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What Do Consumers' Fund Flows Maximize? Evidence from Their Brokers' Incentives

SUSAN E. K. CHRISTOFFERSEN, RICHARD EVANS, and DAVID K. MUSTO*

ABSTRACT

We ask whether mutual funds' flows reflect the incentives of the brokers intermediating them. The incentives we address are those revealed in statutory filings: the brokers' shares of sales loads and other revenue, and their affiliation with the fund family. We find significant effects of these payments to brokers on funds' inflows, particularly when the brokers are not affiliated. Tracking these investments forward, we find load sharing, but not revenue sharing, to predict poor performance, consistent with the different incentives these payments impart. We identify one benefit of captive brokerage, which is the recapture of redemptions elsewhere in the family.

THE DECISION TO INVEST in a mutual fund is usually traced to the investor's preferences and information. However, the vast majority of long-term mutual fund assets arrived through some layer of intermediation (Investment Company Institute (2009), p. 76), which tells us that investors often invite and pay brokers to play a role. In this paper we examine the brokers' role, particularly as regards the incentives arising from their compensation. We investigate how brokers' incentives influence the choice of where to invest, and how this choice works out.

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The paper ties directly to the current regulatory debate over the role of the broker in investor decision-making. In 2010, Rule 913(g) of H.R. 4173, the Dodd-Frank Wall Street Reform and Consumer Protection Act, authorized the SEC to establish a fiduciary duty for brokers and dealers, a standard of conduct that includes acting "in the best interest of the customer without regard to the financial or other interest of the broker, dealer or investment adviser providing the advice" (H.R. 4173–453). This contrasts with brokers' current duty to provide advice that is simply *consistent* with the customer's interests (see, e.g., Black (2005)). Similarly, the Financial Industry Regulatory Authority (FINRA) recently published a new proposal (Federal Register, May 9, 2011, pp. 26779–26787) that would require all broker-dealers to disclose their revenue sharing or "shelf-space" payments. Among the questions these initiatives raise are whether and how brokers are influenced by their compensation in the prevailing regulatory environment. In this study we aim to address these questions.

The incentives that brokers' compensation imparts, and their significance to brokers' clients, are not new concerns to regulators and in fact have their roots in mutual funds' early days. A report commissioned by Congress in 1958, and submitted to it in 1962, analyzes the industry from many perspectives, including that of broker incentives. "Questions are raised by the study," SEC Chairman William Cary wrote to Congress, "as to the relationship or lack of relationship between the growth, size and performance of funds, and sales commissions and other sales incentives."[1] In response to these concerns, the SEC mandated a new reporting requirement with a battery of queries about payments to the sales force (30 Fed. Reg., p. 2143–44). These disclosures have evolved over time into the semiannual reports known as N-SAR filings, the key database used in this study.

Using the database we assembled from these electronic N-SAR filings, we contribute to the regulatory debate by analyzing the disclosure of sales-force compensation that the SEC mandated in response to these concerns. The N-SARs oblige funds to break out their cash flows along two key dimensions: (1) front-end sales loads and the portion of those sales loads retained by the broker (i.e., the load paid to brokers), and (2) the split of the brokers' share going to brokers affiliated with the fund sponsor (captive) versus brokers that are independent of the fund sponsor (unaffiliated). The disclosures also shed light on a third dimension, namely, the degree of revenue sharing between the investment adviser and brokers. The disclosures further oblige funds to help connect these payments to the investment decision by distinguishing their cash inflows from their outflows.

The questions for us to put to the N-SARs have been articulated clearly by regulators and practitioners. In 1967, SEC chairman Manuel Cohen warned that

[1] Letter of Transmittal from Chairman Cary to Chairman Harris, page vi of front matter of Friend et al. (1962).

> ... the judgment of securities firms and their salesmen as to what type of security, or which particular fund, is best for the particular customer may be influenced, even subconsciously, by major differences in sales compensation.[2]

Accordingly, our first question for the data is whether sales of a fund increase with the portion of sales load paid to the broker. While the existing literature shows that *net* flows *decrease* with the *maximum* load (Barber, Odean, and Zheng (2005)), the lack of data on the brokers' share, and on inflows distinguished from outflows, has prevented an assessment of the impact of brokers' sales compensation on sales. Because the N-SAR data make these distinctions, they reveal whether inflows paying a load increase with the amount paid to the brokers. Additionally, because the N-SAR data distinguish the loads shared with captive versus unaffiliated brokers, and because the competition for inflows is likely to occur mostly through unaffiliated brokers, these data reveal further whether competition amplifies the effect of compensation on sales.

Besides a share of the load, brokers can also get a share of investment advisers' revenue. As the National Association of Securities Dealers (NASD, predecessor to FINRA) puts it, revenue sharing occurs "when an investment adviser agrees to pay a broker-dealer cash compensation not otherwise disclosed in the prospectus fee table."[3] The NASD raises the question of whether such payments influence fund flows:

> Revenue sharing and differential cash compensation arrangements may create incentives to favor some funds over others inappropriately. These compensation arrangements may encourage broker-dealers and their registered representatives to sell certain funds to maximize their compensation, rather than to best meet their customers' needs.[4]

The same concern is also often found in a fund's own prospectus. Here is a representative example:

> CFS, the Funds' distributor, and its affiliates are currently subject to supplemental compensation payment requests by certain securities broker-dealers, banks or other intermediaries, including third party administrators of qualified plans (each an "Intermediary") whose customers have purchased Fund shares. . . . Payments to Intermediaries may create a conflict of interest by influencing the broker-dealer or other

[2] Address by The Honorable Manuel F. Cohen, Chairman, Securities and Exchange Commission, before the American Society of Business Writers, Washington, DC, May 1, 1967.

[3] NASD 2005 Report of the Mutual Fund Task Force: Mutual Fund Distribution, p. 4. http://www.finra.org/web/groups/industry/@ip/@reg/@guide/documents/industry/p013690.pdf.

[4] NASD 2005 Report of the Mutual Fund Task Force: Mutual Fund Distribution.

> Intermediary and your salesperson to recommend a Fund over another investment.[5]

So our next question is whether revenue sharing does indeed influence fund flows. To address this question we use N-SAR data that capture revenue sharing by many of the sample funds.

Revenue sharing differs importantly from load sharing in that it generally involves both upfront payments upon investment and continuing payments until redemption that are proportional to the investment value. Pozen and Hamacher (2011) report that a typical revenue-sharing agreement pays a broker 25bp for the initial investment and 5bp per year while it remains. Practitioners also describe a combination of upfront and continuing payments.[6] So unlike upfront-load sharing, revenue sharing exposes brokers to their clients' realized returns, a difference that could prove important to the incentives it imparts when brokers recommend funds.

This is presumably the key question for a consumer, the effect of brokers' incentives on their recommendations' prospects. From Bergstresser, Chalmers, and Tufano (2009) we know that brokered flows generally underperform, which suggests that performance is not the only thing brokerage customers are paying for. They could be paying, for instance, for more fundamental investment guidance, such as how much to save. But all else equal they likely prefer better prospects, so the empirical question is whether, as the SEC conjectures, the cross-section of incentives relates negatively to the cross-section of customers' outcomes. That is, do payments to brokers affect the relation between flows and subsequent performance? And does it make a difference whether the broker gets a one-time, upfront payment to bring in the account, as opposed to a continuing fee that varies with the account's performance?

To summarize our main results, brokers' incentives play a significant role in both flows and performance. New investment increases with the load paid to the broker, in particular when the brokers are unaffiliated, while future performance decreases with the brokers' payment from the load, particularly when the brokers are unaffiliated. Revenue sharing also increases new investment, but conditional on load sharing, does not relate significantly to future performance. The different findings with respect to future performance are consistent with brokers' exposure to the future performance of the investment that revenue sharing, but not load sharing, imposes through ongoing asset-based payments.

This paper is divided into four sections. Section I covers the relevant background and develops the main hypotheses, Section II describes the data, Section III presents the results and Section IV summarizes and concludes.

[5] Calamos Family of Funds "Supplement dated March 21, 2011 to Calamos Family of Funds Class A, B, and C Prospectus dated March 1, 2011," p. 88.

