promise of Institutional Investor Voice*, 39 UCLA L. REV. 811, 814 (1992).

[26] *See, e.g.*, Gilson & Gordon, *supra* note 11, at 867; *see also* Kathryn Judge, *Intermediary Influence*, 82 U. CHI. L. REV. 573, 573 (2015) (documenting agency costs of "intermediary influence" throughout financial markets).

[27] Sean J. Griffith & Dorothy Lund, *Conflicted Mutual Fund Voting in Corporate Law*, 99 B.U. L. REV. 1151, 1155–58 (2019); Ann M. Lipton, Essay, *Family Loyalty: Mutual Fund Voting and Fiduciary Obligation*, 19 TRANSACTIONS: TENN. J. BUS. L. 175, 177 (2017). The empirical evidence supporting the business ties claim is mixed and based on outdated assumptions regarding the incentives of retirement plan fiduciaries. *See*, Natalya Shnitser, *The 401(k) Conundrum in Corporate Law*, 13 HARV. BUS. L. REV. (forthcoming 2023); Rasha Ashraf, Narayanan Jayaraman, and Harley E. Ryan, Jr., *Do Pension-Related Business Ties Influence Mutual Fund Proxy Voting? Evidence from Shareholder Proposals on Executive Compensation*, 47 J. FIN. & QUANT. ANAL. 567, 580–81 (2012) (studying the association between mutual fund votes and pension-related business ties finding no relation when they condition by fund family. They interpret this evidence as indicating that business ties drive fund families with business ties to vote with management at both client and non-client firms); Gerald F. Davis & E. Han Kim, *Business Ties and Proxy Voting by Mutual Funds*, 85 J. FIN. ECON. 552, 552 (2007) (find that "aggregate votes at the fund family level indicate a positive relation between business ties and the propensity to vote with management" but that "[v]otes at specific firms…reveal that funds are no more likely to vote with management of client firms than of non-clients."); Dragana Cvijanovic, Amil Dasgupta & Konstantinos E. Zachariadis, *Ties That Bind: How Business Connections Affect Mutual Fund Activism*, 71 J. FIN. 2933, 2934 (2016) (finding that business ties do influence funds' support for management after

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Moreover, as institutional ownership of the equity market has increased, the investment management industry has become particularly concentrated, leading to additional concerns. In particular, three investment managers have exhibited extraordinary growth in the past two decades—Vanguard, State Street, and BlackRock (the so-called "Big Three")—which has generated significant scholarly attention.[28] The focus on the Big Three is not only attributable to their size—together, they manage over $22 trillion in investor dollars[29]—but also their specialization in passively managed mutual funds, a term that includes ETFs and index mutual funds.[30] As such, the Big Three's growth has been ascribed to reallocational flows, or the aggregate withdrawal of assets from actively managed funds and the corresponding investment in passive funds, a trend that has been driven by changed investor preferences,[31] technology,[32] law and litigation,[33] and investor inertia.[34]

Passively managed mutual funds earn their name due to their passive investment strategy—their portfolio managers commit to match the performance of a baseline index, rather than beat it.[35] Such a strategy relies on insights from financial economics about market efficiency and the challenges that an active investor faces trying to earn an abnormal return net of fees.[36] And yet, as investors have allocated more capital to passively managed funds, some scholars have raised concerns about the incentives of passive fund portfolio managers to monitor their portfolio companies.[37] In particular, some scholars contend that the passive fund portfolio managers, who are evaluated based on relative performance (net of fees), will feature a collective action problem because investments in monitoring and engagement will benefit rivals that track the same index.[38]

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controlling for ISS recommendations and fund holdings. They document a strong association only for shareholder-sponsored proposals).

[28] *See, e.g.*, Fichtner et al., *supra* note 12, at 300.

[29] Lund & Robertson, *supra* note 14, at 14.

[30] Fichtner et al., *supra* note 12, at 301.

[31] Gilson & Gordon, *supra* note 7, at 879.

[32] Coates, PROBLEM OF TWELVE, *supra* note 2, at 11.

[33] *Id.*; Lund, *supra* note 5, at 498.

[34] Coates, PROBLEM OF TWELVE, *supra* note 2, at 12.

[35] Lund, *supra* note 5, at 498.

[36] Gilson & Gordon*, supra* note 7, at 885 (citing Markowitz's mean-variance theory for portfolio selection and investing and modern portfolio theory); Berk & Green, *supra* note 8, at 1278.

[37] *Id.*; Gilson & Gordon*, supra* note 7, at 886*;* Bebchuk & Hirst, *supra* note 5, at 12.

[38] Gilson & Gordon, *supra* note 7, at 886; Lund, *supra* note 5, at 500; Fisch et al., *supra* note 5, at 23. In a recent review of the literature, Brav, Malenko and Malenko provide an economic framework to think about the incentives of institutional investors to engage in governance, including the likelihood of a collective action problem, and then review the existing empirical evidence in the context of this framework. *See* Brav, Malenko & Malenko, *supra* note 5, at 3–6.

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The question of how passive ownership affects investment manager stewardship and incentives to monitor is very much unsettled.[39] Nonetheless, scholarly concerns about the governance implications of passive ownership have received outsized attention due to the Big Three's sheer size. Their aggregate ownership exceeds 5% of many S&P 500 companies,[40] and by some accounts, they may already wield voting control at some.[41] Not only that, but scholars have also predicted that the Big Three's rapid growth will continue.[42]

The prospect of largely passive investment managers controlling an ever increasing share of publicly traded firms has led some scholars, including one of us, to propose legal solutions that would minimize their influence, due to the belief that their outsized influence could lead to economic harm.[43] Such calls to minimize the influence of the Big Three have continued even as these investment managers dedicate additional resources to their governance efforts.[44] Such criticism may be inevitable—size has historically brought about scrutiny.[45] As John Coates has written about the Big Three, "the prospect of twelve people even potentially controlling most of the economy poses a legitimacy and accountability issue of the first order – one might even call it a small 'c' constitutional challenge."[46]

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[39] *C.f.* Bebchuk & Hirst, *Scepter of the Giant Three*, *supra* note 2, at 739; Gilson & Gordon, *supra* note 7, at 887; *and* Lund, *supra* note 5, at 499, *with* Fisch, Hamdani & Solomon*, supra* note 5, at 24; Marcel Kahan & Edward Rock, *Index Funds and Corporate Governance: Let Shareholders Be Shareholders*, 100 B.U. L. REV. 1771, 1776–77 (2020). The empirical literature is also unresolved. Some studies document that passive funds constrain incumbent management by giving managers less power. *E.g.,* Cornelius Schmidt & Ruediger Fahlenbrach, *Do Exogenous Changes in Passive Institutional Ownership Affect Corporate Governance and Firm Value?* 124 J. FIN. ECON. 285, 290 (2017), *and* Ian R. Appel, Todd A. Gormley & Donald B. Keim, *Passive Investors, Not Passive Owners*, 121 J. FIN. ECON. 111, 112 (2016). Other studies find evidence of opposite effects on governance. *See* Davidson Heath, Daniele Macciocchi, Roni Michaely & Matthew C. Ringgenberg, *Do Index Funds Monitor?*, 35 REV. FIN. STUD. 91, 94–95 (2022).

[40] Bebchuk & Hirst, *Specter of the Giant Three*, *supra* note 2, at 731.

[41] Caleb Griffin, *We Three Kings: Disintermediating Voting at the Index Fund Giants*, 79 MD. L. REV. 954, 957 (2020).

[42] Bebchuk & Hirst, *Specter of the Giant Three*, *supra* note 2 at 732 (predicting that investors will continue to reallocate assets from active funds to index funds, which would give the Big Three power to cast 34% of the votes at S&P 500 companies in a decade, and 41% in two decades); Coates, *The Future of Corporate Governance*, *supra* note 2, at 11. As one of us has written, treating these institutions as monolithic is an error, as there are substantial differences between them; nonetheless, we recognize that aggregating their governance power paints a vivid picture of their influence over the market. *See* Lund & Robertson, *supra* note 14.

[43] Lund, *supra* note 5, at 501; Griffin, *supra* note 41, at 958; Sean J. Griffith, *Opt-In Stewardship: Toward an Optimal Delegation of Mutual Fund Voting Authority*, 98 TEX. L. REV. 983, 990 (2020); Dick Weil, *Passive Investors, Don't Vote*, WALL ST. J. (Mar. 8, 2018), https://www.wsj.com/articles/passive-investors-dont-vote-1520552657.

[44] *See*, *e.g.*, Press Release, Dan Sullivan, U.S. Sen. for Alaska, Sullivan Introduces Index Act to Empower Investors and Neutralize Wall Street's Biggest Investment Firms (May 18, 2022), https://www.sullivan.senate.gov/newsroom/press-releases/sullivan-introduces-index-act-to-empower-investors-and-neutralize-wall-streets-biggest-investment-firms.

[45] *See generally,* Mark Roe, STRONG MANAGERS, WEAK OWNERS (1994).

[46] Coates, *The Future of Corporate Governance*, *supra* note 2, at 14.

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Already, the Big Three have run into political challenges due to their size and corresponding governance power. Politicians on both sides of the aisle attack them for being too "woke,"[47] on the one hand, and not doing enough to respond to global problems such as climate change, on the other.[48] Not only that, scholars have argued that holding large stakes across competing firms in concentrated industries could lead to antitrust problems, which has led to further regulatory scrutiny.[49] The political environment has become sufficiently hostile toward the Big Three that in 2021, a group of senators sponsored a bill that would require them to diffuse their voting power by passing through proxies to the beneficial owners of the shares.[50]

In sum, scholars studying the Big Three have painted a picture of rapid growth caused by investor reallocational flows that is predicted to remain on pace. These observations have been met with wide-ranging reform proposals, some of which have been acted on by lawmakers. In the next section, we introduce our framework that reveals a more complete account of how investment manager ownership has evolved over time, and points to the fund-, investor-, and market-level characteristics that shape the growth of institutional ownership.

B. What Accounts for Growth in Institutional Investment Manager Ownership?

The previous Section described the conventional narrative of the Big Three's past and future growth. This Section identifies a more complete set of factors that have contributed to institutional investment manager growth over time. As discussed, previous studies have focused almost exclusively

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[47] *See*, *e.g.*, Vivek Ramaswamy, *Are You Investing in Woke Political Activism? 5 Questions You Need to Ask*, FOXBUSINESS (Jan. 5, 2023), https://www.foxbusiness.com/markets/are-you-investing-woke-political-activism-5-questions-need-ask ("The "Big 3" asset managers – BlackRock, State Street, and Vanguard – collectively manage nearly $20 trillion, about the size of the entire U.S. GDP….So when powerful asset managers speak, companies are incentivized to listen. Lately, they've been listening to some bad advice, driven by the ESG obsession among some asset managers."); Vivek Ramaswamy, *The ESG Fiduciary Gap*, HARV. L. SCH. F. ON CORP. GOVERNANCE (Oct. 25, 2022), https://corpgov.law.harvard.edu/2022/10/25/the-esg-fiduciary-gap/ (arguing that "the Big Three are all promoting the ESG agenda rather than focusing on clients' interests alone").

[48] *See*, *e.g.*, Amelia Pollard, Silla Brush & Cynthia Hoffman, *Blackrock is Caught in the ESG Crossfire and Struggling to Get Out*, BLOOMBERG (Dec. 15, 2022), https://www.bloomberg.com/news/features/2022-12-15/blackrock-is-caught-in-the-esg-crossfire-and-struggling-to-get-out#:~:text=to%20the%20AGs.-,Sept.,response%20to%20Republicans%20as%20concerning (noting how in 2022, "New York City Comptroller Brad Lander sen[t] a letter to BlackRock saying that the firm "abdicates responsibility" when it comes to climate change by not asking companies to set specific emissions targets"); Lewis Braham, *Environmental Activists are Coming After Vanguard. Here's Why*, BARRON'S (May 3, 2023), https://www.barrons.com/articles/environmental-activists-targeting-vanguard-99d3f7b6.

[49] *See Hearings on Competition and Consumer Protection in the 21st Century*, FED. TRADE COMM'N, https://www.ftc.gov/enforcement-policy/hearings-competition-consumer-protection (last visited Aug. 18, 2023); FED. TRADE COMM'N, HEARING ON COMMON OWNERSHIP BY INSTITUTIONAL INVESTORS AND ITS IMPACT ON COMPETITION - NOTE BY THE UNITED STATES (Dec. 6, 2017), https://www.ftc.gov/system/files/attachments/us-submissions-oecd-2010-present-other-international-competition-fora/common_ownership_united_states.pdf.

[50] *See* note 114 *infra*.

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on the idea that investors withdraw funds from actively managed funds and invest it in passive funds. These reallocational flows are certainly part of the story, but they are not all. Indeed, the scholarly literature has generally overlooked the way in which corporations and funds have contributed to the growth in ownership by the Big Three and institutional investment managers more broadly.

To set the stage for our framework of institutional investor ownership, we begin by defining institutional flows and the manner with which we measure these flows. We then describe how these factors affect the evolution of an institution's ownership over time.

i. Measuring Institutional Flows

This Section defines flows into institutional investment managers and how they are measured. Our goal is to explicitly relate flows to underlying portfolio return, the payment of fees, and the reinvestment of dividends and capital gains. By writing down the relationship between flows and these other fund and investor attributes, we are able to estimate flows by taking a stand on the magnitude of fees, dividends yields, and reinvestment rates.

There are I institutions and J companies that these institutions can invest in.[51] Let $V_{ijt} \geq 0$ be institution's i's dollar holdings in firm j at time t, so the institutional investment manager's assets is the sum of its dollar holdings: $AUM_{it} = \sum_{j=1}^{J} V_{ijt}$. The institution's portfolio weight invested in firm j is $\omega_{ijt} = V_{ijt}/AUM_{it}$. The capital gains return on firm j from $t-1$ to t is r_{jt}. Given its portfolio weights, institutional investment manager i's capital gain return, excluding dividends, is $r_{it} = \sum_{j=1}^{J} \omega_{ijt}(1 + r_{jt}) - 1$. We assume the institution's expense ratio, c_{it}, is paid out at the end of the quarter as a fraction of beginning quarter AUM.

Turning to dividend and capital gains distributions, let D_{it} be the dollar value of dividends received by the institutional investment manager in period t. The institution's realized dividend yield is $y_{it}^{D} = D_{it}/AUM_{i,t-1}$. We assume all dividends are distributed to the institution's shareholders by the end of the quarter, net of the fund's expenses. If fund expenses are higher than dividends received, we assume the fund pays the fees from fund assets. We define G_{it} as the institution's distribution of realized capital gains, and $y_{it}^{G} = G_{it}/AUM_{i,t-1}$ as the institution's realized capital gains yield. For every

[51] We think of the I^{th} institution as capturing the residual share ownership of all shareholders that do not file a Form 13F, such as retail investors. *See* Ralph S. J. Koijen & Motohiro Yogo, *A Demand System Approach to Asset Pricing*, 127 J. POL. ECON. 1475, 1480 (2019).

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dollar of distributions of dividends and capital gains by the institution to its shareholders, the institution receives b_{it}^{d} and b_{it}^{g} cents as reinvestment. Finally, we denote the institution's dollar flows by F_{it}.

With this notation, the institution's change in AUM from $t-1$ to t is given by:

$$AUM_{it} = AUM_{i,t-1}(1 + r_{it} + \kappa_{it}) + F_{it} \quad (1)$$

where $\kappa_{it} = \left(b_{it}^{d}\right)^{1(y_{it}^{D} - c \geq 0)}(y_{it}^{D} - c) + \left(b_{it}^{g} - 1\right)y_{it}^{G}$. This representation emphasizes dollar flows F_{it} as the residual change in AUM that cannot be accounted for by asset growth due to returns, fees, and the reinvestment of capital gains and dividends.[52]

ii. Flows and Change in Institutional Ownership

This Section provides a decomposition of flows into an institutional investment manager and shows how these flows affect the growth of that institution's equity ownership over time. We begin with simple examples that show the rationale for our framework's components.

Consider a hypothetical Company X, held by two mutual funds, Fund P (a passively managed fund) and Fund A (an actively managed fund). Each fund owns one percent of Company X. Fund P's ownership of Company X will rise if additional investors choose to invest in the fund, Fund P uses those investor dollars to purchase shares of Company X from Fund A, and there are no changes in Company X's outstanding equity. This conventional scenario is the mechanism for growth that scholars have focused on—how investor preferences for passive funds generate flows that affect the fund's stake size.

This picture is more complex, however, when we relax the assumption that Company X's outstanding shares remain constant. Consider again Fund P and Fund A. If Company X repurchases some of its shares from Fund A only, Company X's market value will decline by the dollar amount of the repurchase. And by simply holding the same dollar investment in the now smaller Company X, Fund P will be left holding more than one percent of Company X. Fund A, on the other hand, will see its ownership of Company X decline. Put simply, in the wake of a buyback in which not all funds participate, the non-participating fund's ownership will grow if it does not experience any investor outflows.

[52] In Part III, we provide estimates for fund reported fees, capital gains, and dividend reinvestment rates.

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This example reveals that it is not possible to evaluate how inflows affect ownership without considering whether Company X has distributed or raised additional equity capital during the same period. Moreover, it is important to note that index funds do not participate in buybacks when these are announced.[53] This fact therefore means that other institutions, such as Fund A, typically sell shares into the buyback, and will typically witness shrinking ownership of Company X.

Although our simple example involves two funds and one company, this same intuition holds for ownership of the entire market. Net corporate distributions (*i.e.*, when companies in the aggregate repurchase more stock than they issue) can be expected to entrench the ownership of passively managed mutual funds relative to actively managed funds. If corporations in the aggregate distribute cash via stock repurchases, institutions such as Fund P will see their ownership of the market grow if they do not experience contemporaneous outflows.[54]

Aggregate net equity issuances via initial and seasoned equity offerings can similarly impact an institution's ownership depending on the degree to which the institution participates in such offerings and the magnitude of the contemporaneous inflows it receives. Consider again Funds P and A. If companies in the aggregate raise equity capital and only Fund P purchased shares, then Fund P would see its aggregate ownership increase while Fund A would experience a decline in ownership. This example highlights how corporate balance sheet transactions (like equity offerings) must coincide with inflows into one or more institutions. For Fund P to participate in aggregate net equity issuances, it must have received inflows from its investors.

A related mechanism for growth of ownership depends on an institution's portfolio return. An institution that has above-market return—*i.e.*, has invested in or overweighted companies that have performed abnormally well relative to the return on the market portfolio—will exhibit growth in ownership for two reasons. First, the direct effect of the above-market return is that the institution's

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[53] *See* note 11 *supra.*

[54] *Cf.* Fried & Wang, *supra* note 19, at 210–11. Fried and Wang document the extent to which corporations in the aggregate distribute cash but also raise equity capital. The authors find that their sample of S&P 500 firms has distributed close to 95% of their aggregate net income to their shareholders via the repurchase of shares and dividends over the period 2007–2016, but that these distributions are offset by direct and indirect equity offerings such that net shareholder payout comprises only 41% of net income. More recently, Tetiana Davydiuk, Scott Richard, Ivan Shaliastovich, & Amir Yaron, *How Risky are U.S. Corporate Assets?*, J. OF FIN. 141, 145–48 (2023) measure aggregate payouts to investors and the implications of fluctuations in these payouts for asset pricing. Corporate payouts in their setting also include share repurchases and equity offerings. They find that while equity offerings and repurchases both tend to comove positively with growth in the economy, their difference, namely, net repurchase activity, does not comove with proxies for economic growth. *Id.* at 144.

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ownership of the market will grow. Second, because flows react to past performance,[55] an indirect effect of the above market return will be an increase in ownership due to larger flows.