[6] For example, UBS Financial Services reports charging fund families 5bp on sales, up to 10bp on the value of equity shares currently held, and 7.5bp on fixed income shares other than money market shares. See UBS Revenue Sharing, available at http://financialservicesinc.ubs.com/wealth/Investing/TraditionalInvestments/MutualFunds/RevenueSharing.html.

I. Background and Hypotheses

A. Regulatory Activity

The incentives of mutual fund brokers have interested regulators since the industry's early days.[7] In 1958, when mutual funds amounted to $12 billion, up from $4 billion six years earlier,[8] the SEC commissioned a study to investigate

> . . . the effects of size on the investment policy of investment companies and on security markets, on concentration of control of wealth and industry, and on companies in which investment companies are interested . . . [9]

Although this mandate does not read like an invitation to analyze brokers' incentives, when the report appears in 1962 it

> . . . questions whether the apparent historical emphasis upon constantly increasing fund assets by intensive sales efforts has always been in the interest of fund investors. The employments of special inducements to sales efforts, particularly in the case of the so-called penalty-type contractual plans, reflects an emphasis on sales not necessarily consistent with the best interests of the investor.[10]

In 1963, the SEC produced its own Special Study of the Securities Markets that devotes a chapter to open-end funds, and in 1964 Lehr and Eisenberg (1964) compared the practice and profitability of mutual fund brokerage across the major players of the time.[11] By late 1966 the SEC produced a report entitled The Public Policy Implications of Investment Company Growth, whose proposed amendments to the Investment Company Act of 1940, particularly a 5% limit on sales loads, died in the House in 1968.[12] However, 1970 saw the passage of a revised bill that replaced the 5% limit with restrictions to be determined by the NASD, with the SEC's oversight, and by 1975 an 8.5% limit was in place.[13]

Along with the effort to limit commissions came new disclosure requirements. In 1964 the SEC proposed revising mutual funds' annual reports, and in 1965, citing Friend et al. (1962) and the SEC's 1963 Special Study of Securities Markets, it rolled out the new form N-1R, which among other things required

[7] From the SEC's 1972 Annual Report, p. 180: "Since the adoption of the Investment Company Act, perhaps no facet of open-end investment company activity has received greater attention than the distribution process for the shares of such companies."

[8] Friend et al. (1962), p. 41.

[9] Letter of Transmittal from SEC Chairman Cary to Committee on Interstate and Foreign Commerce Chairman Harris, August 27, 1962, reprinted in the Front Matter of Friend et al. (1962).

[10] Letter of Transmittal from SEC Chairman Cary to Committee on Interstate and Foreign Commerce Chairman Harris, August 27, 1962, reprinted in the Front Matter of Friend et al. (1962).

[11] Readers can find Friend et al. (1962) and all the other SEC-related documents from the 1960s cited here at http://www.sechistorical.org/museum/papers/1960/.

[12] See, for example, Betty Furness to Chairman Cohen, September 16, 1968.

[13] Securities Act Amendments of 1975.

disclosure of the commissions charged and retained by a fund's underwriters and dealers.[14] Unfortunately, the N-1R did not collect data on the inflows associated with these commissions, making it impossible to use these data to compare payments across funds. However, the N-1R was the progenitor of the source of this paper's data, form N-SAR, which obtains the needed information on the inflows associated with the loads. This information became standardized and electronically accessible in 1993. The Internet Appendix contains an overview of forms N-1R and N-SAR.[15]

A recurring question for regulators relates to the sophistication of brokers' clientele, and the education that their interactions impart. The SEC's 1963 Special Study of Securities Markets contains survey results on investors' understanding of key issues such as loads, expense ratios, and risk, and among other things we see that the customers investing in (very expensive, now forbidden) contractual plans are somewhat less knowledgeable along these lines. In 1995 the SEC, along with the Office of the Comptroller of the Currency, conducted a new survey with similar questions, but focusing on the difference between customers in different distribution channels. The goal was "to assist in developing an empirical foundation for efforts to improve information provided to investors,"[16] and one of the conclusions drawn from the results was that "broker and direct fund company purchasers are relatively more knowledgeable about the costs and risks of mutual fund investments,"[17] though the authors also allow that more knowledgeable investors may self-select into these channels.

Recent enforcement actions reflect the concerns raised in the 1960s. In particular, the revenue sharing and fund sales of Edward Jones, a large unaffiliated distributor, led in 2004 to a $75 million fine. While the financial advisors at Edward Jones were licensed to sell the funds of more than 240 families, 95% of the fund sales were from seven "preferred" fund groups for which they received $82 million of revenue sharing.[18] In response, FINRA proposed a requirement that all broker-dealers disclose their revenue sharing or "shelf-space" payments. These new legislative changes are in keeping with Rule 913 of the Dodd-Frank Act, which gives lawmakers greater ability to hold broker-dealers to a fiduciary duty to their clients.

B. Empirical Findings

The earliest empirical work on the relation between sales loads, flows and future performance appears to be that of Friend et al. (1962). Tracking the

[14] 30 FR 2135-2150 (1965).

[15] An Internet Appendix for this article is available online in the "Supplements and Datasets" section at http://www.afajof.org/supplements.asp.

[16] Alexander, Jones, and Nigro (1997), p. 720.

[17] Alexander, Jones, and Nigro (1998), p. 315. See also the theoretical analysis by Stoughton, Wu, and Zechner (2011).

[18] Friedman, Josh (2005), "Broker got $82 million to push funds," *Los Angeles Times*, January 14.

fund universe from December 1952 to September 1958, they find a positive correlation between loads and net flows (Table III-18, 2nd column),[19] but not between loads and performance (Table V-22). However, the small size of the universe, 152 funds at the beginning of the sample period and 189 at the end (Table III-1), draws a wide confidence interval around these inferences.

More recent work returns to these and related questions with more power. Sirri and Tufano (1998) find that net flows decrease in the expense ratio plus the amortized load, but when Barber, Odean, and Zheng (2005) separate the expense ratio from the maximum load they find a decrease only with respect to the load. While the previous papers analyze both broker-sold and direct-sold funds together, Zhao (2008) and Bergstresser, Chalmers, and Tufano (2009) isolate the broker-sold funds and find that their *net* flows increase with their *maximum* loads. Deaves (2004), Bergstresser, Chalmers, and Tufano (2009), and Friesen and Sapp (2007) compare the future performance of flows that do or do not pass through load-charging brokers and conclude that whatever investors get for paying a load, it is not better future performance. Nanda, Wang, and Zheng (2009) relate flows to the structure of the load and associate new structures with worse future performance, due either to turnover (Edelen (1999), Johnson (2004)) or diseconomies of scale (Chen et al. (2004), Berk and Green (2004)).

The analysis of revenue sharing relates to the literature on 12b-1 fees, which have been shown to relate positively to net flows (Zhao (2008), Bergstresser, Chalmers, and Tufano (2009), Barber, Odean, and Zheng (2005)). Finally, we include some analysis of family-level flows that relates to the "star" effect documented by Nanda, Wang, and Zheng (2004), the family-level effects on flows documented by Gallaher, Kaniel, and Starks (2008), and the focus on aggregate family-level rather than individual fund-level flows discussed in Massa (2003) and Gaspar, Massa, and Matos (2006).

C. Mutual Fund Structure and N-SAR Terminology

The structure and organization of a mutual fund is particularly important for interpreting the N-SAR forms, so a brief review is provided here. For more information, readers are directed to the 2009 *Investment Company Fact Book*. A mutual fund, referred to as the registrant in the N-SAR form, has no employees but rather contracts with service providers. The key service providers include an investment adviser, a principal underwriter, an administrator, a transfer agent, a custodian, and an independent accountant. The investment adviser manages the fund's portfolio while the principal underwriter sells and distributes its shares.

A fund's service providers are often related, and as a group are referred to as the fund sponsor. For example, Fidelity, a fund sponsor, has an investment

[19] The table provides average inflow growth rates between December 1952 and September 1958; the finding is that inflows increase by 188% for funds with sales charges less than 5.9% and 265% for funds with sales charges more than 8%.

adviser called Fidelity Investments Institutional Services Company, Inc., a principal underwriter called Fidelity Distributors Corporation and an administrator called Fidelity Investments Institutional Operations Company, Inc. We do not generally distinguish between the service providers, but to understand broker payments it is important to recognize that they are separate with different contracts. With a load-sharing arrangement, the sharing is between the principal underwriter and either the captive or unaffiliated sales force. The mutual fund, or registrant, is directly responsible for disbursing 12b-1 fees to brokers since these are payments from fund assets. Under a revenue-sharing arrangement, the broker or sales force is paid by the investment adviser. In the remainder of the paper we will refer to "principal underwriter" and "investment adviser" to distinguish between the different payment contracts.