Less obviously, the size of the fee charged by a fund can affect its ownership. Compare once again Funds P and A, both with investments in Company X. Fund P has an expense ratio of 0.1%., while Fund A has an expense ratio of 1%.[56] Holding all else constant, if investors provide each fund with $1,000, Fund P's portfolio managers will have $999 to invest in Company X, while Fund A will only have $990.[57] Of course, fees ought to be set in equilibrium in response to flows and the optimal size of the fund,[58] but any deviation from this logic (as in this example) will result in higher fund fees and lower ownership.

Finally, firm payout policy, which consists of the company's distribution of excess corporate cash and investors' decision to either consume the funds or to reinvest, can also impact ownership. Consider again Fund P and suppose that like most mutual funds, the fund automatically reinvests dividends in the underlying portfolio company. Because dividends cannot be reinvested in the aggregate, Fund P reinvests by purchasing shares from other selling shareholders.[59] Let us further assume that Fund A's shareholders are not entitled to automatic dividend reinvestment. Accordingly, when Fund A's investors receive a cash distribution from Company X, those investors will need to decide whether to consume the distribution or reinvest. Importantly, for markets to clear, the dividend distribution will ultimately have to be consumed by an investor of either of the two funds.

Following the example through, let us assume that some of Fund A's investors decide to take the cash and consume it rather than reinvest in Company X. This action will cause the ownership of Fund A to decline; Fund P, by contrast, which has defaulted its shareholders into the reinvestment of Company X, will now hold a larger share of Company X. Because both actively managed funds and

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[55] *See* Berk & Green, *supra* note 8, at 1271; Itzhak Ben-David, Jiacui Li, Andrea Rossi & Yang Song, *What Do Mutual Fund Investors Really Care About?*, 35 REV. FIN. STUD. 1723, 1727 (2022); James J. Choi & Adriana Z. Robertson, *What Matters to Individual Investors? Evidence from the Horse's Mouth*, 75 J. FIN. 1965, 1969 (2020); Judith Chevalier & Glenn Ellison, *Risk Taking by Mutual Funds as a Response to Incentives*, 105 J. POL. ECON. 1167, 1167 (1997).

[56] In general, passively managed funds are able to charge much lower fees than actively managed funds. This is not only because the costs of managing such funds are substantially less, but also because passive funds generally lend out shares to short sellers and use the revenue to offset fund expenses. *See generally*, Joshua Mitts, *Passive Exit*, 28 STAN. J. L. BUS. & FIN. 155 (2023)

[57] Mutual fund fees are generally used for operating expenses (such as the costs of marketing the fund and paying institutional employees) and on sales commissions. *See* U.S. SEC, *Mutual Fund Fees*, https://www.investor.gov/introduction-investing/investing-basics/glossary/mutual-fund-fees-and-expenses.

[58] Berk & Green, *supra* note 8, at 1273.

[59] *Cf.* Fried, Ma & Wang, *supra* note 9 (observing that not all investors receiving a dividend distribution will be able to reinvest the distribution).

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index funds typically default investors into the automatic reinvestment of dividends,[60] the declaration of a dividend may therefore entrench institutions that specialize in mutual funds relative to other institutions (whose investors tend to consume their dividends) and also relative to retail investors.

To formalize how each of these factors affect ownership, we provide a framework to decompose the change in an institution's stake in the market, $\psi_{it} = AUM_{it}/M_t$, into factors that capture differential fund fees and distributions. We begin by scaling an institutional investment manager's dollar flow, F_{it}, by the institution's lagged assets under management, AUM_{it-1}.

$$f_{it} = \frac{F_{it}}{AUM_{it-1}} = \frac{AUM_{it} - AUM_{i,t1}(1+r_{it}+\kappa_{it})}{AUM_{i,t-1}} \tag{2}$$

Note that scaling the institutional investment manager's dollar flows by assets under management allows us to paint a more complete picture of the effect of flows on institutional growth because a dollar flow to a small institution affects ownership far more than it does at a larger institution. With scaled institutional flows, the growth in the institutional assets under management can be written as:

$$AUM_{it} = AUM_{i,t-1}(1 + r_{it} + \kappa_{it} + f_{it}) \tag{3}$$

Next, consider the evolution of the aggregate market portfolio, M_t. The market flow which we denote by F_{mt} is the change in market value unaccounted for by capital gains.

$$M_t = M_{t-1}(1 + r_{mt}) + F_{mt} \tag{4}$$

where r_{mt} is the capital gains return. Crucially, the market does not grow by the return including dividends because the latter are distributed and consumed. Market flow, F_{mt}, captures balance sheet events such as buybacks and equity issuances that change the market's value and can be thought of as "flows" since they are computed the same way we compute fund flows. Scaling market dollar flows by lagged market value gives:

$$f_{mt} = \frac{F_{mt}}{M_{t-1}} = \frac{M_t - M_{t-1}(1+r_{mt})}{M_{t-1}} \tag{5}$$

and $M_t = M_{t-1}(1 + r_{mt} + f_{mt})$. Growth in aggregate market value is driven by capital gains and balance sheet flows since all dividends must be paid out and consumed. For this reason, the market's dividend yield does not appear in the market's growth equation.

[60] *See* note 10 *supra.*

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The cumulative change in ownership of an institution *i* in the market from time 0 to T is therefore given by:

$$\psi_{iT} = \psi_{i,0} \cdot \prod_{t=1}^{T} \left(\frac{1+r_{it}+\kappa_{it}+f_{it}}{1+r_{mt}+f_{mt}} \right) \quad (6)$$

To provide our intuition about the drivers of the growth in ownership from $t = 0$ to $t = T$ in equation (6), we can approximate the cumulative change in log ownership as follows:

$$\log(\psi_{iT}) - \log(\psi_{i,0}) \approx \sum_{t=1}^{T}(r_{it} - r_{mt}) + \sum_{t=1}^{T} \kappa_{it} + \sum_{t=1}^{T}(f_{it} - f_{mt}) \quad (7)$$

The first term in the decomposition gives the cumulative change in the institution's "excess returns" relative to the market. The second term gives the change in ownership due to fees and distributions of dividends and capital gains. The third term captures the effect of balance sheet effects on institutional investment manager stake size. When $f_{mt} < 0$ ($f_{mt} > 0$), net corporate distributions (issuances) lead to an increase (decrease) in ownership unless these market flows are met with offsetting fund-level flows.

The hypotheticals introduced earlier in this Section were meant to capture the effect of each of the three terms on the right-hand side of Equation (7) on the change in an institution's ownership. Recall, for example, the hypothetical in which we considered the possibility that corporations in the aggregate distribute cash via stock repurchases (captured by $f_{mt} < 0$ in the flows notation). In that hypothetical, we observed that Fund P could see its ownership of the market grow if it did not participate in the repurchase nor experience contemporaneous outflows. This constraint is reflected in the third term on the right hand-side of Equation (7). As long as Fund P's flows are higher than market flows, $f_{it} - f_{mt} > 0$, the fund will see its ownership of the market increase.

A related hypothetical considered the case of aggregate net equity issuances via initial and seasoned equity offerings (captured by $f_{mt} > 0$ in the flows notation). In that hypothetical, Company X conducted a seasoned equity offering and only Fund P purchased shares. By participating in the entire offering, we had effectively assumed that Fund P received investor inflows and was able to participate more than proportionally in the offering, that is, $f_{it} - f_{mt} > 0$. This participation led Fund P's ownership of the market to increase while Fund A's ownership declined. These examples reinforce

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the idea that what matters for growth in ownership is not just the magnitude of inflows or outflows but also the relationship between these flows and contemporaneous market flows.[61]

iii. Equilibrium Restrictions on Fund Flows

Our hypotheticals have thus far involved two funds through which investors either provide capital to corporations or receive distributions that have been made by corporations. In our simple examples, when investors allocate dollars to a fund, these inflows are invested when the fund purchases shares from the corporation conducting an equity offering. Similarly, outflows from funds to investors can only take place if the corporation distributes cash, via corporate events such as stock repurchases, cash acquisitions, or going private transaction, or by distributing dividends.

In this Section, we show how the intuition from these hypotheticals extends to a market with multiple institutional investment managers and corporations. We derive restrictions on equilibrium flows under different assumptions about capital flows from companies to investors. In particular, we consider assumptions about whether companies distribute capital gains and dividends and whether there are balance sheet events such as equity offerings and stock repurchases that lead to changes in the market value of a firm.

Let M_t be the value of the investible universe. For example, M_t could represent the value of all public equity on CRSP, or it could be the value of the S&P 500; for simplicity, we refer to it as the "market." The market comprises J companies and each company's market capitalization is mkt_{jt}. By definition of the market, we have $\sum_{j=1}^{J} mkt_{jt} = M_t$. Aggregate dividends, D_t, are given by $D_t = \sum_{j=1}^{J} D_{jt}$ and the aggregate dividend yield, y_t, is therefore $y_t = D_t/M_{t-1} = \sum_{j=1}^{J} \omega_{jt} y_{jt}$, where ω_{jt} is firm j's market weight, $\omega_{jt} = mkt_{jt}/M_t$, with $\sum_{j=1}^{J} \omega_{jt} = 1$.

Since only I funds can invest in the market, the sum of all funds' assets under management must equal the value of the market: $\sum_{i=1}^{I} AUM_{it} = M_t$. A fund i's ownership stake in firm j, at time t, ψ_{ijt},

[61] The analysis and hypotheticals that we have presented in this Section can be further extended to allow for multiplier effects. Consider, for example, the hypothetical in which Company X conducts a buyback. Fund P does not sell shares in the buyback while Fund A does, and those repurchased shares are then retired. When Fund A sells shares of Company X, it pays the proceeds out to its Fund A investors. Those shareholders can consume the distribution or they can reinvest some of it to Fund P. If they reinvest a portion of the distribution in Fund P, Fund P will see its assets under management increase, and it will need to invest by purchasing shares from Fund A. Fund A will then distribute the proceeds from selling the shares to its investors and this process can repeat. Appendix C provides the quantitative implications in this two-fund example. It also shows how this multiplier effect is also present for dividend distributions.

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is given by: $\psi_{ijt} = V_{ijt}/mkt_{jt}$ and ψ_{it}, again, is fund i's ownership stake in the entire market: $\psi_{it} = AUM_{it}/M_t = \sum_{j=1}^{J} \omega_{jt}\psi_{ijt}$. That is, a fund's stake in the entire market is a weighted average of its ownership stake in each company, where the weights are proportional to the market capitalization of these companies. The larger the market capitalization, the larger the impact of the stake in the company on the institution's ownership of the market.

To derive a restriction on equilibrium flows, we begin with a simplified setting in which funds do not make any distributions nor charge any fees, but do allow for non-zero balance sheet flows. We then relax the former constraint.

Beginning with the market clearing condition that the sum of funds' assets under management equals the value of the market, we write the evolution of assets under management (left-hand-side) and the value of the market (right-hand-side).

$$\sum_{i=1}^{I}\left(AUM_{i,t-1}(1 + r_{it}) + F_{it}\right) = M_{t-1}(1 + r_{mt}) + F_{mt} \tag{8}$$

Recognizing that the market return is a value weight average of the individual company returns, $1 + r_{mt} = \sum_{i=1}^{I} \frac{AUM_{i,t-1}}{M_{t-1}}(1 + r_{it})$, we have the equilibrium condition:

$$\sum_{i=1}^{I} F_{it} = F_{mt} \tag{9}$$

The restriction in Equation (9) tells us that the sum of inflows to institutional investment managers equals market flows. If market flows, F_{mt}, are positive, there is a net balance sheet expansion, which means that the dollar value of initial public offerings or seasoned equity offerings is higher than corporate distributions. As a result, there will need to be net inflows to purchase this new equity. By contrast, market flows are negative when the dollar value of stock repurchases, cash acquisitions, or going private transactions is higher than the dollar value of equity offerings. When this happens, there will be a net balance sheet contraction, which needs to be met with outflows from the institutions.

Next, we introduce fund fees and distributions to evaluate the consequences for the restriction on aggregate institutional flows. We begin with the growth of a single fund's assets under management as in equation (1). Recall that growth in a fund's assets under management is driven by capital gains on its portfolio holdings, the reinvestment of dividends and capital gains, and dollar flows. Aggregating assets under management across all funds gives us:

$$\sum_{i=1}^{I}\left(AUM_{i,t-1}(1 + r_{it} + \kappa_{it}) + F_{it}\right) = M_t \tag{10}$$

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Since the market pays out dividends, it grows only by capital gains return and market flows (see Equation (4)). Moreover, as before, the market return is a value weight average of individual company returns: $\sum_{i=1}^{I}\left(\frac{AUM_{i,t-1}}{M_{t-1}}(1+r_{it})\right)=1+r_{mt}$. We therefore have:

$$\sum_{i=1}^{I} F_{it} = F_{mt} - \sum_{i=1}^{I} AUM_{i,t-1}\,\kappa_{it} \tag{11}$$

Simply put, the sum of flows into institutional investment managers equals market flows as in Equation (9), but we now need to adjust for the impact of fund fees and distributions. Specifically, Equation (11) accounts for the fact that flows into institutional investment managers also have to "absorb" fees and dividend and capital gains reinvestment when funds sell (buy) shares to allow other funds to reinvest distributions (pay fund fees).[62]

In sum, this Section showed how corporate and fund actions impact the evolution of investment management ownership in a market with many institutional owners and corporations. Our framework puts structure on our observation that growth in institutional ownership depends on multiple factors beyond reallocational flows. It generates several insights about why certain funds and institutions have won (or lost) in the contest for flows, which will be made concrete in our next Part, which connects our framework with data. For example, as we will discuss, Vanguard's growth in ownership over the past decade is driven by the fact that it received flows that were higher than contemporaneous market flows, which have been mostly negative due to net aggregate corporate distributions via buybacks.[63] We return to these observations in the next Part.

III. Evidence: Growth of Institutional Investment Manager Ownership

The previous Part revealed the factors beyond reallocation flows that matter for institutional growth in ownership. This Part connects that framework with our comprehensive data on institutional and market flows, as well as the corporate and fund actions that affect institutional ownership. The resulting evidence provides the most complete picture of institutional and market-level flows, as well as institutional investment manager ownership, to date. Unlike earlier studies that rely on third party data, we gather the data on institutional ownership, distributions, fees, and reinvestment of dividends and capital gains directly from SEC filings. Section A further describes our data collection effort and

[62] The restriction in Equation (11) can be equivalently written using scaled flows: $\sum_{i=1}^{I}\psi_{it-1}(f_{it}+\kappa_{it})=f_{mt}$.
[63] *See* Fried & Wang, *supra* note 19.

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Section B summarizes our results. Section C concludes by discussing some of the insights that emerge from the data.

A. Data Collection

This Section describes the data sources that are the basis for our evidence on institutional ownership and flows. Recall that the latter are estimated based on data on fund expense ratios and the reinvestment of dividends and capital gains, all of which we derive from SEC filings. This Section also describes how we gather data on corporate balance sheet events that drive market-level flows.

i. Institutional Ownership

We combine and clean several data sources to measure institutional ownership over time. Data on institutional investment manager share ownership are from raw Form 13F filings with SEC's Electronic Data Gathering, Analysis, and Retrieval (EDGAR) system. Investment managers with "investment discretion over $100 million or more in Section 13(f) securities" are required to file a Form 13F,[64] which details their equity holdings, within 45 days of the end of a calendar quarter, and we gather quarterly institutional share ownership data by scraping raw Form 13F filings.[65] The SEC has required Form 13F filings since April 1, 1999, and our dataset therefore spans from 2000 - 2022. In most cases, institutions report both the number of shares and the value of each security. We rely solely on the reported number of shares and use the reported valuation only for data cleaning purposes. Appendix A provides additional information regarding the formation of the ownership dataset.

We merge the 13F data with the Center for Research in Security Prices (CRSP) using CUSIPs to obtain information on share prices and shares outstanding on the report date for each security. Because we are interested in ownership of domestic equity, we restrict the sample to firms with CRSP

[64] *See* Securities Exchange Act of 1934 § 13(f), 15 U.S.C. § 78m(f).

[65] We follow, in particular, Backus et al., who scrape 13F filings from 2000 to 2017, and Amel-Zadeh et al., who scrape ownership data from 2000 to 2022. Matthew Backus, Christopher Conlon & Michael Sinkinson, *Common Ownership in America: 1980–2017*, 13 AM. ECON. J. 273 (2021). Amir Amel-Zadeh, Fiona Kasperk & Martin C. Schmalz, *Mavericks, Universal, and Common Owners—The Largest Shareholders of U.S. Public Firms* (Eur. Corp. Governance Inst. – Fin. Working Paper No. 838/2022, 2022).

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common share codes 10, 11, and 12 and therefore exclude ADRs, units, certificates, and shares of beneficial interest. The dollar value of each security is calculated based on the reported shares held.[66]

In determining ownership, we exclude BGI from BlackRock prior to its acquisition by the investment manager in 2009 in order to paint a more accurate picture of BlackRock's growth. Before that acquisition, BlackRock was primarily a fixed income asset manager with a modest presence in the equity market.[67] With the purchase of BGI (which housed iShares ETFs), BlackRock more than doubled its assets under management and became a heavy hitter in the world of passive investing.[68] As the next section reveals, excluding BGI from BlackRock's AUM pre-acquisition shows that a substantial part BlackRock's historic growth is attributable to that acquisition rather than flows.

ii. Expense Ratios and Reinvestment of Dividends and Capital Gains Distributions

Data on fund expense ratios and dividend and capital gain distributions all come from CRSP and the CRSP mutual fund database. Funds are identified using *crsp_fundno,* and we retain mutual funds whose primary assets are U.S. domestic equities by excluding foreign and non-equity funds using the CRSP mutual fund style table.[69] For capital gain distributions, we utilize the CRSP mutual fund database variable *fdis_type*, which provides the amount and type of distribution at each distribution event for every fund. We aggregate all distribution types that start with *E* as capital distributions for each fund and calculate the yield on capital gain distributions by scaling by the fund net assets. A fund's dividend yield is the value weight yield of each portfolio company dividend yield.[70] We aggregate the expense ratios and capital gain yields of all U.S. equity funds to the institution level using funds'

[66] We compare our calculation with the reported value on Form 13F. A holding observation is considered valid if the difference between the reported value and our calculated value is within a 10% bound. Each quarter, we drop securities labeled as options and institutions with more than 40% invalid observations.

[67] David Ricketts & Mark Cobley, *Ten Years On: Inside BlackRock's 'Once In a Lifetime' Deal with Barclays*, FIN. NEWS (June 10, 2019), https://www.fnlondon.com/articles/blackrocks-once-in-a-lifetime-deal-with-barclays-left-cvc-smarting-20190611.

[68] Christine Williamson, *BlackRock's BGI Acquisition 10 Years Ago Fuels Rapid Growth*, PENSIONS & INVESTMENTS (June 11, 2019), https://www.pionline.com/article/20190611/ONLINE/190619948/blackrock-s-acquisition-of-bgi-10-years-ago-fuels-breakneck-growth-of-investment-giant.

[69] Appendix A provides additional detail on the criteria for inclusion.

[70] Specifically, we obtain monthly return data from CRSP for each portfolio company as reported on Form 13F and compute the difference in the buy and hold quarterly return with and without dividends. Portfolio company dividend yields are then value weighted using portfolio weights to obtain the fund family dividend yield.