D. Hypotheses

D.1. Loads Paid to Brokers and Inflows

Concerns about brokers' incentives motivated the N-SAR reporting requirements, but how exactly to take these concerns to the reported data is not immediate. In this section we identify the relevant reported data points, and the hypotheses related to the concerns that we can test on them.

The concern that payments to brokers influence their advice corresponds to a cross-sectional prediction: inflows through brokers increase as they are paid more. As a guide regarding how to test this prediction on N-SAR data, the following overview from the SEC is instructive:

> Today, as in 1940, the sale of fund shares is almost always contracted out, on an exclusive basis, to a "principal underwriter," which in most cases is the adviser itself or a close affiliate. Principal underwriters typically confine themselves to wholesale transactions and leave the public selling to independent retail dealers, under sales agreements. Some principal underwriters, e.g. insurance companies that own advisers, have their own retail sales organizations sometimes referred to as "captive sales forces." Captive sales forces sell primarily funds the underwriter represents or other securities issued by the underwriter and its affiliates. Most retail dealers have contracts with numerous principal underwriters and sell the shares of many different funds simultaneously. (SEC (1992), p. 291)

The SEC tracks payments between these major groups of players. Funds report the total loads received by the principal underwriter and its affiliates, as well as the total payments by the principal underwriter to sales agents, aggregated in two groups: captive and unaffiliated. Funds also report total inflows subject to a load, so we have what we need for a cross-sectional test: on the left-hand side the cross section of funds' inflows subject to a load, and on the right-hand side the total load investors pay and the portion of this load that the broker gets. The hypotheses to test are:

H1: *Inflows are positively related to the load paid to the broker.*
H2: *Inflows are negatively related to a fund's total load.*

The distinction the SEC draws between captive and unaffiliated brokers lets us push this test further by including the effect of the competition a broker brings. As the quote above observes, a captive broker focuses on the family's funds, whereas an unaffiliated broker sells a larger number of funds for potentially many families. So unaffiliated, compared to captive, brokerage likely brings stronger competition at two levels: more competition for the consumer's attention, making inflows more negative in the total load, and more competition for the broker's influence, making inflows more positive in the load paid to the broker. In other words, the larger choice of funds in the unaffiliated channel makes it easier for investors to directly compare across funds, implying greater sensitivity of inflows to total loads. In the other direction, an unaffiliated broker sees more offers of broker payments from fund sponsors, implying greater sensitivity of inflows to broker payments. To test for these effects, we can run the same regression as before, but with the total load and brokers' share interacted with the type of broker the fund uses, that is, captive or unaffiliated, and test the hypotheses:

H3: *Inflows relate more negatively to total loads when the brokers are unaffiliated.*

H4: *Inflows relate more positively to the load paid to the broker when the brokers are unaffiliated.*

D.2. Revenue Sharing and Inflows

Revenue sharing is an alternative way to compensate brokers. Testing the effect of revenue sharing is somewhat more complicated because the N-SARs do not address revenue sharing as directly as they address load sharing. That is, the N-SAR form focuses on payments by the fund (i.e., the "Registrant"), and as the NASD explains above, revenue sharing is not paid by the fund but by the investment adviser or the adviser's affiliates. The N-SARs do leave one window open on revenue sharing, however, because funds often reveal their revenue sharing with what is called a "defensive 12b-1 plan," which is reported on N-SARs. The key to our hypothesis test is question 44 on the N-SAR:

> If an investment adviser or other affiliated person of Registrant/Series made unreimbursed payments pursuant to Registrant's/Series' 12b-1 plan, state the total amount of such payments.

The instructions explain that this is where to report a defensive 12b-1 plan:

> The answer to item 44 should include payments an entity other than the registrant/series has made pursuant to a "defensive" 12b-1 plan, for services for which the registrant/series has not specifically reimbursed that entity and will not do so later.

A defensive 12b-1 plan sheds light on revenue sharing because it exists to defend a fund family against the charge that its revenue sharing constitutes an indirect use of fund assets for distribution. That is, when an investment adviser both receives revenue from a fund and pays revenue to brokers selling fund shares, this raises the question of whether the former feeds the latter, which might support a charge that management fees from fund assets are indirectly paying for distribution, which the 1940 Investment Company Act, as amended, limits to 12b-1 plans. So the fund often chooses to have a defensive 12b-1 plan that it does not apply to fund assets but instead leaves unused so, if this question is later raised, the fund can argue that the revenue sharing was part of its 12b-1 plan (i.e., the fund retroactively reallocates the revenue sharing paid by the investment adviser to the 12b-1 plan paid by the mutual fund).[20]

The defensive 12b-1 plan reveals the presence and magnitude of revenue sharing. It does not reveal, however, the details of the sharing, in particular, how the payments are split between lump sums for bringing in accounts and continuing fees while they stay invested. Funds are not obliged to report these details, but when they do, it is apparent that both types of payment are common. Here is an example from Edward Jones:

> Some product partners pay Edward Jones a fee based on the value of assets under management, known as an asset-based fee. For example, if you made a $10,000 purchase of an investment, Edward Jones would be paid by the product partner 0.075% [$7.50] ... For every subsequent year you held that $10,000 investment in your Edward Jones account, the product partner would make a $7.50 payment, assuming no change in the value of your investment. Asset-based payments will increase or decrease from year to year with changes in the value of the related assets held by Edward Jones' clients.
>
> Other product partners may pay Edward Jones a one-time fee based on the amount of the product sold. This approach is referred to as a sales-based fee and is based on the dollar value of your purchase. For example, the product partner may pay Edward Jones 0.25% for each dollar you invest.[21]

Accordingly, for testing purposes we assume that, for the funds with defensive plans, revenue sharing increases with the reported size of the plan, and the broker's payment is some combination of a one-time fee and a continuing asset-based fee. That revenue sharing includes these continuing payments is important when connecting revenue sharing to future returns, since the continuing payments expose the broker to the consumer's performance. It is not so important when connecting revenue sharing to inflows; all that is important is that more revenue sharing means more incentive to bring in inflows, however

[20] More information on defensive 12b-1 plans is provided in Investment Company Institute (2007), footnote 71; SEC (2000), footnote 61; and Pozen and Hamacher (2011). See also Garrity, Mike (1998), "12b1 plans helping to attract assets," *Money Management Executive*, November 29.

[21] See http://www.edwardjones.com/en_US/disclosures/rev_sharing/disclosure_information/index.html

that revenue may be divided between now and later. Therefore, the hypothesis we test on inflows is:

H5: *Among funds with defensive 12b-1 fees, inflows are increasing in the fees.*

D.3 Broker Payments and Future Returns

The hypotheses on future returns directly address concerns that broker payments harm consumers by encouraging brokers toward funds with worse prospects. On this dimension, revenue sharing is potentially less worrisome than load sharing, due to the continuing payments that countervail incentives to sell whatever fund pays the most upfront. So the hypotheses we test are:

H6: *Future performance is negatively related to the load paid to the broker.*
H7: *Future performance is less negatively related to revenue sharing than to load sharing.*

The seven hypotheses above are the main questions we take to the N-SAR data. Some ancillary hypotheses can also be tested on these data; we describe these additional tests in Section III.

II. Data

A. Measuring Fees, Loads, and Load Sharing

Our database, which covers U.S. funds from 1993 to 2009, merges data from two sources: e-filings of SEC form N-SAR and Morningstar. Earlier work (e.g., Elton, Gruber, Blake (2001)) describes the survivor–bias free Morningstar Direct data, so here we focus on the SEC data,[22] in particular, the variables that we use and the merging of Morningstar and N-SAR data.