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total net assets under each investment management company. Investment management companies are identified using their Central Index Key (CIK) with the SEC.[71]

Data on the reinvestment of dividend and capital gain distributions come from Form N-SAR filings, which registered investment companies are required to file under the Investment Company Act of 1940. CRSP provides a mapping file (*crsp.portnomap*) linking *crsp_fundno* and CIK and we extract the reinvestment data by scraping all Form N-SAR filings from EDGAR using the CIKs in the CRSP mapping file. Since mid-2018, the SEC has replaced the requirement to file Form N-SAR with a new Form N-CEN and as a result, our reinvestment data covers the period 2000-2017.[72]

iii. Corporate Events

To form a measure of market-level outflows, we obtain information on the following corporate events. Quarterly repurchases are drawn from the CRSP/Compustat merged database,[73] and the dollar volume of going private transactions is also generated from CRSP.[74] We obtain the dollar value of

[71] The identifier for institutional investment managers who file Form 13-F with the SEC is the CIK assigned by the SEC. The CIKs assigned to investment managers differ from those assigned to asset management companies that file a Form N-SAR with the SEC. Each investment manager may have multiple corresponding asset management companies, while multiple funds file under each asset management company. Each fund is identified in Form N-SAR by a series number, while CRSP identifies the same fund using *crsp_fundno*.

[72] Information on Form N-SAR is reported semi-annually on Form N-SAR/A, and annually on Form N-SAR/B. That is, Form N-SAR/A provides information for the preceding six months while Form N-SAR/B provides year-to-date information for the fiscal year. Each N-SAR filing contains information about all fund series under the reporting investment management company. Fund series' report their type of investment by indicating whether the fund primarily invests in equity (Item 66), primarily invests in securities of foreign issuers (Item 68B), and whether it is an index fund (Item 69). We define a fund series as a U.S. equity fund if it answers Yes to Item 66 and No to Item 68B. Item 72DD and Item 72EE in Form N-SAR provides the amount of dividends and capital gains distributions. Item 28 provides the amount of reinvestment of dividends and capital gains distributions in the six months preceding the reporting date. Form N-SAR provides space for two share classes where in some cases fund series have more than two share classes. In such cases, the additional information is reported in Form EX-99, EX-99.77Q1 OTHR EXHB or EX-99.77Q3 CERT, and we extract this information from these forms. We calculate reinvestment rates of dividend and capital gain distributions for each fund series on an annual basis. Specifically, for each fund series, the rate of reinvestment is calculated as the ratio of the sum of amounts reinvested as reported on Form N-SAR/A and Form N-SAR/B to the sum of dividend and capital gain distributions as reported on Form N-SAR/B. According to the SEC instruction file for filing Form N-SAR, Item 28 provides information for the previous 6-month reporting period on both N-SAR/A and N-SAR/B. Item 72DD and 72EE provides information for the previous 6-month reporting period on Form N-SAR/A while it gives year-to-date information on Form N-SAR/B. We therefore add the reported reinvestment from both N-SAR/A and N-SAR/B filings and retain the dividend and capital gains distributions disclosed on Form N-SAR/B. The fund-level reinvestment data is aggregated to the investment-company level by CIK based on reported total net assets.

[73] *See* Alice A. Bonaime & Kathleen M. Kahle, *Share Repurchases*, HANDBOOK OF CORP. FIN. (2023, forthcoming). Specifically, repurchases are the purchase of common and preferred stock (*prstkcy*) net of increase in preferred stock, measured as redemption (*pstkrq*), or par value (*pstkq*) of preferred stock, in order of preference. If repurchase data is missing, we set it to zero as in Bonaime & Kahle.

[74] See Christian Leuz, Dhananjay Nanda & Peter D. Wysocki, *Earnings Management and Investor Protection: An International Comparison*, 6 J. FIN. ECON 505, 513 (2003). We obtain the list of delisted securities from CRSP and map their cusips to CIKs. For each corresponding CIK, we check its filing history with the SEC and mark it as going private if the firm files

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cash acquisitions from the CRSP delisting dataset for firms with delisting code 233. We construct a measure of market-level quarterly outflows as the sum of share buybacks, cash acquisitions, and going private transactions scaled by the beginning of quarter stock market value. Finally, to form an estimate of quarterly market-level inflows, we calculate the volume of initial public offerings (IPOs) and seasoned equity offerings (SEOs) in a given quarter scaled by the beginning of quarter stock market value.[75]

B. Evidence

This Section presents a comprehensive picture of the growth of institutional investment manager ownership over time. We begin with summary statistics on fund fees, dividend yields, capital gains, and reinvestment that factor into our ownership and flows framework. We then discuss our evidence on ownership and institutional flows.

i. Fund Fees, Dividend Yields, Capital Gains, and Reinvestment

Table 1 provides summary statistics on expense ratios, dividend yields, distributed capital gain yields,[76] and the reinvestment rate of these distributions. The statistics provided in each panel for a given subperiod are the averages of corresponding yearly statistics.[77] These fund-family level attributes are the basis for the institution-level estimates of κ_{it} (see Equation (1) and related discussion in Section II.B.i), and therefore form the basis of our analysis on ownership and flows.

Panel A provides information on expense ratios by subperiod showing the well-documented monotonic decline over the sample period.[78] The average (median) expense ratio is 1.2% (1.2%) in the

Schedule 13E followed by a Form 15. We also include all firms with CRSP delisting code 573 as going private. For each firm we calculate the dollar value going private based on the market capitalization as of the last available trading day.

[75] The dollar value of IPOs is measured as the aggregate market capitalization of firms identified by their *permno* when their stock price information is first available on CRSP. The dollar value of SEOs is calculated as the sale of common and preferred stocks (*sstky*) obtained from CRSP/Compustat merged database, following William R. Kuchinski, Richard E. Ogden, Damian R. Thomas & Missaka Warusawitharana, *Equity Issuance and Retirement by Nonfinancial Corporations*, BOARD OF GOVERNORS OF THE FED. RES. SYS. (June 16, 2017), https://www.federalreserve.gov/econres/notes/feds-notes/equity-issuance-and-retirement-by-nonfinancial-corporations-20170616.html.

[76] For capital gain distributions, we isolate the amount and type of distribution at each distribution event for each fund. We then aggregate all distribution types that start with E as capital distributions for each fund and calculated the yield on capital gain distributions by scaling with the fund net assets.

[77] Table 1 provides data from three different sources aggregated to the fund-family level. The unit of observation for the 13F ownership data is an institutional investment manager, while CRSP and N-SAR data is aggregated at the asset-management company level which is identified by CIK. Below, we refer to a unit of observation as an "institution" rather than an asset management company, an investment company, or a 13F institution.

[78] *See, e.g.*, Vladyslav Sushko & Grant Turner, *The Implications of Passive Investing for Securities Markets*, BIS Q. REV., Mar. 2018, at 113; Rabih Moussawi, Ke Shen & Raisa Velthuis, *The Role of Taxes in the Rise of ETFs* (Working Paper, 2022),

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2000-2004 sub-period, declining to 0.9% (0.9%) by the 2020-2022 sub-period. Panel B provides information on dividend yields. The average (median) dividend yield increases steadily from 1.3% (1.3%) in the early subperiod to a high of 1.9% (2.0%) by 2010-2014 but then declines to a low of 1.7% (1.7%) by the 2020-2022 sub-period.

Panel C provides institutional investment manager-level yields on distributed realized capital gains. The panel provides the share of institutions for which we do not observe a distribution, as well as the average and selected percentiles for distributions by institutions for which we do observe a capital gain distribution. Realized distributed capital gains are volatile, with the average capital gain yield varying in the range of 5.0%-9.3%. The share of institutional investment managers with no capital gains distribution declines from a high of 41.5% in the 2000-2004 sub-period to a low of 15.4% in the 2015-2019 and then increases to 16.5% in the latter part of the sample.

Panel D provides the proportion of institutions reporting zero reinvestment and the distribution of reinvestment rates for institutions that do distribute. Among all institutions that distribute, an average of 10% report zero reinvestment in the 2000-2004 sub-period and this percentage doubles to 19.2% by the 2015-2017 sub-period. The reinvestment rate, however, is extremely high, with the median rate equal approximately to 93% while the average is close to 80%. The high reinvestment that we observe is consistent with the 90% rate used by Morningstar when calculating flows for their U.S. Stock fund category and by the Investment Company Institute (2022).[79]

Importantly, mutual funds differ from ETFs in how they reinvest dividend and capital gains distributions. For investors in mutual funds (and particularly for investors in employer-sponsored retirement plans), dividends are often reinvested automatically. ETFs, by contrast, almost always make these distributions to investors in cash and are less likely to give a free reinvestment option to investors. As a result, the reinvestment of ETF dividends usually requires assistance from the investor's broker or a third party, and often entails a fee. Appendix B contains selections from prospectuses for the ten largest mutual funds and ETFs on CRSP as of March 2022, describing how these funds handle the reinvestment of dividends.

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https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3744519; Bryan Armour, *Investors Piled into the Cheapest Funds in 2022*, MORNINGSTAR (Aug. 8, 2023), https://www.morningstar.com/funds/fund-fees-continued-decline-is-win-investors.

[79] *See Estimated Net Cash Flow Methodology*, MORNINGSTAR, https://www.morningstar.com/content/dam/marketing/shared/research/methodology/765555_Estimated_Net_Cash_Flow_Methodology.pdf (Aug. 31, 2018) *and* INV. CO. INST., 2022 INVESTMENT COMPANY FACTBOOK 194-95 (2022), https://www.icifactbook.org/pdf/2022_factbook.pdf.

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An implication of the different way by which ETF dividends are reinvested is that an institution that distributes ETF dividends will not be able to observe the extent of reinvestment of these dividends. We indeed find a high rate of reported zero reinvestment rates on Form N-SAR by State Street Global Advisors and BlackRock, consistent with the idea that both institutions have a high fraction of ETFs relative to mutual funds. Further complicating the measurement of ETF dividend reinvestment is the fact that the N-SAR reinvestment data combines the reinvestment of all shares of a fund, which may include institutional shares, ETF shares, admiral shares, etc. For this reason, we cannot differentiate the source of the reinvested dividends for each fund and determine whether the reinvestment rate of ETF dividends is similar to that of mutual fund dividends. Given these reporting constraints, we are unable to estimate institution-specific reinvestment rates for each of the Big Three and instead use 90%, an estimate close to the overall sample median, identical to the reinvestment rate used by Morningstar,[80] as a proxy of the reinvestment rate for both mutual funds and ETFs.

ii. Institutional Ownership

Table 2 describes the 13F institutional ownership data. Panels A and Panel B provide information on the cross-sectional distribution of institutional holdings. The statistics are averaged over every five-year subperiod beginning in 2000 and ending with the most recent subperiod, 2020-2022. The median institution's assets under management[81] declines from about $450 million in early 2000s to $187 million in the most recent subperiod, while the average institutional AUM is flat in the range of $4.5 – 4.8 billion in the latter part of the sample. The large difference between the average and median AUM reflects the increasing importance of a few large investment managers.

Panel B provides information on the number of firms held by institutional investment managers in each subperiod. The distribution is highly skewed with the average number of firms held declining from 249 in the 2000-2004 sub-period to 180 firms by the sub-period 2020-2022, while the median number of firms held declines from 91 to 62. Panel C provides statistics on the number of institutions that own shares in a given firm. The average number of institutional owners of a firm has increased from 83 in the first sub-period to 219 in the 2020-2022 subperiod. Meanwhile, average institutional ownership, reported in panel D, has increased from 38% to 59%.[82] All in all, the picture that emerges

[80] *See supra* note 79.
[81] Information on an institution's AUM is restricted to ownership of securities with CRSP common share codes 10–12.
[82] These summary statistics mirror those reported by Jonathan Lewellen & Katharina Lewellen, *Institutional Investors and Corporate Governance: The Incentive to be Engaged*, 77 J. FIN. 213, 261 (2022). This study identifies institutions using the

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is one of a robust market beyond the Big Three. Yes, the largest institutions are growing, but this fact is not preventing rival investment managers from entering the market, as evidenced by the rise in the number of institutional holders over our sample period.

We provide additional detailed information on institutional investment manager annual aggregate market ownership in panel A of Table 3. The panel presents December-end value weight ownership[83] figures for each of the ten largest institutions, identified as those whose aggregate portfolio value of companies with CRSP common share codes 10, 11, and 12 is among the top ten of 13F filers at the end of 2022. Columns (1)-(3) provide ownership for Vanguard, BlackRock, and State Street Global Advisors (SSGA), respectively. The Big Three own the largest market share by the end of the sample period with Vanguard at 8.28%, BlackRock at 6.98%, and SSGA at 3.84%.[84] Of these investment managers, only Vanguard exhibits steady growth in ownership, going from 1.21% in 1999 to 8.28%, and more than doubling its aggregate ownership since 2010. By contrast, BlackRock and SSGA have grown more slowly. BlackRock's large jump in ownership takes place in 2009, going from less than 1% to 5.32% with the acquisition of BGI; since that time, the asset manager's aggregate ownership increased by about 1.66 percentage points, from 5.32% in 2009 to 6.98% in 2022. SSGA's aggregate ownership has remained flat for close to a decade.

Columns (4)-(10) provide ownership for the next seven largest institutional investment managers which, by 2022, own 11.73% of the market in the aggregate. The next largest investment manager, Capital Group, exhibits declining aggregate ownership after hitting a high point in 2008. By contrast, certain smaller investment managers have grown—for example, Geode, JP Morgan, and T. Rowe have seen an increase in ownership over the two-decade sample period. In total, these ten institutions hold 30.83% of the market.

Thomson Reuters s34 database and the variable *mgrno* (while we identify institutions by CIK). Lewellen and Lewellen use WRDS SEC 13F filings data for the post-2013 period and use data from the Thomson Reuters s34 database for the pre-2013 time period.

[83] We value weight company stakes to measure an institution's ownership, rather than equal weight. The advantage of value weighting is that it gives a larger weight to larger companies, in which most fund dollars are invested. By contrast, an equal weight methodology places the same weight on a 5% stake in a million-dollar company and a 5% stake in a trillion-dollar company.

[84] The Big Three ownership figures in Panel A are similar to those reported recently by Lewellen & Lewellen, *supra* note 82. They report a 6.4% value weight ownership for Vanguard, 6.1% for BlackRock, and 3.9% for SSGA for their 2015–2017 sample period (Table 8). The corresponding ownership figures for the Big Three in 2016 in Panel A of Table 3 are 6.33%, 5.90%, and 3.85%. Our ownership results are also similar to those reported by Bebchuk & Hirst, *supra* note 5. They report a 6.6% equal weight ownership of the Russell 3000 for Vanguard, 7.3% for BlackRock, and 2.6% for SSGA for their 2017 sample period (shown in Figure 1).

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Given that investors allocate more capital to investment products that hold large companies,[85] and in light of the importance of those large companies to the broader economy, we also gather information on investment manager annual aggregate ownership of S&P 500 companies and present the evidence in Panel A of Table 4. As expected, the Big Three's ownership of those companies is slightly higher than that of the broader market—as of 2022, Vanguard's ownership was 8.84%, BlackRock's was 7.31%, and SSGA was 4.38%. The next seven largest asset managers also exhibited slightly higher ownership of the S&P 500 than of the broader market, and all but three of the asset managers (Capital Group, Fidelity, and T. Rowe) exhibit their highest level of ownership in 2022. Interestingly, in 2022, Fidelity's aggregate ownership of the S&P 500 was smaller than Capital Group, showing that terms such as the Big Three or Big Four may hamper scholars from recognizing the dynamism of the investment management market.[86] The next Section discusses our evidence on inflows and outflows into these top ten asset managers.

iii. Institutional and Market Flows

We compute institutional investment manager flows as in Equation (2).[87] Since an institution's quarterly flows depend on its fees, distribution of capital gains and dividends, and reinvestment rates, we utilize an institution's reported fees and capital gains from semi-annual and annual reports for registered investment companies filed with the SEC on Form N-SAR (described in Section III.B.i and Table 1). Reinvestment rates are set to 90% as discussed in Section III.B.i.

The first three columns of Table 3 panel B provide the time-series of scaled flows for Vanguard, BlackRock, and SSGA. Investment manager scaled flows are computed by summing the within year quarterly flows and scaling by end-of-year assets under management. Consistent with Vanguard's remarkable growth in ownership documented earlier, we observe positive scaled inflows over the sample period, although in more recent years, scaled flows show a steady decline towards zero. BlackRock's scaled flows, provided in the second column, are highly volatile in the time period preceding the acquisition of Barclays Global Investors (BGI) in December 2009,[88] when the investment manager's ownership was quite low (only .93% in 2008). The years following the BGI acquisition show lower scaled flows than those experienced by Vanguard, with outflows in four of the

[85] *See* Lund & Robertson, *supra* note 14, at 18.
[86] *Id.*; Fisch et al., *supra* note 5, at 23.
[87] *See supra* Section II.B.ii.
[88] By all accounts, this was a transformative acquisition for the investment manager and gave it a strong foothold in the passive investing marketplace. *See* Williamson, *supra* note 68.

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thirteen years since the acquisition. The third column provides scaled flows for SSGA. Consistent with the flat ownership trend described in Panel A, we find that scaled flows are negative in about a half of the sample period.

Figure 1 shows the evolution of ownership and scaled flows for each of the Big Three, providing additional visual support for these observations. An institution's ownership, given in blue and corresponding to the Y-axis on the right, is measured at the end of a quarter as aggregate assets under management scaled by the aggregate market value. Scaled flows, given in red, correspond to the Y-axis on the left, is measured as in Equation (2). Quarterly scaled flows are given as red dots and we fit a cubic spline, which is given as the red line. In the middle panel, we provide in shaded areas the quarters corresponding to BlackRock's acquisition of BGI in December 2009, Merrill Lynch in September 2006, and SSGA research in March 2005. In Panel B, we further exclude the scaled flow in the fourth quarter of 2009 as it reflects the large inflow due to the acquisition of BGI. This figure shows that each of the Big Three features steady or declining scaled flows over the sample period. Additionally, although ownership is trending upward for BlackRock and Vanguard, State Street's ownership has been essentially flat for nearly a decade.

[Insert Figure 1 here]

The remaining columns in Table 3 provide annual scaled flows for the rest of the largest institutional investment managers. Fidelity and Capital Group, the largest active fund managers, experience large outflows, consistent with the well-documented reallocation of capital from active to passive funds.[89] Finally, market flows in a given year—or whether the market expands or contracts due to net distributions or net equity issuances, as given in Equation (5) in Section II.B.ii—are given in the rightmost column of Panel B. Consistent with the observation that corporate buybacks have exceeded equity issuances in recent years, we observe negative market flows in all but five years, from 2005 on.[90]

Figure 2 graphically depicts the evolution of market flows from 2000-2022. Because market flows capture corporate balance sheet events, we construct a "bottom up" flow measure by first constructing

[89] *See* INV. CO. INST., *supra* note 79.

[90] The scaled flows reported in panel B include a few outliers reflecting several acquisitions and initiation of filings during our sample period. For BlackRock, these outliers are due to the acquisition of BGI in December 2009, Merrill Lynch in September 2006, and SSGA research in March 2005. Capital Group's large inflow in 2007 reflects the initiation of filings by Capital Research Global Investors and Capital World Investors. JP Morgan's large inflow in 2000 reflects the acquisition of JP Morgan by Chase Manhattan.

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market-level quarterly inflows by adding the quarterly dollar volume of initial and seasoned public offerings.[91] We form a measure of market-level dollar outflows by adding the dollar value of quarterly repurchases, going private transactions, and cash acquisitions. The bottom-up market flows measure is the difference between market inflows and outflows scaled by the beginning of quarter stock market value (given in blue). The red line shows our computation of market flows as in Equation (5), and maps closely to the bottom-up method. Overall, this figure reinforces the point that market flows reflect aggregate net corporate activity.