In form N-SAR, a mutual fund reports the operations of its combined share classes. Among the figures reported are the total front loads paid by consumers over the semiannual or annual period (Question 30a on N-SAR, that is, Q30a), and the total inflows subject to loads (Q28h). Accordingly, $\textit{Front Load}_{i,t}$ is the total front load paid by consumers (Q30a) divided by the inflows subject to a load (Q28h). The N-SARs also report how much of the load was paid to captive (Q32) or unaffiliated (Q33) brokers, so the brokers' share of the load, $\textit{Load Paid to Broker}_{i,t}$, is the dollars paid to either kind of broker (i.e., Q32 + Q33) divided by the inflows subject to a load (Q28h). The variable $\textit{Family Average Load Paid to Broker}_{i,t}$ is calculated by averaging *Load Paid to Broker* for all other funds in the family. Questions 28a to 28f provide monthly flow information while most other questions on the N-SAR form are semiannual. For the semiannual

[22] Recent mutual fund studies using SEC filings include Reuter (2006), who links CRSP to N-SAR files to address IPO allocations; O'Neal (2004), who uses form 485-B to separate the inflows and redemptions of the largest funds; and Edelen (1999), who uses the N-SAR data to explore fund trading costs.

responses, we associate the response with all six months in the period. The Internet Appendix contains an overview of the N-SAR form, including the text of the questions central to the paper.

Besides front loads, the N-SARs also report the total dollars from back loads (Q35), or in the SEC's words, "deferred or contingent deferred sales loads." However, the N-SARs do not report how many dollars of outflow are subject to these loads. So to put the back-load variable, $\textit{Back Load}_{i,t}$, on roughly the same terms as the front-load variables, we divide the dollars from back loads by simply the total outflows for the period (Q28g4). The variable $\textit{Redemption Fee}_{i,t}$ is an indicator variable showing whether a redemption charge is collected separately from the deferred sales charge (Q37). A common redemption fee is a rapid-trading penalty that is paid back into the fund (rather than paid to the family as revenue). The net expense ratio including 12b-1 fees, $\textit{Expenses}_{i,t}$, is calculated as total expenses reported on the N-SAR form (Q72x) minus expense reimbursements (Q72y) divided by the monthly average net assets over the reporting period (Q75b); we multiply by two to annualize these semiannual numbers.

The N-SARs separate loads paid to captive brokers from those paid to unaffiliated brokers, but do not separate the flows subject to a load into those arriving through captive and unaffiliated brokers. So if a fund's brokers are only captive or only unaffiliated, a load and a load-share can be identified with a broker type and an inflow, but if a fund mixes captive and unaffiliated, the identification is ambiguous. For instance, a fund might report \$10 paid to the underwriter, \$10 paid to captive brokers, \$15 paid to the unaffiliated broker, and \$1,000 received in flows subject to a load. We know the investor paid a total load of 3.5% (\$35/\$1,000); however, we do not know the exact load-sharing received by each of the brokers. If each brought in \$500, then the unaffiliated received 3% of the inflow while the captive only received 2%. However, if the unaffiliated brought in \$600 and the captive \$400, then each would have received 2.5% of their respective inflows. Without knowing the dollars brought into the fund through each channel, we cannot determine the sharing between the broker and the fund sponsor.

Accordingly, in those analyses where we examine the role of broker affiliation, we focus on the subsample of funds whose brokers are only captive or only unaffiliated: fund i is $\textit{Captive}_{i,t}$ in month t if all its loads came through captive brokers in the N-SAR form covering month t, and $\textit{Unaffil}_{i,t}$ if all its loads came through unaffiliated brokers. Section A of the Appendix provides the definitions of all variables used in the empirical analysis.

B. Measuring Revenue Sharing

Revenue sharing is estimated, as discussed above, from the defensive plan reported in reply to Question 44. To account for the possibility that not all funds sharing revenue choose to defend this practice legally with defensive 12b-1 plans, our tests simply assume that, for the funds that do have defensive plans, the size of the plan indicates the magnitude of revenue sharing.

Thus, there are two variables of interest: an indicator variable for the presence of a defensive plan, which for fund i in month t is *Revenue Sharing* $Indicator_{i,t}$, and the amount of the defensive plan divided by average net assets, which is *Revenue* $Sharing_{i,t}$. We multiply by two to annualize revenue sharing. The variable *Family Average Revenue Sharing* is calculated by averaging *Revenue Sharing* for all other funds in the family.

C. Combining N-SAR and Morningstar

We match the N-SAR data to Morningstar so we can include monthly fund size and returns, as well as fund categories, in our tests. Where relevant, we aggregate the Morningstar share-class-level data to the fund level, weighting by the assets of the classes. This subsection describes the statistics using data from both databases, and also the matching of the two databases. From Morningstar we get the return of each share class within a fund, which we aggregate by total net assets to create a fund-level return of fund i in month t, $Ret_{i,t}$. We also use Morningstar for the denominator of percentage flows, since N-SARs provide monthly flows but not monthly assets; thus, for fund i in month t the percentage flows are $Inflows_{i,t}$ and $Redemptions_{i,t}$, which are the month t inflow or redemption, respectively, reported by fund i (in N-SAR's Q28a to Q28f) divided by fund i's total net assets from Morningstar for month t. The variable *Inflows Subject to* $Load_{i,t}$ is simply *Inflows* multiplied by the portion of inflows subject to a load (Q28h/(Q28g1 + Q28g2 + Q28g3)). We calculate *Log Fund* $Size_{i,t}$ as the log of fund total net assets, and *Log Family* $Size_{i,t}$ as the log of the total assets of all funds in fund i's family as of month t. To control for different share class compositions in our regressions, we collect data on the portion of fund assets held in Class A, B, and C and in an institutional and retirement class.

Morningstar sorts funds into 38 Investment Objective categories. To capture the industry-wide flow into a fund's category we create *Category* $Inflows_{i,t}$ by aggregating new inflows across the funds in i's Investment Objective category in month t and dividing by the category's aggregate total net assets. We create the analogous variable for redemptions. For *Lag Ranked* $Return_{i,t}$, we calculate each fund's net return over the trailing year and rank these returns within the funds' categories, creating a variable ranging from zero to one.

Because the numeric fund identifiers on the N-SAR form do not appear in Morningstar, the two databases are matched by hand. This matched database then passes through several filters that serve to (1) double-check that the match is correct by matching exactly on the net asset value of the fund, (2) ensure at least one year of trailing data for the analysis, and (3) remove data entry errors due to incorrect completion of the N-SAR form. The Internet Appendix provides details of the matching between N-SAR and Morningstar and the filters applied to remove data entry errors. In addition, it gauges the accuracy of the filtered data with a detailed comparison of variables in both N-SAR and Morningstar, and finds correlations for like variables that range from 0.91 to 0.96. Considering the often high volatility of these variables over time, these high correlations give us confidence in the hand-collected data and our matching.

D. Data Overview

Table I characterizes the fund flows for all funds in our sample with either a positive 12b-1 payment, a defensive 12b-1 plan, a positive load payment, or some combination of these. This subset represents all those funds where an intermediary is paid, in some form that we can identify, to distribute mutual fund shares. Averages across the fund-months of the sample are provided, with the table showing redemptions averaging 3.12% per month, outrun by inflows running 4.22% per month. Other studies using N-SAR inflow and redemption data report comparable summary statistics. In monthly terms, Edelen (1999) finds mean redemptions and inflows of 4.0% and 5.4%, respectively, and O'Neal (2004) (studying the 200 largest equity funds) finds 2.4% and 3.7%, respectively, from 1994 to 2000. Limiting our sample to above-median-asset funds, we find 2.9% and 3.4%, respectively, for our sample period.

The difference between the loads investors actually pay and the maximum loads reported in Morningstar is apparent in Table I, which summarizes actual and maximum loads, as well as the load paid to brokers, for captive and unaffiliated funds. For both broker types, the actual load is little over half the maximum, a difference that likely reflects volume discounting on larger investments.[23] So as a measure of the cost faced by investors, the actual load brings accuracy over the maximum load on average, and the low cross-sectional correlation between actual and maximum loads reported in Panel B indicates that it brings accuracy in the cross-section as well.[24] That the broker's share of the load varies significantly over time is indicated by the correlation of 0.49 with its six-month lagged value.

Our analysis takes a fund's choice between captive and unaffiliated channels to be exogenous. That there is little if any endogenous variation over time due to funds' changing circumstances is apparent in the infrequency with which funds change on this dimension: from 1993 to 2009, only 1.5% of the funds change between unaffiliated and captive. This persistence is also apparent in Del Guercio, Reuter, and Tkac (2010). As for what does determine the choice, Appendix B runs a selection model and finds that the decade of a fund's inception is more influential than current variables such as performance and

[23] As an example of the volume discounting, the Statement of Additional Information for John Hancock in December 2011 indicates on p. 70 that investor loads and broker payments change with investment size. For investment breakpoints (in $thousands) of 50, 100, 250, 500, and 999, an investor investing less than and between these breakpoints would pay 5%, 4%, 3.5%, 2.5%, and 2% in loads and the selling broker would receive 4.01%, 3.51%, 2.61%, 1.86%, and 1.36%. The benefit of the N-SAR number is that it properly weights these loads, which one could never infer from looking at the contract.

[24] To compare, the Internet Appendix shows that N-SAR and Morningstar report almost identical average maximum front loads of 4.79% and 4.80%, respectively, with a correlation of 0.94, so the discrepancy between the actual loads paid and maximum load is not a consequence of differences across data samples.

Table I

Descriptive Statistics

This table provides descriptive statistics of our matched sample of Morningstar and N-SAR data from 1993 to 2009 and considers only those funds with a 12b-1 plan, a defensive 12b-1 plan, or load. Panel A gives the mean, median, and standard deviation for key variables used in the analysis. The variables *Inflows, Inflows Subject to a Load, Redemptions, Reinvestments* and *Net Flows* are all based on information from Question 28a to 28f in the N-SAR file, where reinvestments are calculated as a percent of assets like inflows and redemptions and net flows are inflows plus reinvestments less redemptions. A fund is defined as captive (unaffiliated) if the front load is paid only to captive (unaffiliated) brokers and no load payment goes to unaffiliated (captive) brokers. Defensive 12b-1 plans and 12b-1 plans are determined as the total dollar value of the plan (Q44 or Q43, respectively) divided by average net assets (Q75b) and multiplied by two to annualize. The load information and its allocation by captive or unaffiliated sales channel is based on information from Q28 to Q38 in the N-SAR file. Front load paid by investors is given as both the maximum amount paid by any one individual in the fund (from Morningstar) and the actual amount paid across all individuals in the fund (from N-SAR). Panel B provides correlation between the actual loads collected that are reported on the N-SAR files and the maximum load charged reported in Morningstar. The conditional correlations condition on the front load and back load being positive as reported in Morningstar, or over 80% of the fund total net asset being in the A or B share class. Additional details on variable construction are provided in Appendix A.

Panel A: Variable Means, Medians, and Standard Deviations

Variables	Units	Mean	Median	*SD*	Obs
New Inflows	($ thousands)	30,064	4,069	129,943	268,906
Redemptions	($ thousands)	25,344	3,974	105,271	268,906
Reinvestments	($ thousands)	4,403	0	72,837	268,906
Net Flows	($ thousands)	9,191	135	102,954	268,906
Inflows	% TNA	4.22%	2.13%	6.11%	268,906
Inflows Subject to Load	% TNA	1.40%	0.48%	2.96%	182,330
Redemptions	% TNA	3.12%	1.96%	4.27%	268,906
Reinvestments	% TNA	0.31%	0	1.39%	268,906
Net Flows	% TNA	1.42%	0.20%	6.09%	268,906
Fund Size	$ millions	1,118	182	5,196	268,906
Expenses	% TNA	1.17%	1.09%	0.58%	237,614
Front Load Paid to Brokers					
Captive	% Inflow	1.73%	1.31%	1.60%	25,807
Unaffiliated	% Inflow	2.30%	2.01%	1.80%	123,824
Front Load Paid by Investors					
Captive	% Inflow	2.40%	1.80%	2.20%	25,807
Unaffiliated	% Inflow	2.77%	2.46%	2.08%	123,824
Captive: Max. Front Load (Morningstar)	% Inflow	4.57%	5.00%	1.41%	25,807
Unaffiliated: Max. Front Load (Morningstar)	% Inflow	4.64%	4.75%	1.44%	123,824
For Those Funds with 12b1 Plans					
12b1 Payments	% TNA	0.30%	0.26%	0.24%	199,618
Funds with Defensive 12b1 Plans	% Funds	11.69%	0	32.13%	199,094
Defensive 12b1 Payments	%TNA	0.17%	0.07%	0.22%	23,274

Panel B: Correlation between N-SAR Actual Loads and Morningstar Maximum Loads

	Front Load	Back Load
Unconditional	0.47	0.44
Positive load	0.14	0.38
Positive load and >80% in A Class	0.38	
Positive load and >80% in B Class		0.33

changes in total net assets. On this basis we maintain the assumption that the choice is exogenous to our explanatory variables.

III. Empirical Tests

A. Empirical Tests

The questions for the empirical tests are whether broker payments affect consumers' investments and returns, whether these effects are stronger for unaffiliated brokers, and whether greater revenue sharing, rather than greater load payments, corresponds to better future performance. We address these questions in two steps. First, we identify the baseline rates of load and revenue sharing for each fund-month with regression models that predict sharing with intuitively relevant variables such as fund size, type, performance, and year. We then ask how departures from the baseline relate to current inflows and future performance, and how this relation varies with brokers' affiliation. Along the way, we make several related observations that this new database affords, particularly through its distinction between inflows and outflows. In all the empirical analysis, the reported standard errors address the correlation of residuals by clustering by fund, and address potential heteroskedasticity by using standard errors calculated according to the methods described in Huber (1967) and White (1980).

B. Baseline Rates

Flows and returns vary over time and across funds for many reasons, and these reasons could also be important for broker payments. For example, flows, payments, and returns could all be higher for equity funds. So to identify the effect of payments on flows, rather than the effect of a third force on both, we net out the baseline rate of payment with regressions that pool across funds and time, and then use the residuals from these regressions, the excess payments, to explain flows and returns. These baseline models are also useful in their own right as estimators of the key determinants of broker compensation.

The first model estimates the baseline rate of loads paid to brokers. The OLS model has year and fund-type indicators, and several other fund- and family-specific variables. The fitted model, which explains 87% of the variation in load payments to brokers, is the first regression in Table II, and shows, among other things, that payments shrink as family size and recent performance grow, indicating less demand for broker attention by larger families and better performing funds. The higher intercept and lower slope on total front loads for captive brokers show their compensation to be less sensitive to the total load the investor pays. That is, at the point estimates, captive brokers receive a base 19bp higher than unaffiliated brokers receive, but only 56%, compared to 76%, of the variation of the load, consistent with higher loads putting funds at a greater competitive disadvantage in the unaffiliated channel, thereby necessitating greater variable compensation for the broker. The negative

Table II

Baseline Payment Regressions

This table gives the regression estimates of broker payments as a function of fund and family characteristics and other variables. The dependent variable for the panel regression 1 is *Load Paid to Broker*, calculated as the front load dollars paid to both captive and unaffiliated brokers, Q32 + Q33, divided by the inflows subject to a load, Q28h. Regressions 2 and 3 examine *Revenue Sharing* by the fund with the broker. Regression 2 is a probit of whether the fund has a revenue-sharing program as proxied by unreimbursed 12b-1 payments to brokers (Q44) and regression 3 is a panel regression of the dollar amount of revenue sharing (Q44) divided by fund total net assets (TNA). Marginal effects of the probit, *MrgEfx*, measure how a change in the independent variables affects the probability of revenue sharing. While regression 2 includes all funds that charge a 12b-1 fee, regression 3 is limited to those funds that have nonzero revenue-sharing payments. The independent variables are defined in Appendix A. The 38 Morningstar categories are grouped into six general categories with specialty funds omitted for identification and the other fund categories listed as the first five dummies in each regression. The table gives coefficient estimates, *t*-statistics, adjusted R^2s, and the number of fund-month observations for all three regressions and marginal effects for the probit regression. Panel B gives the *p*-value for a test of the difference in coefficients. Yearly fixed effects are included and the reported *t*-statistics use robust standard errors as described in Huber (1967) and White (1980) and cluster by fund.