[Insert Figure 2 here]

As before, we repeat our flows analysis for the subsample of S&P 500 firms in Table 4, and the evidence that emerges is similar: scaled flows are small and positive but flat for Vanguard and BlackRock, and mostly negative for SSGA, Fidelity, and Capital Group. The smaller investment managers within the top ten generally exhibit greater volatility than the larger asset managers—consider, for example, how Morgan Stanley's scaled flows go from 6.06% in 2021 to 47.48% in 2022. This volatility may be because of the different investment products (and therefore clients) that larger and smaller asset managers specialize in. The largest investment managers have a substantial fraction of their assets under management invested in passive funds that tend to come from locked-in investors saving for retirement. Smaller investment managers, by contrast, focus on active management, which can lead to greater performance changes from year to year and therefore higher volatility in flows. As before, market flows are mostly negative from 2005 to 2022—a point that we return to in the next Section.

C. Discussion

This Section discusses the lessons that can be gleaned from our framework and evidence. It begins by reinforcing that market flows affect institutional ownership with additional evidence about the relationship between the Big Three's growth and market flows. It concludes with observations about the past and future growth in ownership of the Big Three, highlighting once again that any predictions should consider the impact of the factors we identify.

[91] Information on the construction of each component of the bottom-up market flow measure is given in Section III.A.iii.

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i. Interaction Between Institutional Growth in Ownership and Market Flows

This Section discusses in greater detail our insight that market flows—whether the market contracts due to net corporate distributions (*e.g.*, stock buybacks) or expands due to net corporate equity issuances (*e.g.*, IPOs and SEOs)—matter for institutional growth.

Recall the hypothetical example involving passive Fund P and active Fund A and assume that the two funds hold the market portfolio. Suppose that in a given year there are net corporate distributions due to a high level of stock buybacks (captured by $f_{mt} < 0$ in the flows notation in Section II.A.ii). Fund P does not participate in the buybacks and continues to hold the same dollar stake in all companies, while Fund A participates and then distributes the cash to its investors who consume the distribution. In this example, the net aggregate distribution serves to increase the ownership of the Fund P, which will be left investing the same amount of investor dollars in a smaller market portfolio. Likewise, Fund A's ownership of the market will shrink.

Equation (7) in Section II.B.ii describes these effects more formally. In particular, it revealed that net corporate distributions will lead to an increase in an institution's ownership unless these market flows are met with offsetting fund-level outflows. Likewise, corporate equity issuances will shrink an institution's ownership unless the institution receives offsetting inflows from investors. This Section shows how this relationship has affected the evolution of Big Three's ownership through our sample period.

Figure 3 displays the evolution of Big Three ownership and the difference between institutional and market flows. Specifically, we plot the difference between each institution's flows and market flows for SSGA, BlackRock, and Vanguard over the period 2000-2022.[92] An institution's ownership, given in blue and corresponding to the Y-axis on the right, is measured at the end of a quarter as aggregate assets under management scaled by the aggregate market value. The difference between each institution's quarterly scaled flows and market flows, given in red bars, corresponds to the Y-axis on the left.[93]

[Insert Figure 3 here]

[92] In the terminology of Section II.B, we present the difference, $f_{it} - f_{mt}$, rather than the institutional flow, f_{it}.
[93] In the middle panel, we exclude the flow information for quarters prior to BlackRock's acquisition of BGI in December 2009. The volatility of BlackRock's scaled flows in that period is extremely high as can be seen in Figure 1 making it hard to discern the variation in the difference between BlackRock's scaled flows and market flows in the post-acquisition period.

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Figure 3 shows that when the difference between an institution's flows and market flows is positive, the institution's ownership tends to increase (holding all else constant). This means that an institution's ownership may grow even with negative flows in a given year, so long as the institution's flows are less negative than market flows. When the difference between an institution's flows and market flows was negative, as was the case for the Big Three (and most evident for Vanguard) in 2020, ownership declines or remains flat.

To summarize, this figure highlights how market flows, and namely net corporate distributions, affect investment manager ownership. As Figure 3 reveals, for an institution to grow, the flows that it receives must exceed market flows.[94] Recall again that market flows have been mostly negative over the past decade.[95] Our analysis therefore points to a previously unrecognized link between corporate balance sheet events, such as stock buybacks, and the rise in ownership of investment managers that specialize in passive funds. We return to the implications of this insight in the next Part.

Of course, our framework also discusses how other fund and corporate actions—fund fees and the reinvestment of dividends and capital gains—affect institutional ownership. Section II presented summary statistics that indicate that over the past two decades institutional investment managers have distributed dividends and capital gains to investors, most of which were reinvested back. As discussed, the high reinvestment rate likely increases the ownership of institutional owners relative to retail investors (to the extent that the latter group consumes the distributions they receive) and ultimately benefits certain institutions (for example, those with a smaller fraction of their assets under management in ETFs, which do not reinvest distributions as a default) more than others.

In unpacking the extent to which these factors have contributed to the dominance and continued growth of institutions in U.S. capital markets, questions remain, including whether corporate decisions to raise or distribute equity capital covary with institutional-level flows. More specifically, in order to ascertain the impact of these variables on ownership, one needs to know if there are differences across institutions in the extent to which they receive investor capital at the same time that corporations seek such capital for growth. Similarly, one needs to determine whether there are differences across

[94] More specifically, as long as an institution participates less than proportionally in the aggregate distribution each year or receives inflows such that it participates more than proportionally in equity issuances, it will see its ownership grow, holding all other variables constant.

[95] Fried & Wang, *supra* note 19, at 210.

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institutions in the extent of outflows at the same time that corporations decide to distribute capital back to their shareholders.

One potential mechanism that would generate such heterogeneity is differential sensitivity to flows due to the management of defined contribution retirement plan assets. Clemens Sialm, Laura Starks, and Hanjiang Zhang examine the sensitivity to economic conditions of flows into equity and fixed income funds by investors in defined and non-defined contribution plans.[96] They document an economically significant relation between macroeconomic conditions and the investment behavior of investors in defined contribution plans relative to that of investors in non-defined contribution plans. Because institutional investors have different exposures to assets managed in defined contribution plans, changes in macroeconomic conditions may lead to differential flows to institutions, while also affecting demand for equity capital by corporations. This mechanism would thus generate a link between flows to institutions, market flows, and changes in ownership.

Given the importance of these questions—why certain institutions have grown larger than others and why institutions have grown to dominate the equity market over the past several decades—we hope that our framework will inspire future research to model these dynamics more precisely.

ii. Big Three Growth and Market Structure

Our results also speak to the debate about the Big Three and their future growth. For example, in *The Specter of the Giant Three*, Lucian Bebchuk and Scott Hirst charted the rise of the Big Three investment managers and predicted that their rapid growth will continue.[97] In so doing, the authors collected asset flows into the Big Three's mutual funds and ETFs from 2009 to 2018, relying on data from Morningstar Direct.[98] The picture that emerges from their analysis is of positive and growing dollar inflows, with only one investment manager seeing outflows in one single year (BlackRock in 2010).[99] The authors also extrapolate, based on their observation that ownership of non-Big Three holders has declined by .84% per year, that "the combined average ownership stake of the Big Three will rise to 27.6% in ten years, and to 33.4% of S&P 500 equity in twenty years."[100] Likewise, in *The*

[96] Clemens Sialm, Laura Starks, & Hanjiang Zhang, *Defined Contribution Pension Plans: Mutual Fund Asset Allocation Changes*, 105 AM. ECON. REV. 432, 439 (2015) (showing that changes in macroeconomic conditions differently affect flows into funds and therefore institutions).
[97] Bebchuk & Hirst, *Specter of the Giant Three*, *supra* note 2, at 725.
[98] *Id.*
[99] *Id.* at 726. Their second study, *Big Three Power and Why it Matters*, responds to criticism of their methodology from BlackRock executives and updates these numbers through 2021. Bebchuk & Hirst, *Big Three Power*, *supra* note 2.
[100] Bebchuk & Hirst, *Specter of the Giant Three*, *supra* note 2, at 737.

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Problem of Twelve, John Coates noted that the Big Four (a term that includes Fidelity) now "own more than 60 percent of the large…blocks of stock in the S&P 500" and predicted that even if this growth rate slows, a handful of institutions will soon control the public market.[101]

Altogether, our data and analytical framework provide a more nuanced picture of Big Three future growth. Rather than projecting the average growth in ownership of non-Big Three institutions over time (or projecting the growth of the Big Three based on historic growth rates), we consider the underlying factors that drive growth for any one institution in the first place. Going forward, if one wants to project institutional growth one needs to take a stand on how each of the factors we presented will likely evolve. Is it plausible, for example, that Vanguard's flows will be consistently higher than market flows? After all, as Vanguard's ownership grows closer to the entire market, its flows will be more and more correlated with market flows.

Moreover, while investment managers can grow via acquisitions, as BlackRock did with the acquisition of BGI, our framework considers acquisitions as a separate source of growth from fees, reinvestment of distributions, and inflows. Estimating the average growth in ownership of non-Big Three institutions and projecting that forward implicitly assumes that more such acquisitions will be undertaken by the Big Three in the future. While possible, this assumption should be explicitly recognized; as such, we distinguish this source of growth from the other factors we elaborated upon above.

Overall, our evidence on institutional ownership and market level flows suggests that the Big Three's recent growth has been less remarkable than many commentators have observed, with substantial differences between each institution. In particular, BlackRock's scaled annual flows are only slightly positive following its acquisition of BGI in 2009, with most of its recent growth attributable to that acquisition. Likewise, Vanguard's scaled flows remain positive, although we find a steady decline approaching zero in recent years. State Street exhibits scaled flows that are slightly negative over the past decade (and flat ownership for over a decade). Fidelity—which is excluded from the Big Three, despite its large size and share of inflows into passive funds—likewise exhibits more outflows than inflows over the sample period.

Our analysis of ownership and flows also considered smaller investment managers, and the results were somewhat surprising. In particular, as State Street's ownership has flattened, smaller investment

[101] *See* Coates, *The Future of Corporate Governance*, *supra* note 2, at 13; *see also* Coates, PROBLEM OF TWELVE, *supra* note 2, at 27.

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managers like Geode, JP Morgan, and Morgan Stanley have exhibited increasing ownership over the past few years. This suggests that the Big Three are not the only game in town. Yes, some of the Big Three are growing, but certain smaller rivals are too**.** Panel C of Table 2 further supports this observation by showing that the average number of institutional shareholders per firm has risen steadily since the beginning of our sample period, going from 83 to 219. Although the Big Three are growing, the picture that emerges is one of a robust market that can support smaller asset manager entrants alongside giants.

We further investigate the historic growth of the Big Three and rival institutions and retail investors in Figure 4. Big Three ownership is captured in red, ownership by the rest of the 13F-filer institutions is in blue, and retail ownership is in gray. Institutional ownership is measured as the aggregate AUM of all non-Big Three investment managers scaled by the aggregate market value at the end of a quarter. Retail investors are defined as shareholders holding the residual (non-13F) firm shares. We place the Big Three ownership at the bottom and that of the remaining 13F filers at the top of the figure to make it easier to observe different trends over time.

[Insert Figure 4 here]

The figure makes it clear that over the first half of the sample, the Big Three and the rest of the institutional investment managers both saw their ownership grow at the expense of retail investors. However, in the second half of the sample, beginning roughly in 2009 after the acquisition of BGI by BlackRock, we see continued growth in ownership for the Big Three while the ownership by the rest of the 13F filers declines by about 5 percentage points. Hence, only in this more recent time period, the growth of the Big Three ownership comes at the expense of both retail shareholders and other institutions.

In sum, our results reveal that over the past few years, certain small institutions have managed to grow, while others have ceded ownership to the Big Three and other large asset managers. Once again, this conclusion is not surprising in light of our data showing net buybacks, falling mutual fund fees, and the reinvestment of corporate distributions, all of which entrench the ownership of the largest asset managers. Moreover, M&A appears to be a potent avenue for growth for small asset managers. We further reflect on these dynamics in the next Part.

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IV. Implications for Law

The previous Parts described our analytical framework as well as our extensive data collection effort that provided the most complete depiction of the institutional investment management industry and its historic growth to date. We now address the legal implications of our analysis.

As discussed, the topic of growing institutional investor ownership has captivated scholars and policymakers, many of whom suggest that the emergence of giant investment managers will lead to serious economic and democratic harm. This prospect has already inspired proposals from scholars and regulators that would reshuffle the investment management industry in order to avert such harm.

One set of concerns (and corresponding advocacy) involves antitrust law. In an important paper, Jose Azar, Martin Schmalz, and Isabel Tecu argued that institutional ownership of industry rivals in concentrated industries led to higher consumer prices—in the example of the airline industry, the authors suggested that the presence of horizontal ownership made ticket prices three to ten percent higher than they would have been otherwise.[102] Their research generated a large literature evaluating and contesting their results.[103] And despite a lack of consensus that common ownership is harming consumers, scholars have offered a series of radical proposals to respond to potential harm. In particular, legal scholars have proposed to break up large investment managers or limit the size of their holdings in certain industries;[104] others argued that the DOJ should do more to investigate and pursue violations under existing antitrust law, and specifically, Section 7 of the Clayton Act.[105] The DOJ and FTC have since opened investigations.[106]

The argument that horizontal shareholding harms consumers is based on the idea that if an investment manager owns a large stake in two competing firms, the shareholder may prefer collusion that would lead to higher consumer and share prices. As many have pointed out, however, it is not

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[102] Azar, Schmalz & Tecu, *supra* note 4, at 8.

[103] *See* Martin C. Schmalz, *Recent Studies on Common Ownership, Firm Behavior, and Market Outcomes*, 66 ANTITRUST BULL. 12, 14 (2021); José Azar & Xavier Vives, *Revisiting the Anticompetitive Effects of Common Ownership* (Eur. Corp. Governance Inst. – Fin. Working Paper No. 827/2022). For critical studies, *see*, *e.g.*, Pauline Kennedy, Daniel P. O'Brien, Minjae Song & Keith Waehrer, *The Competitive Effects of Common Ownership: Economic Foundations and Empirical Evidence* (Working Paper, 2017), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3008331; Patrick J. Dennis, Kristopher Geradi & Carola Schenone, *Common Ownership Does Not Have Anti-Competitive Effects in the Airline Industry*, 77 J. FIN. 2765 (2022); Rock & Rubinfeld, *supra* note 4, at 5; Katharina Lewellen & Michelle B. Lowry, *Does Common Ownership Really Increase Firm Coordination?* 141 J. FIN. ECON. 322, 323 (2021).

[104] Eric A. Posner, Fiona M. Scott Morton & E. Glen Weyl, *A Proposal to Limit the Anti-Competitive Power of Institutional Investors* 81 ANTITRUST L. J. 669, 675 (2017).

[105] *See* Einer Elhauge, *How Horizontal Shareholding Harms Our Economy—And Why Antitrust Law Can Fix It*, 10 HARV. BUS. L. REV. 207, 212 (2020); Elhauge, *supra* note 4, at 1273.

[106] *See* note 103 *supra.*

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obvious how a large shareholder, holding even 5% of the company's stock, would facilitate this collusion.[107] The potential for consumer harm increases, however, if institutional growth continues such that the biggest shareholders own larger and larger stakes in competing firms.[108] In other words, understanding the future path of institutional investment manager growth (and the factors that contribute to it) will help scholars and policymakers evaluate the merits of these policy proposals designed to avert consumer harm.

The growth in ownership of large institutional investment managers may also be problematic from a corporate governance perspective. Several scholars (including one of us) have viewed the rise of the Big Three with alarm,[109] arguing that because these investment managers primarily invest assets in passive funds, their portfolio managers will lack both the firm-specific information necessary for informed voting as well as much of an incentive to generate it.[110] The empirical evidence, however, on the efficacy of the Big Three's stewardship is mixed, and impact of large investment managers on corporate governance remains subject to debate.[111] Nonetheless, some scholars have proposed drastic action, including regulatory action to limit the extent of the Big Three's holdings[112] or mandate that they invest greater dollars in stewardship.[113] These concerns have formed the basis of the INDEX Act, a bill pending in the Senate that would require investment advisors of passively managed funds to follow voting instructions from beneficial investors.[114] As sponsoring Senator Toomey explained, "The INDEX Act returns voting power to the real shareholders — retail investors who put their own money at risk. Further democratizing investing and diminishing the consolidation of corporate voting power are concepts members of both parties should get behind."[115]

Facing increasing political blowback, the Big Three have each voluntarily taken steps to pass through votes to a portion of their beneficial owners, allowing them to generate their own customized

[107] Several papers consider the viability of mechanisms that would facilitate such collusion. Rock & Rubinfeld, *supra* note 4, at 5; C. Scott Hemphill & Marcel Kahan, *The Strategies of Anticompetitive Common Ownership*, 129 YALE L.J. 1392 , 1395(2020).
[108] This is because not all shareholders vote. Already, Bebchuk and Hirst project that the Big Three control 31% of the votes. Coates, *Specter of the Giant Three*, *supra* note 2, at 725.
[109] Lund, *supra* note 5, at 498; Bebchuk & Hirst, *supra* note 5, at 12.
[110] *Id.*; *but see* Rock & Kahan, *supra* note 5; Brav, Malenko & Malenko, *supra* note 5.
[111] Brav, Malenko & Malenko, *supra* note 5.
[112] Griffin*, supra* note 41, at 957.
[113] Bebchuk & Hirst, *supra* note 5, at 12; Coates, PROBLEM OF TWELVE, *supra* note 2, at 22.
[114] INDEX Act, S. 4241, 117th Cong. (2022).
[115] Press Release, Dan Sullivan, U.S. Sen. For Alaska, *supra* note 44.

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voting instructions.[116] They have also stepped up their own political lobbying efforts.[117] However, if the Big Three continue to grow to a point where they control over a third of the U.S. equity market, as some scholars predict is on the horizon, these voluntary steps will be unlikely to assuage concern and respond to political pushback.[118] If, however, the Big Three's share of the market remains stable, with a strong and growing competitive fringe chipping away at their dominance, the conclusion changes somewhat. In that picture, the costs of taking drastic measures to diffuse their voting power (such as limiting their holdings[119] or mandating pass-through voting[120]) or increase their stewardship expenditures[121] are less likely to be warranted.

Therefore, proposals to reshuffle the investment management industry depend on the continued growth in equity ownership of the Big Three. Our data collection and analysis suggest that such proposals may be premature. In particular, BlackRock's historic growth is mostly attributable to one acquisition, and State Street's growth is essentially flat over time. Vanguard's ownership continues to trend upward, but its scaled flows have declined more recently towards zero. The number of investment manager rivals has increased over time, and some of those rivals also feature growth in ownership. In sum, although the Big Three without question play a major role in the governance of U.S. firms due to their size and corresponding voting power, a more complete picture of their ownership and growth casts doubt on some radical proposals to transform the investment management industry.

As this discussion reveals, our analysis implicates merger policy for another reason: as Table 2 shows, BlackRock's largest increase in ownership occurred after it acquired BGI in 2009 (before that time, it had acquired Merrill Lynch Investment Managers in 2006[122] and State Street Research in

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116 *Empowering Investors Through Voting Choice*, BLACKROCK (Nov. 2022), https://www.blackrock.com/corporate/literature/publication/voting-choice-factsheet.pdf; *Empowering Everyday Investors Through Proxy Voting Choice*, VANGUARD (Feb. 1, 2023), https://investor.vanguard.com/investor-resources-education/article/empowering-everyday-investors-through-proxy-voting-choice; *Extending Proxy Voting Choice to more Investors*, STATE ST., https://www.ssga.com/us/en/intermediary/etfs/about-us/what-we-do/asset-stewardship/proxy-voting-choice (last visited Aug. 18, 2023).

117 Coates, PROBLEM OF TWELVE, *supra* note 2, at 24.

118 *See id.*

119 Posner et al. *supra* note 104, at 675 (proposing antitrust enforcement unless institutional investors "limit their holdings of an industry to a small stake (no more than 1% of the total size of the industry) or hold the shares of only a single 'effective firm' per industry").