Panel A: Regressions

	1		2			3	
	Load Paid to Broker		Revenue Sharing Indicator			Revenue Sharing	
	Coef	*t*-stat	MrgEfx	Coef	*t*-stat	Coef	*t*-stat
Equity	0.0027	4.02	−0.026	−0.196	−1.63	6.76*E*–05	0.29
International	0.0031	4.27	−0.026	−0.212	−1.46	5.81*E*–05	0.21
Fixed Income	0.0031	4.55	−0.024	−0.188	−1.34	9.55*E*–05	0.38
Balanced	0.0028	3.95	−0.029	−0.242	−1.75	2.75*E*–04	1.08
Muni	0.0036	5.42	−0.011	−0.081	−0.56	−2.71*E*–04	−1.03
Front Load	0.5561	30.01					
Front Load × Captive	0.0103	0.51					
Front Load × Unaffil	0.2002	11.73					
Lag Ranked Returns	−4.65*E*–04	−2.69	0.005	0.039	0.82	2.27*E*–04	2.07
Log Family Size	−4.65*E*–04	−6.55	0.019	0.141	6.79	1.34*E*–05	0.41
Log Fund Size	−8.17*E*–05	−1.36	−0.002	−0.016	−0.90	−2.53*E*–04	−6.89
Category Inflows	−0.0375	−7.68	−0.055	−0.400	−0.39	0.0014	0.56
Category Redemptions	−0.0160	−3.50	0.092	0.664	0.56	−2.28*E*–03	−0.74
Family Average Load Paid to Broker	0.2028	15.86					
Family Average Revenue Sharing						0.6543	12.65
Proportion Class A	0.0018	5.48	0.001	0.004	0.04	9.37*E*–04	4.70
Proportion Class B			−0.018	−0.129	−0.64	5.25*E*–04	1.01
Proportion Class C			0.122	0.886	4.13	0.0029	4.14
Proportion Retirement			−0.069	−0.499	−1.64	0.0014	2.82
Proportion Institutional			−0.126	−0.911	−7.17	0.0000	0.15
Captive	0.0019	7.33	−0.081	−1.049	−8.49	0.0013	3.12
Unaffil	−5.86*E*–04	−2.88	−0.008	−0.056	−0.88	−4.47*E*–04	−3.36
Constant	0.0042	3.35		−3.015	−8.73	0.0030	4.95
Year fixed effects	Yes			Yes		Yes	
Adjusted R^2	87.17%			10.46%		39.53%	
Observations	163,347			178,693		21,781	

Panel B: Tests

	F-test	*p*-value
Front Load × captive = Front Load × Unaffil	189.08	0.001

coefficients on both concurrent category inflows and redemptions show that a fund pays less for flows when turnover in its category is higher. Fund category dummies are included in each baseline regression where, for simplicity, we aggregate 38 Morningstar objective categories into six fund categories (equity, fixed income, specialty, international, municipal, and balanced) and omit the specialty category in the regressions. The only significant difference in broker payment across fund categories is in the omitted fund category, specialty funds, where payment is particularly low. Year fixed effects (not shown) indicate that brokers' pay varies over time, possibly reflecting changes in economic conditions that affect the difficulty of selling mutual funds.

The next model is a Probit addressing whether a fund is in our revenue-sharing sample, that is, those funds with defensive 12b-1 plans. Because these plans reflect legal considerations and because a subset of revenue-sharing funds initiates them, membership in the revenue-sharing sample reflects both the decision to share revenue and the decision to defend its legality this way. The goal of the Probit is to characterize the resulting makeup of the revenue-sharing sample. The fitted model, in the middle of Table II, shows a significant tilt away from funds using captive brokers—at the point estimate, funds sold through captive brokers are 8% less likely to have such plans—and away from funds with more institutional money. Revenue sharing therefore seems to be used to attract retail investors through the unaffiliated channel. We also see that larger families are overrepresented, which could reflect both their larger liability if sued and larger chance of being sued (Curtis and Morley (2011)).

The final model estimates the baseline rate of revenue sharing, and is an OLS regression fit to only the sample with defensive plans, where the dependent variable is *Revenue Sharing*. This is the model whose residuals are used to explain flows and future performance in Tables IV and VI. The fitted model, which explains 40% of the variation in revenue sharing, is on the right side of Table II, and is identical to the Probit model except for the inclusion of family-level revenue sharing, which, considering the involvement of the investment adviser, is intuitively a major influence on a fund's revenue sharing. The regression finds less revenue sharing by larger funds, and more among retail share classes, particularly from high-fee C shares. One potential concern with this two-stage approach is that an omitted variable, such as advertising quality or quantity, may correlate with broker payments, flows, or performance. While we cannot completely rule this out, the high explanatory power of the initial-stage model, as represented by the high R^2, helps to mitigate this concern. In addition, family-level average fees help control for family spending if fees across the family are correlated with aggregate spending on advertising and the like.

C. Broker Payments and Flows

In this subsection, we use the residuals from the baseline regressions in the previous subsection to test the effect of broker payments on inflows. We run pooled multiple regressions with percentage monthly inflows as the dependent variable, and broker payments relative to the baseline, that is, the excess load paid to the broker from the baseline regression, among the explanatory variables, along with other likely influences on fund flows. The tests focus on inflows since this is where broker payments likely have the greatest and most direct influence, but we address outflows as well, as there are a few findings to note. The sample of fund-months for the tests of load payments consists of those with some portion of their inflows subject to a load, and the sample for the revenue-sharing tests comprises those in which the fund has a defensive 12b-1 plan.

While the regression models relating revenue-sharing and load payments to flows are similar, there are two notable differences. First, for the revenue-sharing tests, we do not know whether the revenue was shared with captive or unaffiliated brokers. Thus, the tests for the effect of broker affiliation are all conducted on the load-sharing, rather than revenue-sharing, sample. Second, the inflows explained by load payments are inflows subject to a load (as a percent of total net assets) whereas the inflows explained by revenue sharing are total inflows (as a percent of total net assets). Inflows are defined differently in the two regressions in order to match the broker payments as closely as possible to the part of the flows they could influence. For brokers receiving a load, their payment can influence only the flows subject to a load, so this is the dependent variable. For revenue-sharing arrangements, the payments can apply to all share classes, and not only to the flows subject to a load, so the entire inflow is the dependent variable. As before, standard errors are adjusted for heteroskedasticity in accordance with Huber (1967) and White (1980) and are clustered by fund.

C.1. Loads Paid to Brokers and Flows

The first regression explains inflows subject to a load with the excess load paid to the broker, the total load paid, and controls, including past performance. By distinguishing the total load the consumer pays from the excess load that the broker gets, this regression distinguishes the effect of the total load on the consumer from the effect of the load paid to the broker. The questions are whether the excess load paid to the broker enters positively and whether the total load paid enters negatively. The latter would be consistent with Barber, Odean, and Zheng (2005), though their result relates net flows to maximum loads, not inflows to the loads actually paid. The model accounts for the convexity of the flow/performance relation (e.g., Ippolito (1992), Sirri and Tufano (1998)) by allowing recent performance to enter with different slopes above and below the median. The results are in the first pair of columns in Table III.

The first main result is that the excess load paid to the broker does indeed enter positively, consistent with H1. Thus, we conclude that sharing more of the load with brokers brings in more flows. Regarding the magnitude of this influence, at the point estimate of 0.0372, 50bp more to the broker increases

Table III

Flows and Excess Load Paid to Broker

This table provides regression estimates of inflows and redemptions on residual broker payments from Table II and other fund and family characteristics. The dependent variable for regressions 1 through 3 is monthly fund inflows subject to a load and for regressions 4 through 6 is monthly fund redemptions as a percent of fund total net assets. In regressions 1 and 4, the sample consists of all fund-month observations where the fund reports a nonzero front load collected from investors. Regressions 2 and 5 require that loads are paid solely to unaffiliated or captive brokers, but not both. Regressions 3 and 6 require that the fund family consist of 10 or more funds. The independent variable of interest is *Excess Load Paid to Broker*, the residuals from regression 1 of Table II . The performance measure, *Lag Ranked Returns*, is the fractional rank of the fund's return (between zero and one) from the end of month $t-13$ to the end of month $t-1$ among funds in the same investment objective category. The low and high *Lag Ranked Returns* are calculated as *Lag Ranked Returns Low* = min(0.5, *Lag Ranked Returns*) and *Lag Ranked Returns High* = *Lag Ranked Returns – Lag Ranked Returns Low* to create a piecewise linear specification with a kink at the 50th percentile of ranked performance. Lagged inflows subject to a load and redemptions are six-month lags of the dependent variables. All other independent variables are defined in Appendix A. The table gives coefficient estimates, t-statistics, adjusted R^2s, and the number of fund-month observations for all regressions. Panel B gives p-values for tests of the difference in coefficients. Yearly fixed effects are included in the regression and the reported t-statistics use robust standard errors as described in Huber (1967) and White (1980) and cluster by fund.