120 INDEX Act, *supra* note 120.

121 Bebchuk & Hirst, *supra* note 5, at 11.

122 *BlackRock Will Acquire Merrill Lynch Investment Managers From Parent*, PENSIONS & INVESTMENTS (Feb 16, 2006), https://www.pionline.com/article/20060215/ONLINE/602150701/blackrock-will-acquire-merrill-lynch-investment-managers-from-parent.

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2005[123]). Since 2009, BlackRock's growth in ownership has slowed. Going forward, if scholars remain concerned about the democratic, antitrust, and corporate governance harms created by large investment managers, M&A would be a potent avenue to focus on. For example, two years ago, State Street had planned to purchase Invesco's ETF business, which would have combined the third and fourth largest ETF providers in the U.S. and created a giant (in terms of equity AUM) to rival BlackRock and Vanguard.[124] The deal was scrapped for undisclosed reasons, but M&A has continued to increase across the investment management industry, creating the possibility of greater consolidation and bigness.[125] Although regulators evaluating such mergers generally focus on the prospect of harm to consumers of products offered by the merged entities (in this example, the investors in the asset manager's funds),[126] consolidation across the investment management industry could be problematic for consumers of products sold by portfolio companies, as the common ownership literature cautions. In theory, the DOJ and FTC could investigate these harms when deciding whether to allow a future merger between asset managers to proceed, under the breadth of their mandate under Section 7 of the Clayton Act.[127] In particular, mergers that substantially increase concentration and ownership of U.S. equity may deserve additional scrutiny under a common ownership theory.[128]

As this example reveals, our analysis points to previously unrecognized connections between important policy debates, such those implicating merger policy or stock buybacks, and the growth of giant investment managers. As for the latter debate, scholars and policymakers alike have focused on

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123 Eric Hazard, *BlackRock Acquiring State Street Research From Metlife*, PLAN SPONSOR (Aug. 26, 2004), https://www.plansponsor.com/blackrock-acquiring-state-street-research-from-metlife/.

124 Will Schmitt, Nicole Piper, John Coumarianos & Alex Steger, *Power, Price, and Products: What an Invesco-State Street Merger Might Mean*, CITYWIRE (Sept. 17, 2017), https://citywire.com/pro-buyer/news/power-price-and-products-what-an-invesco-state-street-merger-might-mean/a1556271.

125 Chris Flood, Michael Mackenzie & James Fontanella-Khan, *Does State Street Need a Deal to Save its ETF Business?*, FIN. TIMES (Oct. 4, 2021), https://www.ft.com/content/2429963d-34af-4cbd-9bd1-ea9cf22d5ae2; Mackenzie & Fontanella-Khan, *M&A in 2021: Asset Management Primed for Consolidation*, *supra* note 20; *see also supra* note 20.

126 *See* DEP'T OF JUST. & FED. TRADE COMM'N, *supra* note 22.

127 15 U.S.C. § 18 (prohibiting mergers and acquisitions where "in any line of commerce or in any activity affecting commerce in any section of the country, the ef fect of such acquisition may be substantially to lessen competition, or to tend to create a monopoly"); Fiona Scott Morton & Herbert Hovenkamp, *Horizontal Shareholding and Antitrust Policy*, 127 YALE L. J. 2026, 2033 (2017) (explaining that the "Clayton Act does not insist on proof of the precise mechanism by which prices are increased. It requires only a showing that the 'effect may be substantially to lessen competition.'").

128 Of course, investment manager mergers might also harm or benefit investors who choose financial products offered by the merged entities, and such considerations would need to be balanced as well. See generally, Narayanan Jayaraman, Ajay Khorana, Edward Nelling, *An Analysis of the Determinants and Shareholder Wealth Effects of Mutual Fund Mergers,* 57 J. Fin. 1521, 1525 (2002).

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the fact that corporations have recently, on net, distributed cash in the aggregate.[129] Critics of buybacks argue that they are the product of pressure from investors with short investment horizons who seek a quick return and pirate corporate assets that would have otherwise been used for long-term investments such as R&D and employee skills development.[130] Although scholars dispute this picture of buybacks,[131] it has generated regulatory action—for example, in 2022, a group of democratic senators urged the Secretary of the Treasury to ensure that companies receiving government funds from the CHIPS Act be prohibited from buying back shares.[132] It has also fueled policymaking, including a new punitive tax on buybacks[133] and proposed additional SEC disclosure requirements for companies that buy back stock.[134]

Although the evidence linking buybacks and corporate short-termism is hotly contested, the link between aggregate net distributions and the growth of institutions is more evident. Specifically, an increase in aggregate buyback activity should boost the ownership of institutions that specialize in passive funds relative to those that specialize in active, so long as those funds do not experience contemporaneous outflows. Put simply, the decision to repurchase stock (rather than declare a dividend) can be expected to change the composition of the company's shareholder base; likewise, proposals to clamp down on buybacks may have the unintended effect of affecting the growth of the largest investment managers.

More broadly, the framework that we develop provides a more complete picture as to why institutional investment managers have displaced retail shareholders in owning a majority of the equity market—without question, one of the most important conversations in law and finance over the past half century. Previous accounts of institutional investment manager growth have focused on

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[129] Fried & Wang, *supra* note 19, at 208, find that over the 2007–2016 sample period S&P 500 companies distributed $4.2 billion via buybacks while at the same time raised $3.3 billion via share issuances.

[130] William Lazonick, *Profits Without Prosperity*, HARV. BUS. REV., Sept. 2014, at 46, https://hbr.org/2014/09/profits-without-prosperity. Many scholars dispute this picture of buybacks.

[131] *See* Mark J. Roe, MISSING THE TARGET (2022); Fried & Wang, *supra* note 19, at 210; Mark Roe, *Looking for the Economy-Wide Effects of Stock Market Short-Termism,* 33 J. OF APPLIED CORP. FIN. (2023); Alon Brav, John R. Graham, Campbell R. Harvey, Roni Michaely, *Payout Policy in the 21st Century*, 77 J. OF FIN. ECON. 483, 487 (2005) (surveying executives and learning that many factors drive the decision to repurchase shares versus declaring a dividend).

[132] Press Release, Chris Van Hollen, U.S. Sen. For Md., Lawmakers to Commerce Dept: Prevent Stock Buybacks by Corporations that Receive CHIPS Act Funds (Oct. 5, 2022), https://www.vanhollen.senate.gov/news/press-releases/van-hollen-warren-lawmakers-to-commerce-dept-prevent-stock-buybacks-by-corporations-that-receive-chips-act-funds.

[133] 26 U.S.C. § 4591.; Jennifer Williams-Alvarez, *New U.S. Buyback Tax Hits Companies with $3.5 Billion Burden*, WALL ST. J. (Aug. 22, 2023), https://www.wsj.com/articles/new-u-s-buyback-tax-hits-companies-with-3-5-billion-burden-452c1f93?mod=itp_wsj&ru=yahoo.

[134] Press Release, U.S. Sec. Exch. Comm'n, SEC Adopts Amendments to Modernize Share Repurchase Disclosure (May 3, 2023), https://www.sec.gov/news/press-release/2023-85.

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retirement law and policy, as well as changed investor demand for mutual funds.[135] These factors have driven reallocational flows toward institutional owners, but they are not the whole story; as we show, corporate financing decisions and choices by mutual funds themselves have helped propel institutions toward the impressive feat of owning the vast majority of U.S. equity. More specifically as dividends and capital gains have been automatically reinvested and buybacks have accelerated, institutions experienced a boost in their ownership relative to the retail investors who were more likely to consume dividends and sell their shares in a buyback. Because the factors we enumerate will continue to shape institutional growth in ownership, scholars would do well to quantify the impact of these channels and study the interplay between them. We hope that our framework and evidence will provide the first step in this direction.

V. Conclusion

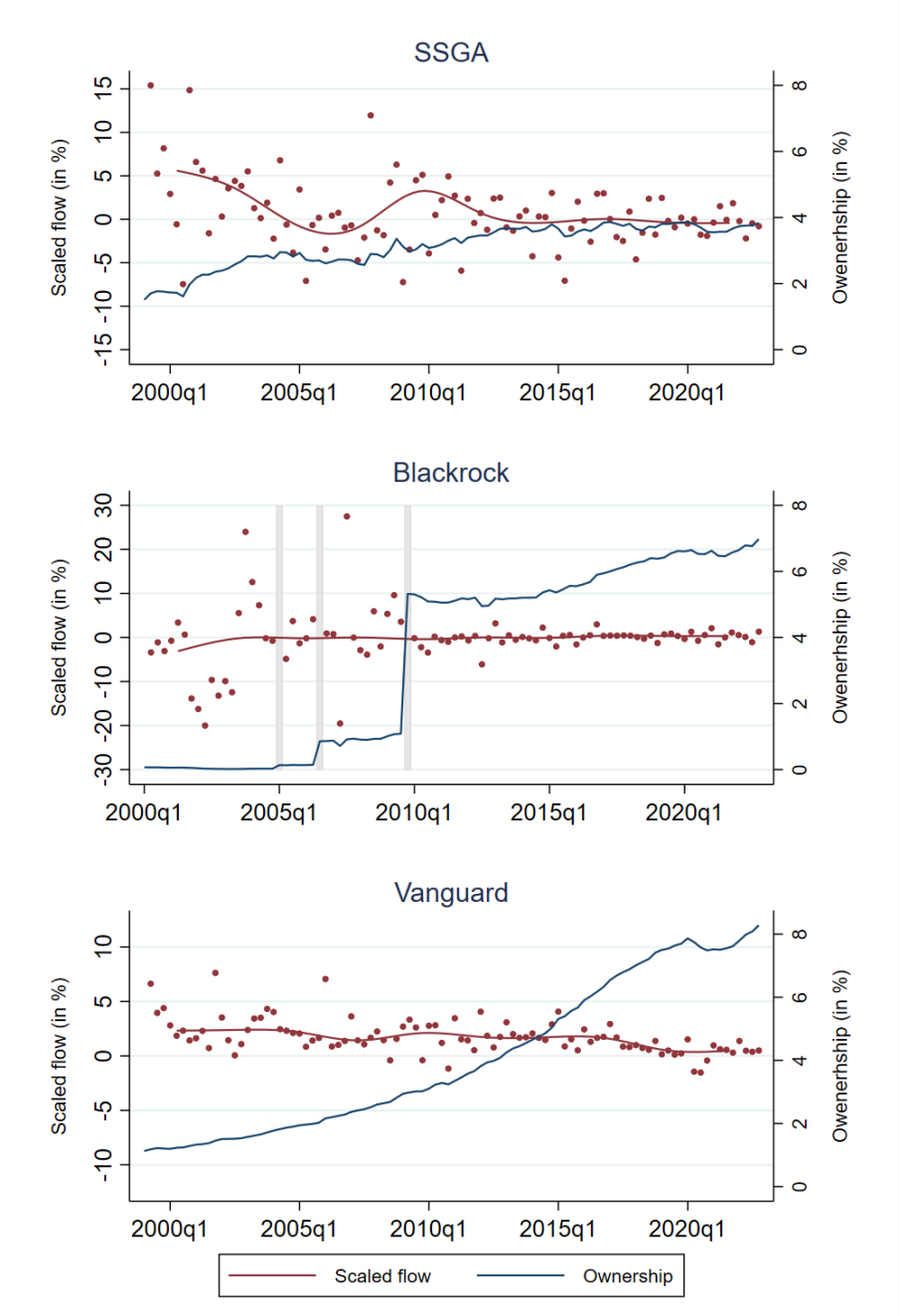
This Article presented an analysis of the relationship between equity flows, corporate financing decisions, and institutional ownership of U.S. public equity. Our framework and data collection leads to a more complete understanding of the sources of inflows allocated to investment managers and the dramatic growth in equity ownership of institutional shareholders over the past two decades. In particular, we show how firm payout policy, fund characteristics, and aggregate balance sheet actions impact institutional investment manager ownership over time. Our results shed light on several important policy questions in corporate law and finance, including the governance, democratic, and antitrust risks caused by rise of institutional shareholders (and the Big Three in particular) and the impact of stock buybacks on the economy.

[135] *See* note 5 *supra*.

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Figure 1: Big Three asset management firms' ownership and scaled flows

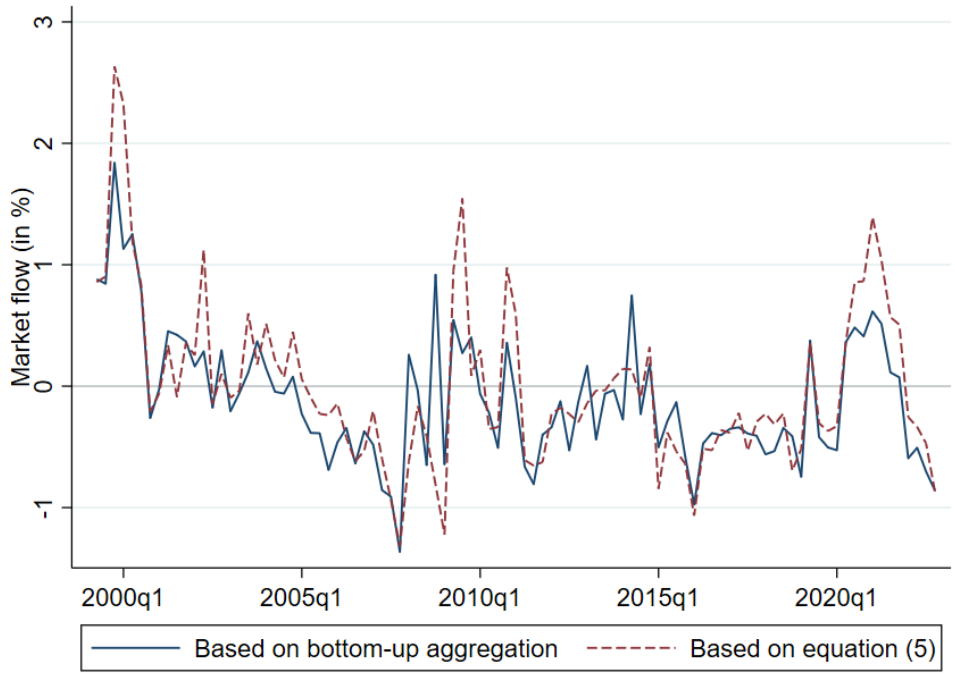
This figure displays the evolution of ownership and scaled flows for SSGA (top panel), BlackRock (middle panel), and Vanguard (bottom panel) over the period 2000-2022. An institution's ownership, given in blue and corresponding to the Y-axis on the right, is measured at the end of a quarter as aggregate AUM scaled by the aggregate market value. Scaled flow, given in red, corresponds to the Y-axis on the left, is measured as in equation (4). Estimates of fund family level κ_{it} are based on fund family level expense ratios, dividend and capital gain yields as described in Table 1. Reinvestment rates are set to 90%. Quarterly scaled flows are given as red dots and we fit a cubic spline given as the red line. In the middle panel we provide in shaded areas the quarters corresponding to BlackRock's acquisition of Barclays Global Investors (BGI) in December 2009, Merrill Lynch in September 2006, and SSGA research in March 2005. We further exclude in Panel B the scaled flow in the fourth quarter of 2009 as it reflects the large inflow due to the acquisition of BGI.



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Figure 2: Market flows

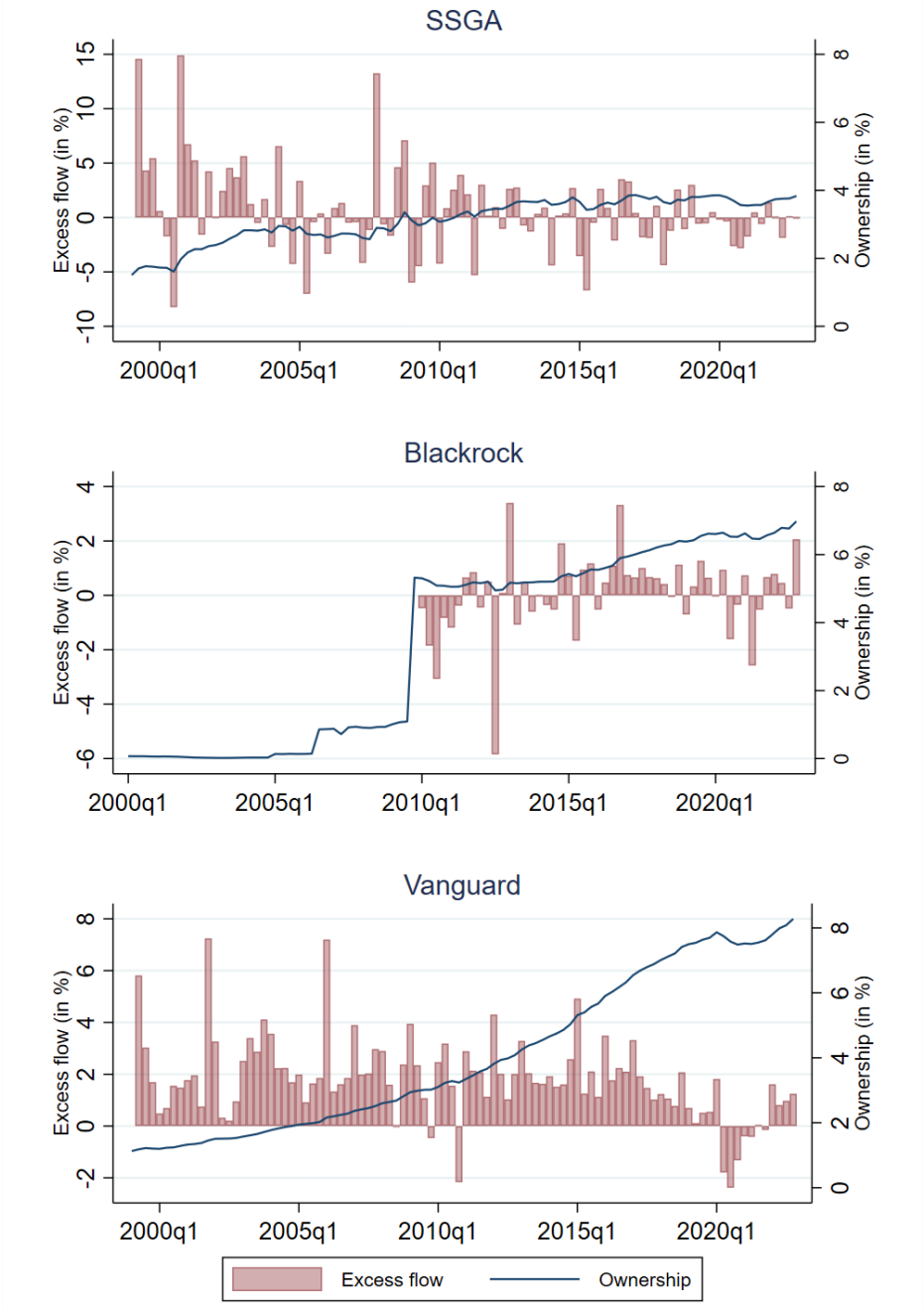
This figure displays the evolution of market flow over the period 2000-2022. We compute market flow, f_{mt}, as in Equation (5) in the text, $f_{mt} = \frac{F_{mt}}{M_{t-1}} = \frac{M_t - M_{t-1}(1+r_{mt})}{M_{t-1}}$, where r_{mt} is the market capital gains return, M_t and, M_{t+1} are the aggregate market values in time *t* and *t+1*, respectively. The resulting quarterly market flows are given in the figure in dashed red. Since market flow captures corporate balance sheet events, we construct a "bottom up" flow measure by first constructing a market-level quarterly inflow by adding the quarterly dollar volume of initial and seasoned public offerings. We form a measure of market level dollar outflow by adding the dollar value of quarterly repurchases, going private transactions, and cash acquisitions. The bottom-up market flow measure is the difference between market inflows and outflows all scaled by the beginning of quarter stock market value. It is given in blue. Information on the construction of each component of the bottom-up market flow measure is given in Section III.A.iii.



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Figure 3: Big Three ownership and the difference between market and scaled flows

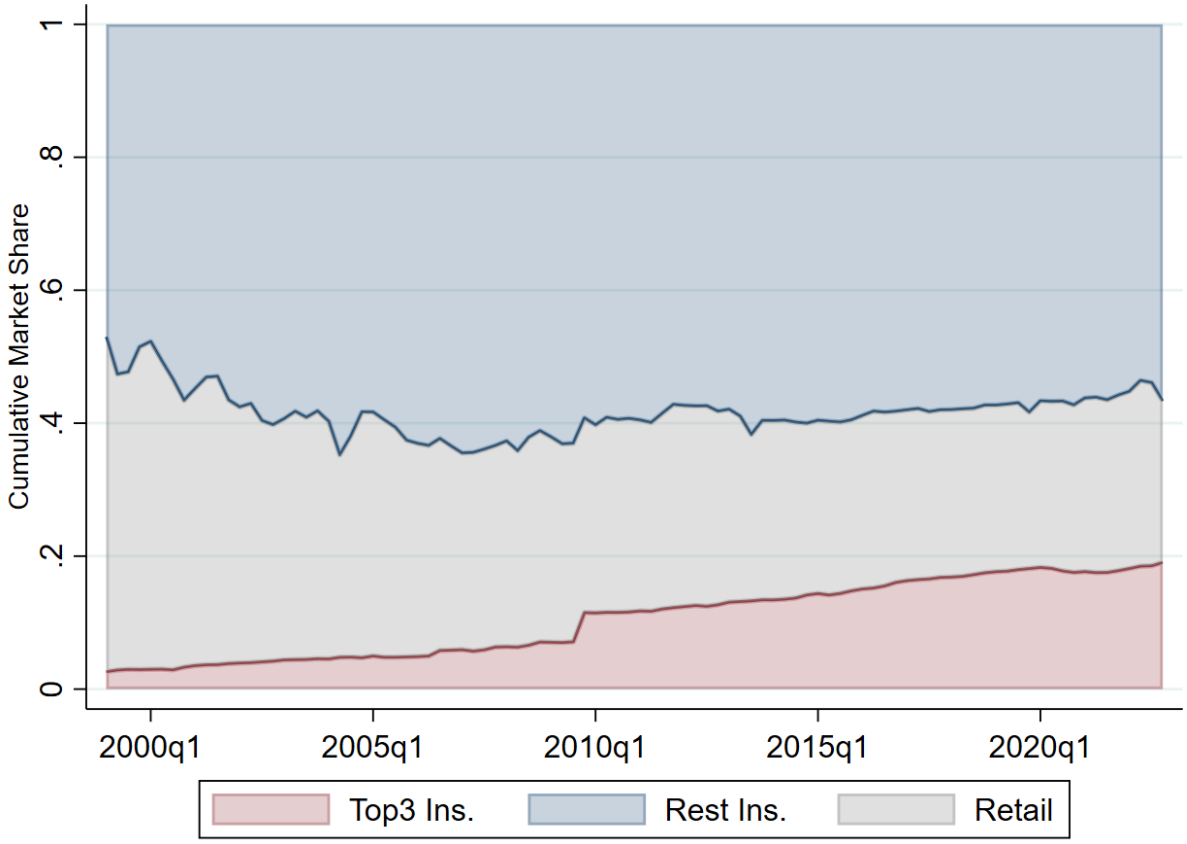
This figure displays the evolution of Big Three ownership and the difference between each institution's scaled flows and market flows for SSGA (top panel), BlackRock (middle panel), and Vanguard (bottom panel) over the period 2000-2022. An institution's ownership, given in blue, corresponding to the Y-axis on the right, is measured at the end of a quarter as aggregate AUM scaled by the aggregate market value. The difference between each institution's quarterly scaled flows and market flows, given in red bars, corresponds to the Y-axis on the left. Additional information on the computation of an institution's flows and market flows is given in Section III.A.i. In the middle panel we exclude the flow information for quarters prior to BlackRock's acquisition of Barclays Global Investors (BGI) in December 2009. The volatility of BlackRock's scaled flows in that period is extremely high as can be seen in Figure (1) making it hard to discern the variation in the difference between BlackRock's scaled flows and market flows in the post-acquisition period.



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Figure 4: Cumulative stock market ownership by the Big Three, all other institutional investors, and retail shareholders

This figure displays the evolution of cumulative stock market ownership by the Big Three (SSGA, BlackRock, and Vanguard), the rest of institutional investment managers filing on Form 13F, and retail investors. Big Three ownership is given in red, ownership by the rest of institutional investment managers filing on Form 13F is given in blue, and retail ownership is captured in gray. Institutional ownership is measured at the end of a quarter as aggregate AUM of all corresponding investment managers scaled by the aggregate market value. Retail investors are defined as shareholders holding the residual, non-13F, firm shares.



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Table 1: Fund family distributions and fees

This table provides information on fund family level expense ratios, dividend yields, distributed capital gain yields, and the reinvestment rate of these distributions. Fund are identified using *crsp fundno* and we retain mutual funds whose primary assets are US domestic equities by excluding foreign and non-equity funds using the CRSP mutual fund style table. Appendix Section A.2 provides additional detail on the criteria for inclusion. We gather information on funds' dividend and capital gains distributions as well as fund fees from CRSP. Information on reinvestment rates comes from Form N-SAR filings with the SEC. Data from N-SAR filings spans the time period 2000 - 2017 since Form N-SAR filings are no longer filed after 2018. CRSP data spans the time period 2000-2022. Additional information regarding the construction of the variables is given in Appendix A. Panel A provides information on fund families' expense ratios. Panel B provides information on fund families' dividend yields. Panel C provides summary statistics on realized capital gains distribution yields. Panel D provides information on reinvestment rates as share of total assets as reported in Form N-SAR and as a share of total distributions. The data is aggregated at the fund family level.

Panel A: Expense ratios

period	Avg	10th pct	25th pct	50th pct	75th pct	90th pct
2000-2004	1.2%	0.6%	0.9%	1.2%	1.5%	1.9%
2005-2009	1.2%	0.5%	0.9%	1.2%	1.4%	1.8%
2010-2014	1.1%	0.4%	0.8%	1.1%	1.3%	1.6%
2015-2019	1.0%	0.3%	0.7%	0.9%	1.2%	1.5%
2020-2022	0.9%	0.3%	0.6%	0.9%	1.1%	1.4%

Panel B: Dividend yields

period	Avg	10th pct	25th pct	50th pct	75th pct	90th pct
2000-2004	1.3%	0.3%	0.8%	1.3%	1.7%	2.0%
2005-2009	1.6%	0.4%	1.0%	1.6%	2.1%	2.5%
2010-2014	1.9%	0.6%	1.3%	2.0%	2.5%	3.0%
2015-2019	1.8%	0.4%	1.1%	1.9%	2.4%	2.8%
2020-2022	1.7%	0.2%	0.9%	1.7%	2.2%	2.8%

Panel C: Distributed capital gain yields

period	% No obs.	Avg	10th pct	25th pct	50th pct	75th pct	90th pct
2000-2004	41.5%	6.1%	0.6%	1.6%	3.9%	7.8%	14.2%
2005-2009	35.5%	5.5%	1.0%	2.4%	4.5%	7.0%	10.5%
2010-2014	36.7%	5.0%	0.6%	1.7%	3.7%	6.7%	10.4%
2015-2019	15.4%	6.6%	1.2%	3.0%	5.7%	8.5%	12.2%
2020-2022	16.5%	9.3%	1.1%	3.9%	7.7%	12.2%	18.7%

Panel D: Reinvestment of dividend and capital gains distributions

	% of funds with no	Reinvestment as % of total assets				Reinvestment as % of total distributions			
period	reinvestment	Avg	25th pct	50th pct	75th pct	Avg	25th pct	50th pct	75th pct
2000-2004	10.0%	4.4%	0.8%	2.9%	6.3%	83.5%	66.8%	93.1%	99.4%
2005-2009	16.3%	3.5%	0.5%	2.5%	5.1%	81.6%	68.6%	93.0%	99.8%
2010-2014	19.3%	1.6%	0.2%	1.1%	2.2%	78.1%	52.0%	91.7%	99.7%
2015-2017	19.2%	4.3%	0.6%	3.4%	6.4%	78.3%	60.1%	92.9%	99.3%

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Table 2: Summary of 13F Institutional data using scraped SEC filings

This table reports descriptive statistics on ownership by 13F institutions and the firms they hold. The statistics shown in the table are averages of cross-sectional statistics. Panels A and B provide the assets under management and number of firms held by an institution. Panels C and Panel D provide the number of institutional owners and fraction of shares outstanding held by institutional investors. The institutional holding data is constructed using raw filings from the SEC. Institutions are identified by CIK (Central Index Key) and firms are identified by CRSP PERMCO.

Panel A: Assets under management ($ millions), by institution

Period	Avg	Median	Stdev	25th pct	75th pct	N
2000-2004	5689	450	32544	179	1704	1,979
2005-2009	4816	346	29235	132	1373	2,696
2010-2014	4574	304	29612	116	1251	3,157
2015-2019	4911	251	46556	93	955	4,243
2020-2022	4858	187	60569	67	675	5,800

Panel B: Number of firms held, by institution

Period	Avg	Median	Stdev	25th pct	75th pct	N
2000-2004	249	91	502	47	200	1,979
2005-2009	221	75	473	34	174	2,696
2010-2014	203	68	433	28	162	3,157
2015-2019	192	65	410	23	157	4,243
2020-2022	180	62	402	22	147	5,800

Panel C: Number of institutional shareholders, by firm

Period	Avg	Median	Stdev	25th pct	75th pct	N
2000-2004	83	38	131	10	103	5,845
2005-2009	122	72	163	22	152	4,879
2010-2014	154	97	200	36	183	4,133
2015-2019	203	121	278	47	231	3,997
2020-2022	219	107	357	45	233	4,720

Panel D: Institutional ownership (fraction of shares), by firm

Period	Avg	Median	Stdev	25th pct	75th pct	N
2000-2004	0.38	0.33	0.30	0.10	0.63	5,845
2005-2009	0.52	0.54	0.32	0.22	0.82	4,879
2010-2014	0.57	0.62	0.32	0.28	0.85	4,133
2015-2019	0.61	0.69	0.31	0.35	0.89	3,997
2020-2022	0.59	0.67	0.31	0.33	0.87	4,720

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Table 3: Ownership and scaled flows

This table provides information on 13F institutions' aggregate ownership and annual scaled flows over the period 1999-2022. Share ownership data, provided in Panel A, is based on December-end 13F SEC filings and we scale by the aggregate market value derived from the CRSP universe. The first three columns provide ownership data for Vanguard, BlackRock, and SSGA. The next seven columns provide information for next seven largest institutional owners. Panel B provides information on annual scaled flows for the same institutions as in Panel A. Annual fund family scaled flows are computed by summing within year quarterly flows and scaling by the institution's AUM at the end of the previous year. We report in the rightmost column scaled flows for the aggregate CRSP market value weight portfolio. Scaled market flows are computed following Equation (5) as, $f_{mt} = \frac{M_t - M_{t-1}(1+r_{mt})}{M_{t-1}}$.

Panel A: Institutional ownership

Year	Vanguard	Blackrock	SSGA	Capital Group	Fidelity	Geode	Morgan Stanley	T. Rowe	JP Morgan	Wellington
1999	1.21	--	1.76	0.25	3.35	--	0.93	0.51	0.16	0.69
2000	1.29	0.06	1.97	0.30	3.38	--	1.03	0.53	0.97	0.91
2001	1.45	0.05	2.36	0.39	3.36	--	0.92	0.56	1.11	1.16
2002	1.53	0.02	2.68	0.45	2.67	--	0.87	0.63	0.85	1.28
2003	1.71	0.02	2.85	0.50	2.67	0.24	0.84	0.73	0.67	1.40
2004	1.90	0.03	2.81	0.51	3.30	0.25	0.85	0.87	0.92	1.50
2005	2.02	0.14	2.70	0.51	3.18	0.27	0.97	0.99	0.91	1.52
2006	2.28	0.87	2.73	0.51	3.03	0.30	0.94	1.08	0.83	1.52
2007	2.52	0.94	2.90	3.43	3.03	0.36	0.95	1.23	0.80	1.45
2008	2.81	0.93	3.36	3.43	2.93	0.40	0.90	1.29	0.81	1.48
2009	3.02	5.32	3.19	3.33	3.00	0.39	0.91	1.46	0.80	1.47
2010	3.24	5.08	3.30	3.15	2.83	0.43	0.50	1.62	0.93	1.47
2011	3.66	5.18	3.43	2.90	2.76	0.51	0.58	1.66	0.97	1.49
2012	4.08	4.97	3.66	2.66	2.79	0.51	0.54	1.78	1.16	1.45
2013	4.55	5.18	3.72	2.63	2.81	0.60	0.59	1.77	1.17	1.41
2014	5.04	5.36	3.79	2.58	2.76	0.63	0.64	1.73	1.24	1.42
2015	5.67	5.56	3.57	2.72	2.79	0.70	0.67	1.86	1.22	1.52
2016	6.33	5.90	3.85	2.86	2.56	0.79	0.69	1.81	1.12	1.46
2017	6.89	6.13	3.81	2.73	2.48	0.92	0.71	1.87	1.10	1.39
2018	7.41	6.40	3.70	2.90	2.35	1.11	0.74	1.99	1.04	1.35
2019	7.70	6.62	3.85	2.88	2.29	1.29	0.76	2.05	0.98	1.27
2020	7.49	6.52	3.57	2.79	2.35	1.33	0.98	2.13	1.04	1.18
2021	7.62	6.57	3.67	2.72	2.28	1.47	0.99	1.93	1.07	1.09
2022	8.28	6.98	3.84	2.68	2.17	1.64	1.48	1.41	1.23	1.12

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Panel B: Institutional scaled flows (in %)

Year	Vanguard	Blackrock	SSGA	Capital Group	Fidelity	Geode	Morgan Stanley	T. Rowe	JP Morgan	Wellington	Market
2000	8.70	--	8.87	15.37	1.64	--	15.59	1.64	471.18	15.16	4.28
2001	10.75	-7.47	14.39	12.55	2.07	--	-1.39	1.92	12.86	18.72	0.43
2002	5.91	-42.58	11.07	17.36	-15.94	--	-0.66	13.80	-15.94	9.25	1.36
2003	15.40	8.60	9.34	2.55	-1.95	--	-5.45	19.35	-20.75	10.77	0.87
2004	11.54	19.95	-0.17	6.84	24.43	10.39	2.41	18.04	40.14	8.16	1.21
2005	6.14	341.08	-4.23	1.22	-6.73	8.28	10.67	11.78	0.71	-1.69	-0.45
2006	10.78	568.04	-3.31	-0.45	-3.61	8.98	-3.91	9.70	-12.79	-0.86	-1.73
2007	8.27	5.17	4.51	585.22	-7.22	20.89	0.38	10.14	-4.19	-10.37	-3.25
2008	4.53	-2.83	5.85	-0.94	-0.13	4.45	-5.98	2.59	-1.27	-0.42	-1.77
2009	8.15	603.25	-0.27	-3.84	-3.54	2.55	0.80	7.10	1.45	-2.90	1.31
2010	5.73	-5.45	3.66	-4.92	-8.52	11.70	-44.69	8.30	16.82	-0.90	0.63
2011	7.24	-1.44	-1.69	-12.39	-3.43	14.01	13.36	-1.22	1.91	-1.56	-1.29
2012	9.27	-7.04	4.85	-13.67	-2.71	-0.67	-9.33	3.45	18.93	-5.81	-1.00
2013	9.61	1.87	-0.82	-4.97	-3.48	18.92	9.66	-6.72	-2.93	-7.51	-0.13
2014	8.66	1.55	-0.56	-4.74	-3.64	4.79	9.51	-3.36	4.38	-2.49	0.48
2015	7.16	-1.30	-10.52	-2.07	-4.83	5.71	1.56	-2.14	-5.90	0.50	-2.35
2016	7.56	2.13	3.43	1.79	-8.13	11.52	4.21	-2.29	-11.23	-4.28	-2.46
2017	6.73	1.80	-3.82	-9.07	-9.85	16.37	2.00	-2.69	-4.31	-6.42	-1.50
2018	3.88	0.68	-5.67	0.65	-8.16	17.55	0.16	-0.42	-7.44	-6.65	-1.53
2019	1.16	1.00	1.36	-1.51	-7.87	17.68	1.55	0.31	-8.97	-9.76	-0.92
2020	-1.55	0.55	-4.11	-3.18	-3.24	5.93	24.59	-0.50	5.38	-2.34	1.76
2021	2.64	1.73	3.29	-0.93	-1.59	13.99	12.84	-3.49	5.91	-5.85	3.62
2022	2.53	0.81	-3.29	-3.94	-2.60	6.37	40.43	-15.97	6.39	-7.12	-1.55

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Table 4: Ownership and scaled flows: Subsample of S&P500 firms

This table provides information on 13F institutions' ownership and annual scaled flows over the period 1999-2022 constrained to the universe of S&P500 firms. We obtain S&P500 Index membership data from CRSP. Share ownership data, provided in Panel A, is based on December-end 13F SEC filings and we scale by the aggregate market value of S&P500 firms derived from the CRSP. The first three columns provide ownership data for Vanguard, BlackRock, and SSGA. The next seven columns provide information for next seven largest institutional owners. Panel B provides information on annual scaled flows for the same institutions as in Panel A. Annual fund family scaled flows are computed by summing within year quarterly flows into S&P500 firms and scaling by the aggregate dollar value of the institution's holdings of S&P500 companies at the end of the previous year.