Panel A: Regressions

	Inflows Subject to Load						Redemptions					
	1		2		3		4		5		6	
	Coef	t-stat	Coef	t-stat	Coef	t-stat	Coef	t-stat	Coef	t-stat	Coef	t-stat
Lagged Inflows Subject to Load	0.4495	34.48	0.4318	30.06	0.4322	27.72						
Lagged Redemptions							0.3666	21.87	0.3576	21.80	0.3466	19.53
Excess Load Paid to Brokers	0.0372	2.47					0.0171	0.52				
Excess Load Paid to Brokers × captive			−0.0899	−2.13	−0.1734	−3.46			−0.1650	−2.67	−0.3059	−4.15
Excess Load Paid to Brokers × Unaffil			0.0952	3.11	0.1320	3.49			−0.0262	−0.65	−0.1214	−2.41
Front Load	−0.1577	−23.44					−0.0523	−5.36				
Front Load × Captive			−0.1228	−7.20	−0.1338	−6.62			−0.0589	−2.81	−0.0277	−1.27
Front Load × Unaffil			−0.1794	−19.89	−0.1866	−19.12			−0.0682	−6.19	−0.0456	−3.89
Redemption Fee	−0.0009	−2.82	−0.0006	−1.72	−0.0013	−3.80	−0.0010	−2.34	−0.0009	−1.85	−0.0006	−1.25
Lag Ranked Returns Low	−0.0003	−0.41					−0.0143	−10.51				
Lag Ranked Returns High	0.0114	11.68					−0.0010	−0.86				
Lag Ranked Returns Low × captive			0.0041	2.21	0.0058	2.77			−0.0098	−3.81	−0.0082	−3.36
Lag Ranked Returns Low × Unaffil			−0.0016	−1.46	−0.0013	−1.12			−0.0150	−8.63	−0.0142	−7.78
Lag Ranked Returns High × Captive			0.0046	2.05	0.0041	1.59			−0.0006	−0.25	0.0008	0.31
Lag Ranked Returns High × Unaffil			0.0138	10.67	0.0132	9.53			−0.0010	−0.76	−0.0007	−0.45

Log Family Size	0.0007	8.15	0.0009	8.56	0.0013	9.52	0.0007	4.22	0.0008	5.77	0.0005	2.89
Log Fund Size	−0.0011	−9.49	−0.0012	−9.27	−0.0012	−8.48	−0.0009	−6.39	−0.0009	−5.91	−0.0006	−3.60
Expenses	0.1886	5.33	0.1606	4.03	0.1365	3.04	0.3993	7.61	0.3325	6.75	0.2867	5.33
Category Inflows	0.1879	10.23	0.2184	8.79	0.2131	7.76						
Category Redemptions							0.6919	21.52	0.7201	21.57	0.7262	20.28
Proportion Class A	0.0044	9.22	0.0039	7.21	0.0038	6.08	−0.0029	−3.73	−0.0041	−5.11	−0.0039	−4.33
Captive			−0.0042	−4.47	−0.0078	−4.32			−0.0048	−3.01	−0.0094	−4.22
Family Inflows × Captive					0.1271	2.75					0.1292	2.05
Family Inflows × Unaffil					0.0873	6.07					0.0417	1.95
Family Redemptions × Captive					0.0890	2.17					0.3619	6.98
Family Redemptions × Unaffil					−0.0090	−0.55					0.2785	9.38
Constant	0.0093	1.66	0.0014	0.74	0.0020	0.27	0.0060	1.77	0.0039	1.44	0.0068	0.72
Year Fixed Effects	Yes		Yes		Yes		Yes		Yes		Yes	
Adjusted R^2	35.76%		36.38%		36.81%		30.43%		30.55%		33.44%	
Observations	126,904		98,063		83,781		126,979		98,121		83,839	

Panel B: Tests

	2		3		4		5	
	F-test	p-value	F-test	p-value	F-test	p-value	F-test	p-value
Excess Load Paid to Broker (Captive = Unaffil)	11.82	0.001	22.14	0.001	3.50	0.062	4.29	0.039
Front Load (Captive = Unaffil)	8.54	0.004	5.65	0.018	0.15	0.699	0.52	0.473
Lag Ranked Return Low (Captive = Unaffil)	6.99	0.008	8.73	0.003	2.68	0.102	3.81	0.051
Lag Ranked Return High (Captive = Unaffil)	12.33	0.001	9.63	0.002	0.03	0.873	0.24	0.621
Lag Ranked Return High–Low (Captive)	0.02	0.889	0.16	0.686	4.93	0.027	4.32	0.038
Lag Ranked Return High–Low (Unaffil)	53.73	0.000	40.52	0.000	24.46	0.000	20.42	0.000
Family Inflows (Captive = Unaffil)			0.68	0.410			1.73	0.188
Family Redemptions (Captive = Unaffil)			5.06	0.025			2.13	0.145

Table IV

Flows and Excess Revenue Sharing

This table gives the regression estimates of inflows and redemptions on excess broker payments from Table II and other fund and family characteristics. The dependent variable for regressions 1 and 2 is monthly fund inflows as a percent of fund total net assets (TNA). The dependent variable for regressions 3 and 4 is monthly fund redemptions as a percent of fund TNA. In regressions 1 and 3, the sample consists of all fund-month observations where the fund reports unreimbursed 12b-1 expenses/revenue-sharing payments (Q44). In regressions 2 and 4 a requirement that the fund family have 10 or more funds is added. The independent variable of interest is *Excess Revenue Sharing*, the residuals from regression 3 in Table II. The performance measure, *Lag Ranked Returns*, is the fractional rank of the fund's return (between zero and one) from the end of month $t-13$ to the end of month $t-1$ among funds in the same investment objective category. The low and high *Lag Ranked Returns* are calculated as *Lag Ranked Returns Low* = min(0.5, *Lag Ranked Returns*) and *Lag Ranked Returns High* = *Lag Ranked Returns* – *Lag Ranked Returns Low* to create a piecewise linear specification with a kink at the 50th percentile of ranked performance. Lagged inflows and redemptions are six-month lags of the dependent variable. All other independent variables are defined in Appendix A. The table gives coefficient estimates, t-statistics, adjusted R^2s, and the number of fund-month observations. Yearly fixed effects are included in the regression and the reported t-statistics use robust standard errors as described in Huber (1967) and White (1980) and cluster by fund.