Panel A: Institutional ownership

Year	Vanguard	Blackrock	SSGA	Capital Group	Fidelity	Geode	Morgan Stanley	T. Rowe	JP Morgan	Wellington
1999	1.52	--	2.28	0.22	3.68	--	0.87	0.49	0.14	0.72
2000	1.54	0.05	2.41	0.27	3.57	--	1.06	0.46	1.10	0.92
2001	1.69	0.04	2.86	0.36	3.55	--	0.94	0.48	1.27	1.17
2002	1.78	0.02	3.29	0.46	2.64	--	0.94	0.58	0.97	1.33
2003	2.03	0.02	3.57	0.53	2.49	0.32	0.92	0.66	0.77	1.47
2004	2.22	0.02	3.60	0.58	3.30	0.34	0.93	0.81	1.03	1.60
2005	2.39	0.10	3.47	0.59	3.02	0.36	1.07	0.95	1.06	1.62
2006	2.68	0.94	3.46	0.60	2.95	0.39	1.05	1.09	0.93	1.62
2007	2.99	1.02	3.72	4.32	2.93	0.48	1.03	1.31	0.90	1.49
2008	3.22	0.99	4.21	4.25	2.76	0.51	0.99	1.34	0.93	1.53
2009	3.47	5.60	4.04	4.22	2.82	0.51	1.01	1.60	0.92	1.54
2010	3.71	5.31	4.21	4.01	2.56	0.55	0.52	1.76	1.09	1.57
2011	4.13	5.39	4.25	3.53	2.59	0.64	0.62	1.75	1.11	1.60
2012	4.59	5.51	4.52	3.22	2.67	0.64	0.55	1.89	1.34	1.55
2013	5.09	5.61	4.58	3.28	2.74	0.72	0.59	1.84	1.31	1.49
2014	5.63	5.84	4.67	3.09	2.69	0.75	0.65	1.75	1.39	1.51
2015	6.08	5.90	4.23	3.20	2.71	0.79	0.70	1.88	1.33	1.59
2016	6.77	6.21	4.58	3.34	2.49	0.89	0.73	1.86	1.19	1.53
2017	7.39	6.45	4.49	3.16	2.41	1.04	0.77	1.92	1.18	1.42
2018	7.92	6.70	4.33	3.34	2.38	1.25	0.79	2.02	1.11	1.36
2019	8.22	6.91	4.49	3.24	2.30	1.45	0.78	2.06	1.03	1.27
2020	8.08	6.85	4.21	3.10	2.26	1.50	0.94	2.14	1.07	1.21
2021	8.26	7.00	4.32	3.01	2.22	1.66	0.95	1.95	1.16	1.13
2022	8.84	7.31	4.38	2.92	2.08	1.82	1.55	1.55	1.35	1.16

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Panel B: Institutional scaled flows (in %)

Year	Vanguard	Blackrock	SSGA	Capital Group	Fidelity	Geode	Morgan Stanley	T. Rowe	JP Morgan	Wellington	Market
2000	7.05	--	6.42	20.21	2.83	--	26.20	-2.85	631.61	18.25	5.10
2001	10.11	-14.61	15.11	15.26	1.69	--	-4.27	3.32	14.00	21.63	2.10
2002	4.61	-49.36	11.08	22.36	-21.73	--	2.26	17.26	-17.87	9.71	0.73
2003	14.26	5.13	7.62	7.39	-10.73	--	-5.04	13.83	-21.83	11.89	0.17
2004	9.35	14.15	0.81	10.60	33.76	9.37	0.97	22.23	35.19	9.99	1.41
2005	5.88	419.79	-5.39	0.61	-10.83	6.99	12.94	15.47	2.72	-2.32	-0.37
2006	10.39	921.79	-4.13	3.49	0.02	7.27	-2.67	16.37	-14.29	-0.05	-0.46
2007	8.03	4.92	4.38	637.06	-7.65	21.48	-2.35	14.63	-5.94	-12.91	-2.55
2008	4.13	-2.30	6.94	0.30	0.18	3.83	-4.40	3.66	2.11	1.22	-0.86
2009	7.36	578.85	-1.17	-3.27	-3.52	1.65	1.77	12.11	-0.10	-3.35	1.99
2010	5.64	-5.69	3.99	-5.13	-10.27	11.30	-46.92	8.35	18.54	1.43	1.28
2011	8.42	-0.74	-1.49	-14.58	1.05	15.14	16.66	-2.06	3.11	0.62	-0.29
2012	9.71	0.16	4.82	-14.04	-0.64	-2.01	-15.20	3.62	19.34	-6.47	-0.91
2013	10.20	0.14	-0.27	-2.11	-0.40	15.21	9.77	-7.63	-5.39	-8.29	-0.08
2014	8.42	1.81	-0.38	-8.34	-3.70	3.33	10.09	-5.58	4.09	-2.44	-0.85
2015	5.67	-0.98	-11.08	-1.67	-4.39	5.02	5.78	0.24	-6.52	1.48	-0.76
2016	7.63	1.55	4.11	0.96	-8.78	11.41	4.76	-0.98	-13.02	-3.97	-1.96
2017	6.72	1.34	-5.06	-10.04	-11.06	16.68	4.65	-3.33	-3.18	-7.65	-1.67
2018	4.01	0.31	-5.69	0.69	-3.95	17.68	0.78	-0.72	-7.03	-8.94	-1.69
2019	1.77	1.25	1.85	-2.35	-8.23	17.64	-2.25	0.80	-9.89	-8.79	-0.89
2020	-0.84	0.65	-3.92	-1.25	-5.80	5.75	24.28	0.78	6.24	0.02	2.41
2021	1.40	1.65	2.26	-4.23	-3.69	12.83	6.06	-8.20	9.79	-7.79	0.34
2022	2.51	0.77	-4.09	-4.57	-2.53	6.79	47.48	-12.86	8.05	-7.53	-1.05

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Appendix

A. Data Appendix

A.1 Information regarding the construction of the 13-F dataset

We scrape 13-F filings from the SEC website to construct our institutional share ownership dataset given that the Thomson Reuters ``S34'' institutional holding dataset provides inaccurate ownership data (Backus et al. (2021)).

Institutional investment managers that file 13-F filings with the SEC are identified by their CIK. Our universe of CIKs consists of CIK from the following two sources: (1) CIKs that are in WRDS-SEC Suite table *wrdssec.wciklink_names* and (2) CIKs that are listed in Backus et al. (2021). In all, we gather 13,185 CIKs. We scrape all raw Form 13-F filings from SEC's EDGAR for each CIK from 1999 through 2022 to obtain approximately 350,000 filings. We extract meta data from each filing from EDGAR, including the CIK, filing type, filing date, and period of report.

Utilizing a Python script, we parse raw filings to extract information on each security holding including its CUSIP, market value and shareholding. From September 2013 onwards, all filings are in XML format and are easier to parse. Filings prior to September 2013 are in TXT format with different layouts across institutions and over time thus requiring substantial effort to parse. We follow Backus et al. (2021) and first extract CUSIPs using regular expressions and then extract the corresponding share value and number of shares. In order to improve the accuracy of identification of security CUSIPs we make use of the Official List of Section 13(f) Securities published by the SEC. In each quarter the SEC publishes the universe of securities that should be reported on Form 13-F. The list of securities is made publicly available in PDF format and we process these PDFs to obtain the entire list of valid CUSIPs. We use the official list of CUSIPs to clean up potentially incorrect CUSIPs that have been matched by regular expressions.

There are several problems with the parsed data due to how the information is reported in the original filings. We first clean up the CUSIPs before merging holding data with price data from CRSP. Some institutions do not report the leading zeros of the CUSIP, to resolve this issue, we also merge the parsed CUSIPs to the official list of CUSIPs without leading zeros to find the corresponding full CUSIPs. Most institutions report 9-digit CUSIP, but some institutions report CUSIP in 6, 7 or 8 digits. Since CRSP price data are based on 8-digit CUSIP, for each of the 6-digit or 7-digit CUSIP, we assign the mode of the 8-digit CUSIPs that correspond to the same 6-digit or 7-digit CUSIP in the same quarter as its 8-digit CUSIP.

We next merge the share ownership data with CRSP price data based on 8-digit historical CUSIP. We drop observations that do not have price information in CRSP. We further clean our share ownership data with price information. Different institutions report market value of holding in dollars, thousands of dollars, or millions of dollars. Institutions similarly may report shares in different units (thousands of units or millions of units). We determine the correct units associated with market value and number of shares by calculating the implied stock price of each of these combinations and retain the combination that generates a stock price that matches the actual price. We also implement the filters applied by Lewellen and Lewellen.[136] If the number of shares of a security held by an institution is larger than shares outstanding, we replace it with shares outstanding. If a security holding's market value calculated from its reported number of shares and price differs from the reported market value

[136] Lewellen & Lewellen, *supra* note 82.

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by more than 100%, we replace the reported shares by lagged shares. If the market value of a security is larger than values in both previous and next quarter by more than tenfold, we replace the reported shares by the average of shares in the two adjacent quarters.

Since our focus is on US domestic equities, we merge the universe of relevant firm CUSIPs to the holding ownership data and retain the matched observations. This effectively removes all options and other types of securities that are not US domestic equities. Finally, we convert CUSIPs to PERMNOs and aggregate dollar holdings at PERMNO level to ensure consistency when calculating flows.

A.2 Procedure used to identify mutual funds whose primary assets are US domestic equities

In order to identify mutual funds whose primary assets are US domestic equities, we make use of the fund style information from CRSP (*crsp.fund_style*). This table provides several variables describing each fund's investment style. We first require funds that have variable *crsp_obj_cd* begin with ``ED," where *E* stands for equity fund and *D* indicates that the fund invests in domestic assets. These funds include those that invest in US domestic assets such as real estate and precious metals. We manually exclude such funds by checking for the variable *lipper_obj_names*. In all, we identify a mutual funds as a US domestic equity fund if it has *crsp_obj_cd* beginning with ``ED" and *lipper_obj_cd* included in the follows list:

lipper_obj_cd	**lipper_class_name**
ABR	Absolute Return Funds
CA	Small-Cap Growth Funds
DL	Equity Leverage Funds
EI	Equity Income Funds
EMN	Alternative Equity Market Neutral Funds
G	Large-Cap Growth Funds
GI	Multi-Cap Core Funds
LSE	Extended U.S. Large-Cap Core Funds
MC	Mid-Cap Core Funds
MR	Small-Cap Growth Funds
SG	Small-Cap Core Funds
SP	S&P 500 Index Objective Funds
TK	Science & Technology Funds

A.2 Additional information regarding the construction of the variables included in Table 1

Table 1 provides information on fund family fees, dividend yields, capital gain yields, and their rate of reinvestment. In Panels A, C, and D we identify a fund family by its CIK. CRSP provides the table *crsp.cik_map* linking the fund identifier *crsp_fundno* to CIK which is the same identifier used for filing Form N-SAR. We constrain the sample in these three panels to funds that invest primarily in US domestic equity (see the description in Appendix A.2). In Panel B, the unit of observation is the institutional investment manager that files on Form 13-F. In all panels, the summary statistics are calculated on an annual basis and we report the simple average of the statistics in the reporting period.

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Panel A provides information on fund fees. We use the expense ratio as our measure of fund fees. Data on expense ratios comes from CRSP table *crsp.fund_fees*, where the variable *exp_ratio* is the annualized expense ratio over the reporting period (*begdt* to *enddt*). A fund family's annual expense ratio is constructed in the following way: we first calculate the average TNA of the fund in the reporting period using *mtna* from *crsp.monthly_tna*. If the calendar year is covered by more than one reporting period, we weight the expense ratios of the reporting periods by their average TNAs to obtain the fund's calendar year's expense ratio. To calculate expense ratio of a calendar quarter, we first divide the annual expense ratio by four to obtain the quarterly expense ratio and then take the weighted average of quarterly expense ratios if the calendar quarter is covered by more than one reporting period.

Panel B provides information on investment managers' portfolio dividend yields. Dividend yields are calculated based on the 13-F holdings in our universe --securities with CRSP share code 10, 11, 12. Data on securities' monthly returns are from CRSP table *crsp.msf*. Quarterly dividend yields are calculated as the difference between the buy-and-hold return with and without dividends. To calculate an annual dividend yield, we first calculate annual dividend yields based on the institution's portfolio holdings in each quarter. We then average the four dividend yields of a given year, weighting by AUM to calculate the annual dividend yield.

Panel C provides fund-family capital gain yields. Data on fund distributions come from the CRSP table *crsp.dividends*. The variable *dis_type* provides the type of distribution. We retain all distribution events *dis_type* that begin with letter C as capital gain distributions. The variable *dis_amt* provides the per-share distribution. We calculate a fund's number of shares outstanding by dividing a fund's *mtna* by *mnav* from the table *crsp.monthly_tna*. We calculate the dollar amount of capital gain distribution as *dis_amt* x *mtna* / *mnav*. For each fund-family, the annual capital gain yield is the ratio of the aggregate all dollar distributions in a given year to the beginning-of-year fund-family total TNA.

Panel D provides information on fund-family reinvestment rates. Item 28 in Form N-SAR/A and N-SAR/B provides the reinvestment of dividend and capital gain distributions in a 6-month reporting period of each fund in a fund family. Item 72DD and 72EE in Form N-SAR/B report the total dividend and capital gain distributions in the past year, separately. We aggregate reinvestment and distribution of all funds in a fund family to calculate its reinvestment rate.

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B. Mutual fund and ETF disclosures on dividend reinvestment

This Appendix provides selected excerpts from mutual fund and ETF prospectuses regarding reinvestment of dividend distributions. The mutual funds and ETFs are those in the top 10 list of largest AUM on the CRSP mutual fund database in March 2022.

Mutual fund rank #1: Vanguard Total Stock Market Index Fund; Admiral Class Shares (VTSAX). April 29, 2022. Prospectus available here.

Fund Distributions

Each Fund distributes to shareholders virtually all of its net income (interest and dividends, less expenses) as well as any net short-term or long-term capital gains realized from the sale of its holdings. From time to time, each Fund may also make distributions that are treated as a return of capital. Income dividends generally are distributed quarterly in March, June, September, and December; capital gains distributions, if any, generally occur annually in December. In addition, each Fund may occasionally make a supplemental distribution at some other time during the year.

You can receive distributions of income or capital gains in cash, or you can have them automatically reinvested in more shares of the Fund. However, if you are investing through an employer-sponsored retirement or savings plan, your distributions will be automatically reinvested in additional Fund shares.

Mutual fund rank #2: Vanguard 500 Index Fund; Admiral Shares (VFIAX). April 29, 2022. Prospectus available here.

Fund Distributions

The Fund distributes to shareholders virtually all of its net income (interest and dividends, less expenses) as well as any net short-term or long-term capital gains realized from the sale of its holdings. From time to time, the Fund may also make distributions that are treated as a return of capital. Income dividends generally are distributed quarterly in March, June, September, and December; capital gains distributions, if any, generally occur annually in December. In addition, the Fund may occasionally make a supplemental distribution at some other time during the year.

You can receive distributions of income or capital gains in cash, or you can have them automatically reinvested in more shares of the Fund. However, if you are investing through an employer-sponsored retirement or savings plan, your distributions will be automatically reinvested in additional Fund shares.

Mutual fund rank #3: Fidelity 500 Index Fund (FXAIX). April 29, 2022. Prospectus available here.

Dividends and Capital Gain Distributions

The fund earns dividends, interest, and other income from its investments, and distributes this income (less expenses) to shareholders as dividends. The fund also realizes capital gains from its investments, and distributes these gains (less any losses) to shareholders as capital gain distributions.

The fund normally pays dividends in April, July, October, and December and capital gain distributions in April and December.

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Any dividends and capital gain distributions paid to retirement plan participants will be automatically reinvested.

Distribution Options

When you open an account, specify on your application how you want to receive your distributions. The following distribution options are available:

1. Reinvestment Option. Any dividends and capital gain distributions will be automatically reinvested in additional shares. If you do not indicate a choice on your application, you will be assigned this option.

2. Income-Earned Option. Any capital gain distributions will be automatically reinvested in additional shares. Any dividends will be paid in cash.

3. Cash Option. Any dividends and capital gain distributions will be paid in cash.

4. Directed Dividends® Option. Any dividends will be automatically invested in shares of another identically registered Fidelity® fund. Any capital gain distributions will be automatically invested in shares of another identically registered Fidelity® fund, automatically reinvested in additional shares of the fund, or paid in cash.

Not all distribution options may be available for every account and certain restrictions may apply. If the distribution option you prefer is not listed on your account application, or if you want to change your current distribution option, visit Fidelity's web site at www.fidelity.com or call 1-800-544-6666 for more information.

If you elect to receive distributions paid in cash by check and the U.S. Postal Service does not deliver your checks, your distribution option may be converted to the Reinvestment Option. You will not receive interest on amounts represented by uncashed distribution checks.

If your dividend check(s) remains uncashed for six months, your check(s) may be invested in additional shares at the NAV next calculated on the day of the investment.

Mutual fund rank #4: Vanguard Institutional Index Fund; Institutional Plus Shares (VIIIX). April 29, 2022. Prospectus available here.

Fund Distributions

The Fund distributes to shareholders virtually all of its net income (interest and dividends, less expenses) as well as any net short-term or long-term capital gains realized from the sale of its holdings. From time to time, the Fund may also make distributions that are treated as a return of capital. Income dividends generally are distributed quarterly in March, June, September, and December; capital gains distributions, if any, generally occur annually in December. In addition, the Fund may occasionally make a supplemental distribution at some other time during the year.

You can receive distributions of income or capital gains in cash, or you can have them automatically reinvested in more shares of the Fund. However, if you are investing through an employer-sponsored retirement or savings plan, your distributions will be automatically reinvested in additional Fund shares.

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Mutual fund rank #5: Capital Group. Growth Fund of America; Class R6 Shares (RGAGX). November 1, 2021. Prospectus available here.

Dividends and distributions The fund intends to distribute dividends to you, usually in December.

Capital gains, if any, are usually distributed in December. When a dividend or capital gain is distributed, the net asset value per share is reduced by the amount of the payment.

You may elect to reinvest dividends and/or capital gain distributions to purchase additional shares of this fund or other American Funds, or you may elect to receive them in cash. Dividends and capital gain distributions for 529 share classes and retirement plan shareholders will be reinvested automatically.

Mutual fund rank #6: Vanguard Growth Index Fund; Admiral Class Shares (VIGAX). April 29, 2022. Prospectus available here.

Fund Distributions

Each Fund distributes to shareholders virtually all of its net income (interest and dividends, less expenses) as well as any net short-term or long-term capital gains realized from the sale of its holdings. From time to time, each Fund may also make distributions that are treated as a return of capital. Income dividends generally are distributed quarterly in March, June, September, and December; capital gains distributions, if any, generally occur annually in December. In addition, each Fund may occasionally make a supplemental distribution at some other time during the year.

You can receive distributions of income or capital gains in cash, or you can have them automatically reinvested in more shares of the Fund. However, if you are investing through an employer-sponsored retirement or savings plan, your distributions will be automatically reinvested in additional Fund shares.

Mutual fund rank #7: Capital Group. Washington Mutual Investors Fund (FWWMX). July 1, 2022. Prospectus available here.

Dividends and distributions The fund intends to distribute dividends to you, usually in March, June, September and December.

Capital gains, if any, are usually distributed in June and December. When a dividend or capital gain is distributed, the net asset value per share is reduced by the amount of the payment.

You may elect to reinvest dividends and/or capital gain distributions to purchase additional shares of this fund or other American Funds, or you may elect to receive them in cash. Dividends and capital gain distributions for 529 share classes and retirement plan shareholders will be reinvested automatically.

Taxes on dividends and distributions For federal tax purposes, dividends and distributions of short-term capital gains are taxable as ordinary income. If you are an individual and meet certain holding period requirements with respect to your fund shares, you may be eligible for reduced tax rates on "qualified dividend income," if any, distributed by the fund to you. The fund's distributions of net long-term capital gains are taxable as long-term capital gains. Any dividends or capital gain distributions you receive from the fund will normally be taxable to you when made, regardless of whether you reinvest dividends or capital gain distributions or receive them in cash. Dividends and

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capital gain distributions that are automatically reinvested in a tax-favored retirement or education savings account do not result in federal or state income tax at the time of reinvestment.

Mutual fund rank #8: Vanguard Mid-Cap Index Fund; Admiral Shares (VIMAX). April 29, 2022. Prospectus available here.

Fund Distributions

Each Fund distributes to shareholders virtually all of its net income (interest and dividends, less expenses) as well as any net short-term or long-term capital gains realized from the sale of its holdings. From time to time, each Fund may also make distributions that are treated as a return of capital. Income dividends generally are distributed quarterly in March, June, September, and December; capital gains distributions, if any, generally occur annually in December. In addition, each Fund may occasionally make a supplemental distribution at some other time during the year.\\

You can receive distributions of income or capital gains in cash, or you can have them automatically reinvested in more shares of the Fund. However, if you are investing through an employer-sponsored retirement or savings plan, your distributions will be automatically reinvested in additional Fund shares.

Mutual fund rank #9: Vanguard Value Index Fund; Investor Shares (VIVAX). April 29, 2022. Prospectus available here.

Fund Distributions

Each Fund distributes to shareholders virtually all of its net income (interest and dividends, less expenses) as well as any net short-term or long-term capital gains realized from the sale of its holdings. From time to time, each Fund may also make distributions that are treated as a return of capital. Income dividends generally are distributed quarterly in March, June, September, and December; capital gains distributions, if any, generally occur annually in December. In addition, each Fund may occasionally make a supplemental distribution at some other time during the year.

You can receive distributions of income or capital gains in cash, or you can have them automatically reinvested in more shares of the Fund. However, if you are investing through an employer-sponsored retirement or savings plan, your distributions will be automatically reinvested in additional Fund shares.

Mutual fund rank #10: Vanguard Small-Cap Index Fund; Institutional Plus Shares (VSCPX). April 29, 2022. Prospectus available here.

Fund Distributions

Each Fund distributes to shareholders virtually all of its net income (interest and dividends, less expenses) as well as any net short-term or long-term capital gains realized from the sale of its holdings. From time to time, each Fund may also make distributions that are treated as a return of capital. Income dividends generally are distributed quarterly in March, June, September, and December; capital gains distributions, if any, generally occur annually in December. In addition, each Fund may occasionally make a supplemental distribution at some other time during the year.\\

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You can receive distributions of income or capital gains in cash, or you can have them automatically reinvested in more shares of the Fund. However, if you are investing through an employer-sponsored retirement or savings plan, your distributions will be automatically reinvested in additional Fund shares.

ETF rank #1: SPDR S&P 500 ETF Trust (SPY). January 28, 2022. Prospectus available here.

Dividends and Capital Gains

Holders of Units receive on the last Business Day of April, July, October and January an amount corresponding to the amount of any cash dividends declared on the Portfolio Securities during the applicable period, net of fees and expenses associated with operation of the Trust, and taxes, if applicable. Because of such fees and expenses, the dividend yield for Units is ordinarily less than that of the Index. Although all such distributions are currently made quarterly, under certain limited circumstances the Trustee may vary the times at which such distributions are made.

Any capital gain income recognized by the Trust in any taxable year that is not distributed during the year ordinarily is distributed at least annually in January of the following taxable year. The Trust may make additional distributions shortly after the end of the year in order to satisfy certain distribution requirements imposed by the Internal Revenue Code of 1986, as amended (the "Code").

The amount of distributions may vary significantly from period to period. Under limited certain circumstances, special dividend payments also may be made to holders of Units. See "Additional Information Regarding Dividends and Distributions." Investors should consult their tax advisors regarding tax consequences associated with Trust dividends, as well as those associated with Unit sales or redemptions.

No Dividend Reinvestment Service

No dividend reinvestment service is provided by the Trust. Broker-dealers, at their own discretion, may offer a dividend reinvestment service under which additional Units are purchased in the secondary market at current market prices. Investors should consult their broker-dealer for further information regarding any dividend reinvestment program offered by such broker-dealer.

Distributions in cash that are reinvested in additional Units through a dividend reinvestment service, if offered by an investor's broker-dealer, will be taxable dividends to the same extent as if such dividends had been received in cash.

ETF rank #2: iShares Core S&P 500 ETF (IVV). August 1, 2022. Prospectus available here.

Dividends and Distributions

General Policies. Dividends from net investment income, if any, generally are declared and paid at least once a year by the Fund. Distributions of net realized securities gains, if any, generally are declared and paid once a year, but the Trust may make distributions on a more frequent basis for the Fund. The Trust reserves the right to declare special distributions if, in its reasonable discretion, such action is necessary or advisable to preserve its status as a regulated investment company ("RIC") or to avoid imposition of income or excise taxes on undistributed income or realized gains.

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Dividends and other distributions on shares of the Fund are distributed on a pro rata basis to beneficial owners of such shares. Dividend payments are made through DTC participants and indirect participants to beneficial owners then of record with proceeds received from the Fund.

Dividend Reinvestment Service. No dividend reinvestment service is provided by the Trust. Broker-dealers may make available the DTC book-entry Dividend Reinvestment Service for use by beneficial owners of the Fund for reinvestment of their dividend distributions. Beneficial owners should contact their broker to determine the availability and costs of the service and the details of participation therein. Brokers may require beneficial owners to adhere to specific procedures and timetables. If this service is available and used, dividend distributions of both income and realized gains will be automatically reinvested in additional whole shares of the Fund purchased in the secondary market.

ETF rank #3: Invesco QQQ Trust, Series 1 (QQQ). January 31, 2022 Prospectus available here.

Dividend Payment Dates:

Distributions

Distributions by the Trust are made quarterly to the extent that dividends accumulated in respect of the Securities and other income, if any, received by the Trust exceed Trust fees and expenses accrued during the quarterly Accumulation Period which ends on the Business Day preceding each ex-dividend date for Invesco QQQ Shares. However, no net dividend distribution will be made in any given quarter, and any net dividend amounts will be rolled into the next Accumulation Period, if the aggregate net dividend distribution would be in an amount less than 5/100 of one percent (0.05\%) of the NAV of the Trust, unless the Trustee determines that such distribution is required to be made in order to maintain the Trust's status as a regulated investment company, to avoid the imposition of income or excise taxes on undistributed income. The Trustee further reserves the right to declare special dividends if, in its discretion, it would be otherwise advantageous to the Beneficial Owners.

The expenses of the Trust may be as great as or in excess of the dividend and other income to be received by the Trust during any quarter and, under such circumstances, no quarterly net dividend distributions would be made.

Any net capital gains recognized by the Trust in any taxable year are to be distributed at least annually. The Trust may make additional distributions after the end of the year in order to satisfy certain distribution requirements imposed by the Internal Revenue Code of 1986, as amended (the "Code"). Although income distributions, if any, are currently made on a quarterly basis, the Trustee reserves the right to vary the frequency of distributions.

ETF rank #4: Vanguard Extended Market Index Fund; ETF Shares (VXF). April 29, 2022. Prospectus available here.

Fund Distributions

Each Fund distributes to shareholders virtually all of its net income (interest and dividends, less expenses) as well as any net short-term or long-term capital gains realized from the sale of its holdings. From time to time, each Fund may also make distributions that are treated as a return of capital. Income dividends generally are distributed quarterly in March, June, September, and December. Capital gains distributions, if any, generally occur annually in December. In addition, each Fund may occasionally make a supplemental distribution at some other time during the year.

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Reinvestment of Distributions

In order to reinvest dividend and capital gains distributions, investors in a Fund's ETF Shares must hold their shares at a broker that offers a reinvestment service. This can be the broker's own service or a service made available by a third party, such as the broker's outside clearing firm or the DTC. If a reinvestment service is available, distributions of income and capital gains can automatically be reinvested in additional whole and fractional ETF Shares of the Fund. If a reinvestment service is not available, investors will receive their distributions in cash. To determine whether a reinvestment service is available and whether there is a commission or other charge for using this service, consult your broker.

As with all exchange-traded funds, reinvestment of dividend and capital gains distributions in additional ETF Shares will occur four business days or more after the ex-dividend date (the date when a distribution of dividends or capital gains is deducted from the price of a Fund's shares). The exact number of days depends on your broker. During that time, the amount of your distribution will not be invested in the Fund and therefore will not share in the Fund's income, gains, and losses.

ETF rank #5: Vanguard Dividend Appreciation Index Fund; ETF Class Shares (VIG). May 27, 2022. Prospectus available here.

Fund Distributions

The Fund distributes to shareholders virtually all of its net income (interest and dividends, less expenses) as well as any net short-term or long-term capital gains realized from the sale of its holdings. From time to time, the Fund may also make distributions that are treated as a return of capital. Income dividends generally are distributed quarterly in March, June, September, and December; capital gains distributions, if any, generally occur annually in December. In addition, the Fund may occasionally make a supplemental distribution at some other time during the year.

Reinvestment of Distributions

In order to reinvest dividend and capital gains distributions, investors in the Fund's ETF Shares must hold their shares at a broker that offers a reinvestment service. This can be the broker's own service or a service made available by a third party, such as the broker's outside clearing firm or the DTC. If a reinvestment service is available, distributions of income and capital gains can automatically be reinvested in additional whole and fractional ETF Shares of the Fund. If a reinvestment service is not available, investors will receive their distributions in cash. To determine whether a reinvestment service is available and whether there is a commission or other charge for using this service, consult your broker.

As with all exchange-traded funds, reinvestment of dividend and capital gains distributions in additional ETF Shares will occur four business days or more after the ex-dividend date (the date when a distribution of dividends or capital gains is deducted from the price of the Fund's shares). The exact number of days depends on your broker. During that time, the amount of your distribution will not be invested in the Fund and therefore will not share in the Fund's income, gains, and losses.

ETF rank #6: iShares Core S&P Small-Cap ETF (IJR). August 1, 2022. Prospectus available here.

Dividends and Distributions

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General Policies. Dividends from net investment income, if any, generally are declared and paid at least once a year by the Fund. Distributions of net realized securities gains, if any, generally are declared and paid once a year, but the Trust may make distributions on a more frequent basis for the Fund. The Trust reserves the right to declare special distributions if, in its reasonable discretion, such action is necessary or advisable to preserve its status as a regulated investment company ("RIC") or to avoid imposition of income or excise taxes on undistributed income or realized gains.

Dividends and other distributions on shares of the Fund are distributed on a pro rata basis to beneficial owners of such shares. Dividend payments are made through DTC participants and indirect participants to beneficial owners then of record with proceeds received from the Fund.

Dividend Reinvestment Service. No dividend reinvestment service is provided by the Trust. Broker-dealers may make available the DTC book-entry Dividend Reinvestment Service for use by beneficial owners of the Fund for reinvestment of their dividend distributions. Beneficial owners should contact their broker to determine the availability and costs of the service and the details of participation therein. Brokers may require beneficial owners to adhere to specific procedures and timetables. If this service is available and used, dividend distributions of both income and realized gains will be automatically reinvested in additional whole shares of the Fund purchased in the secondary market.

ETF rank #7: iShares Russell 1000 Growth ETF (IWF). August 1, 2022. Prospectus available here.

Dividends and Distributions

General Policies. Dividends from net investment income, if any, generally are declared and paid at least once a year by the Fund. Distributions of net realized securities gains, if any, generally are declared and paid once a year, but the Trust may make distributions on a more frequent basis for the Fund. The Trust reserves the right to declare special distributions if, in its reasonable discretion, such action is necessary or advisable to preserve its status as a regulated investment company ("RIC") or to avoid imposition of income or excise taxes on undistributed income or realized gains.

Dividends and other distributions on shares of the Fund are distributed on a pro rata basis to beneficial owners of such shares. Dividend payments are made through DTC participants and indirect participants to beneficial owners then of record with proceeds received from the Fund.

Dividend Reinvestment Service. No dividend reinvestment service is provided by the Trust. Broker-dealers may make available the DTC book-entry Dividend Reinvestment Service for use by beneficial owners of the Fund for reinvestment of their dividend distributions. Beneficial owners should contact their broker to determine the availability and costs of the service and the details of participation therein. Brokers may require beneficial owners to adhere to specific procedures and timetables. If this service is available and used, dividend distributions of both income and realized gains will be automatically reinvested in additional whole shares of the Fund purchased in the secondary market.

ETF rank #8: iShares Core S\&P Mid-Cap ETF (IJH). August 1, 2022. Prospectus available here.

Dividends and Distributions

General Policies. Dividends from net investment income, if any, generally are declared and paid at least once a year by the Fund. Distributions of net realized securities gains,

if any, generally are declared and paid once a year, but the Trust may make distributions on a more frequent basis for the Fund. The Trust reserves the right to declare special distributions if, in its

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reasonable discretion, such action is necessary or advisable to preserve its status as a regulated investment company ("RIC") or to avoid imposition of income or excise taxes on undistributed income or realized gains.

Dividends and other distributions on shares of the Fund are distributed on a pro rata basis to beneficial owners of such shares. Dividend payments are made through DTC participants and indirect participants to beneficial owners then of record with proceeds received from the Fund.

Dividend Reinvestment Service. No dividend reinvestment service is provided by the Trust. Broker-dealers may make available the DTC book-entry Dividend Reinvestment Service for use by beneficial owners of the Fund for reinvestment of their dividend distributions. Beneficial owners should contact their broker to determine the availability and costs of the service and the details of participation therein. Brokers may require beneficial owners to adhere to specific procedures and timetables. If this service is available and used, dividend distributions of both income and realized gains will be automatically reinvested in additional whole shares of the Fund purchased in the secondary market.

ETF rank #9: iShares Russell 2000 ETF (IWM). August 1, 2022. Prospectus available here.

Dividends and Distributions

General Policies. Dividends from net investment income, if any, generally are declared and paid at least once a year by the Fund. Distributions of net realized securities gains, if any, generally are declared and paid once a year, but the Trust may make distributions on a more frequent basis for the Fund. The Trust reserves the right to declare special distributions if, in its reasonable discretion, such action is necessary or advisable to preserve its status as a regulated investment company ("RIC") or to avoid imposition of income or excise taxes on undistributed income or realized gains.

Dividends and other distributions on shares of the Fund are distributed on a pro rata basis to beneficial owners of such shares. Dividend payments are made through DTC participants and indirect participants to beneficial owners then of record with proceeds received from the Fund.\\

Dividend Reinvestment Service. No dividend reinvestment service is provided by the Trust. Broker-dealers may make available the DTC book-entry Dividend Reinvestment Service for use by beneficial owners of the Fund for reinvestment of their dividend distributions. Beneficial owners should contact their broker to determine the availability and costs of the service and the details of participation therein. Brokers may require beneficial owners to adhere to specific procedures and timetables. If this service is available and used, dividend distributions of both income and realized gains will be automatically reinvested in additional whole shares of the Fund purchased in the secondary market.

ETF rank #10: iShares Russell 1000 Value ETF (IWD). August 1, 2022. Prospectus available here.

Dividends and Distributions

General Policies. Dividends from net investment income, if any, generally are declared and paid at least once a year by the Fund. Distributions of net realized securities gains, if any, generally are declared and paid once a year, but the Trust may make distributions on a more frequent basis for the Fund. The Trust reserves the right to declare special distributions if, in its reasonable discretion, such action is necessary or advisable to preserve its status as a regulated investment company ("RIC") or to avoid imposition of income or excise taxes on undistributed income or realized gains.

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Dividends and other distributions on shares of the Fund are distributed on a pro rata basis to beneficial owners of such shares. Dividend payments are made through DTC participants and indirect participants to beneficial owners then of record with proceeds received from the Fund.

Dividend Reinvestment Service. No dividend reinvestment service is provided by the Trust. Broker-dealers may make available the DTC book-entry Dividend Reinvestment Service for use by beneficial owners of the Fund for reinvestment of their dividend distributions. Beneficial owners should contact their broker to determine the availability and costs of the service and the details of participation therein. Brokers may require beneficial owners to adhere to specific procedures and timetables. If this service is available and used, dividend distributions of both income and realized gains will be automatically reinvested in additional whole shares of the Fund purchased in the secondary market.

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C. Flow multiplier effects: A two-fund example

Consider two funds, *A* and *P*, with ownership stakes ψ_A and ψ_B. There are no capital gains or dividends. From *t=1* to *t=2*, there is a buyback worth *X*. In the flows notation, this is $F_{m2} = -X$.

Fund P does not sell in the buyback while fund A absorbs the buyback and sells shares worth X, which are then retired by the company doing the buyback. With no multiplier effects, each fund's AUM grows following: $AUM_{A2} = AUM_{A1} - X$ and $AUM_{P2} = AUM_{P1}$, and their ownership grows following: $\psi_{A2} = \frac{AUM_{A1}-X}{M_1-X}$ and $\psi_{P2} = \frac{AUM_{P1}}{M_1-X}$. By not selling into the buyback, P's stake increases. Fund A's stake falls because it absorbs the buyback.

We now consider multiplier effects. When fund A sells X worth of shares, they pay it out to their fund shareholders. Those shareholders can consume it all, or they can reinvest some of it in fund P. Let γ_{AP} be the share that they invest in P and $(1-\gamma_{AP})$ is the share they consume. By investing in fund P, P's AUM expands to $AUM_{1P} + \gamma_{AP}X$. By market clearing, fund P needs to purchase from A shares worth $\gamma_{AP}X$. Fund A's AUM falls to $AUM_{A1} - X - \gamma_{AP}X$.

This process can repeat. Fund A now has an outflow of $\gamma_{AP}X$ which they distribute to their shareholders. If those shareholders reinvest $\gamma_{AP} \times \gamma_{AP}X$ into fund $\$P\$$, then A sees another another outflow of $\$\gamma amma_{A, P}^{2}X\$$. In the limit, the change in each fund's AUM is:

$$AUM_{A2} = AUM_{A1} - X - \gamma_{AP}X - \gamma_{AP}^2X - \cdots = AUM_{A1} - (1-\gamma_{AP})^{-1}X \quad \text{(B.1a)}$$

$$AUM_{P2} = AUM_{P1} + \gamma_{AP}X + \gamma_{AP}^2X + \cdots = AUM_{AP} + (1-\gamma_{AP})^{-1}\gamma_{AP}X \quad \text{(B.1b)}$$

and the change in fund ownership is:

$$\psi_{A2} = \frac{AUM_{A1}-(1-\gamma_{AP})^{-1}X}{M_1-X} \quad \text{(B.2a)}$$

$$\psi_{P2} = \frac{AUM_{P1}+(1-\gamma_{AP})^{-1}\gamma_{AP}X}{M_1-X} \quad \text{(B.2b)}$$

Double checking the equilibrium condition for flows, total flows equal the amount of the buyback, as required:

$$-(1-\gamma_{AP})^{-1}X + (1-\gamma_{AP})^{-1}\gamma_{AP}X = (1-\gamma_{AP})^{-1}(1-\gamma_{AP})X = -X = F_{m2} \quad \text{(B.3)}$$

This multiplier effect is also present for dividends. To see this, assume there are no balance sheet events. Suppose fund P reinvests all dividends and A consumes all dividends. Each fund receives dividends D_P and D_A. With no multiplier effects, the change in ownership is:

$$\psi_{A2} = \frac{AUM_{A2}-D_P}{M_2} \quad \text{(B.4a)}$$

$$\psi_{P2} = \frac{AUM_{P2}+D_P}{M_2} \quad \text{(B.4b)}$$

For each dollar of fund P's reinvestment, D_P, there is a corresponding dollar of outflow from fund A equal to $-D_P$.

With multiplier effects, we have a similar chain of events: fund P purchases D_P of shares from A; fund A distributes D_P in outflows to its shareholders; fund A's shareholders reinvest $\gamma_{AP}D_P$ in fund P; and fund P purchases $\gamma_{AP}D_P$ from A; etc..

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With multiplier effects, the change in ownership is:

$$\psi_{A2} = \frac{AUM_{A2} - (1-\gamma_{AP})^{-1} D_P}{M_2} \tag{B.5a}$$

$$\psi_{P2} = \frac{AUM_{P2} + (1-\gamma_{AP})^{-1} D_P}{M_2} \tag{B.5b}$$

The sum of reinvestment flows and absorbing flows is zero. There are no net inflows or outflows, because there are no balance sheet events.

The effect can actually be larger. Suppose that instead of consuming their dividends, fund A's shareholders reinvest γ_{AP} in the passive fund. There are now two base amounts of wealth being multiplied: 1) fund P's fully reinvested dividend D_P; and 2) fund A's partially reinvested dividend $\gamma_{AP} D_A$. We have shown the multiplier effect for 1). When we include 2), the combined effect is:

$$\psi_{A2} = \frac{AUM_{A2} - (1-\gamma_{AP})^{-1} D_P - (1-\gamma_{AP})^{-1} \gamma_{AP} D_A}{M_2} \tag{B.6a}$$

$$\psi_{P2} = \frac{AUM_{P2} + (1-\gamma_{AP})^{-1} D_P + (1-\gamma_{AP})^{-1} \gamma_{AP} D_A}{M_2} \tag{B.6b}$$

More generally, there should be a multiplier effect whenever fund shareholders receive distributions and choose between consumption or reinvestment. There needs to be an injection of wealth into fund shareholders' hands to see a multiplier. This is why for ``reallocation'' flows, there is no multiplier.

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