	Inflows				Redemptions			
	1		2		3		4	
	Coef	t-stat	Coef	t-stat	Coef	t-stat	Coef	t-stat
Lagged Inflows	0.4097	14.20	0.3733	17.72				
Lagged Redemptions					0.3783	6.43	0.3234	8.02
Excess Revenue Sharing	1.1765	3.07	1.1199	2.87	0.3802	1.21	0.1986	0.73
Front Load	−0.0987	−2.28	−0.1240	−4.51	−0.0599	−1.48	−0.0605	−3.32
Back Load	0.0362	1.37	0.0361	1.28	−0.0071	−1.05	−0.0070	−1.19
Redemption Fee	0.0010	0.66	0.0008	0.56	−0.0019	−1.82	−0.0014	−1.40
Lag Ranked Returns Low	−0.0014	−0.41	−0.0005	−0.14	−0.0162	−5.04	−0.0135	−4.37
Lag Ranked Returns High	0.0309	6.74	0.0317	7.86	−0.0001	−0.04	0.0026	0.88
Log Family Size	0.0011	1.49	0.0030	4.54	−0.0003	−0.41	0.0004	0.82
Log Fund Size	−0.0033	−6.19	−0.0039	−8.24	−0.0011	−3.03	−0.0011	−3.68
Expenses	0.0372	0.17	0.1585	0.66	0.3687	1.67	0.7210	3.70
Proportion Class A	−0.0002	−0.08	−0.0003	−0.09	−0.0005	−0.22	−0.0031	−1.21
Proportion Class B	−0.0065	−1.18	−0.0007	−0.10	−0.0083	−1.87	−0.0132	−2.20
Proportion Class C	−0.0008	−0.11	−0.0054	−0.69	0.0050	0.89	−0.0018	−0.28
Proportion Retirement	0.0216	2.18	0.0294	2.89	0.0115	1.47	0.0130	1.53
Proportion Institutional	−0.0012	−0.29	−0.0010	−0.21	−0.0009	−0.32	−0.0056	−1.77
Category Inflows	0.6479	8.25	0.7544	10.63				
Category Redemptions					0.6603	8.82	0.7265	10.93
Family Inflows			0.2225	3.57			0.0737	1.36
Family Redemptions			0.0500	0.73			0.1974	2.91
Constant	0.0580	1.68	−0.0172	−1.34	0.0524	2.36	0.0051	0.49
Year Fixed Effects	Yes		Yes		Yes		Yes	
Adjusted R^2	39.34%		44.32%		31.21%		36.30%	
Observations	17.479		14.921		17.479		14.921	

monthly inflows by 0.0186%, which for the median fund translates to $1 in load payment increasing flows by approximately $6.71.[25]

The second main result testing H2 confirms that the total load enters negatively, so higher loads discourage inflows, while sharing more of the loads with brokers brings flows in. Redemption fees, which generally penalize early divestment, also discourage inflows, and as the analogous outflows regression demonstrates, they discourage outflows as well. Expense ratios relate positively to both inflows and outflows, which is consistent with the Barber, Odean, and Zheng (2005) argument that the expense ratio does not deter investment because it is not salient at that point, and also with the expense ratio becoming salient as investors pay it.

The second regression addresses the role of broker affiliation in the effect of load payment on flows. It does so by focusing on the subset of funds categorized as either captive or unaffiliated and interacting the effects of past performance, total load paid, and excess load paid to the broker on flows with affiliation. The corresponding hypotheses to test regarding the effect of affiliation are H3 and H4. The regression finds significant effects of affiliation in the predicted directions. Unaffiliated brokers bring stronger price competition: consumers are more sensitive to the total load (H3), and inflows are more sensitive to the excess load paid to the broker (H4), when the brokers are unaffiliated. At the point estimate, a 50bp increase in load payment to unaffiliated brokers increases flows into the average fund by 0.0476%, more than double the increase in the first regression. For each $1 increment in the load payment to the broker there is a $14.20 increase in flows.[26] The regression also identifies another implication of affiliation, which is lower turnover with captive brokerage: *Captive* on its own is negative in both the inflow and the redemption regressions. So unaffiliated brokerage brings greater sensitivity to price and performance, as well as higher turnover.

Following up on H3, there is also the related question of whether affiliation alters the effect of performance on flows. That is, funds compete not only on price (total loads) but also on past performance, so if unaffiliated brokerage brings tougher competition on price it should also bring tougher competition on past performance. This would correspond to a more positive coefficient on past performance when interacted with unaffiliated, rather than captive brokerage, particularly in the region of better past performance, which is where the competition for flows primarily occurs (Ippolito (1992)). The two hypotheses ancillary to H3 are:

[25] For the median fund from Table I, we calculate the expected change in flows as $0.000186 \times$ $182 million = $33,852. Using median expected inflows of 0.48% and the median load paid to the broker of 1.5% (between captive and unaffiliated brokers), the expected increase in the load paid to the broker is $(0.0048 + 0.000186) \times$ $182 million $\times (0.015 + 0.005) - (0.0048) \times$ $182 million $\times (0.015) =$ $5,045. The ratio of expected flow changes to expected change in dollars of load payment is $1 to $6.71.

[26] The expected dollar increase in the load payment to the broker for a 50bp change is $(0.0048 + 0.005 \times 0.0952) \times$ $182 million $\times (0.015 + 0.005) - (0.0048) \times$ $182 million $\times (0.015) =$ $6,100 and the change in flows is $0.005 \times 0.0952 \times$ $182 million = $86,632. The ratio of expected flow changes to expected change in dollars of load payment is $1 to $14.20.

H3a: *Inflows are more positively related to past performance when brokers are unaffiliated.*

H3b: *Inflows are more convex in past performance when brokers are unaffiliated.*

The regression also addresses a question left open by the flow/performance literature, namely, the effect of performance on the inflows, rather than net flows, of load funds. Because load revenue is a one-time upfront payment that arises specifically from inflows, the disaggregation of inflows from outflows is critical to understanding the incentive effects of these payments in load funds that net flows fail to capture. Results are in the second regression in Panel A of Table III with *F*-tests for equality of the interaction terms underneath in Panel B.

Unaffiliated brokers also bring stronger competition on past performance: the sensitivity of inflows to past performance is much stronger in the region of better past performance (i.e., *Lag Ranked Returns High*) when brokers are unaffiliated. Furthermore, the convexity of inflows in past performance, as measured by the slope in the region of better performance minus the slope in the region of worse performance (i.e., *Lag Ranked Returns High – Low*), is significantly stronger when brokers are unaffiliated. Indeed, there appears to be no convexity at all with captive brokers, as the slopes in the two regions are almost equal. We thus conclude that unaffiliated brokerage amplifies the convexity-driven incentive effects of load revenue. Among outflows we do not find a significant effect of affiliation, which is consistent with the fact that, unlike inflows, outflows come only from investors already aware of the fund and its performance, making the influence of brokers relatively less important.

Our last set of tests addresses the effect of affiliation on flows within the family. Captive brokerage brings less competition with funds in other families, but by the same token it could bring more competition with funds in the same family. That is, if two funds are competing for the same inflows, both the fund that receives the inflow and the fund that lost out on the inflow could more often be in the same family, if the brokers are captive to the family. To test whether captive brokerage fosters such "cannibalization," the regression includes as an explanatory variable the inflows to the other funds in the same family interacted with broker affiliation. The key test for cannibalization is whether captive brokerage has a negative effect, that is, whether a fund's inflows are more negative in the rest of its family's inflows when the fund uses captive brokerage. We also test for a more positive potential effect of captive brokerage, which could be termed "recapture": the other fund receiving the money redeemed from a fund could more often be in the same family if brokers are captive. To test for recapture, the regression includes the outflows from the other funds in the same family interacted with affiliation, and tests whether captive brokerage has a positive effect, that is, whether a fund's inflows are more positively related to the rest of its family's outflows when the fund uses captive brokerage.

The results including intrafamily flows are provided in the third regression of Table III with F-tests for the differences across affiliation provided in Panel B (the sample is slightly reduced because to properly capture intrafamily flows we restrict the sample to families with 10 or more funds). We find significant evidence of recapture through captive brokerage: inflows increase more with the rest of the family's outflows when the brokers are captive rather than unaffiliated. However, there is no evidence of cannibalization: there is a significantly positive relation between the inflows of a fund and its family, consistent with the family-level influences documented in Gallaher, Kaniel, and Starks (2008) and Nanda, Wang, and Zheng (2004), but there is no significant difference between *Captive* and *Unaffil*. We therefore conclude that captive brokerage brings the benefit of recapture. It is also worth noting that, because the effects of the total load and the excess load paid to the broker on inflows maintain their sign and significance when we allow for recapture and cannibalization, they appear not to be driven by flows coming from within the fund family, but instead from outside the family.

C.2. Revenue Sharing and Flows

To test whether revenue sharing attracts inflows (H5), we run the same sort of test, except with excess revenue sharing rather than excess load sharing. The analogous regressions explaining outflows with excess revenue sharing test the hypothesis that, because it generally keeps paying while an account stays invested, revenue sharing discourages outflows. This sample is only a tenth the size of the load-sharing sample because it is restricted to only those funds with defensive 12b-1 plans, so we do not use it to test hypotheses about other variables. The results are in Table IV.

The main result of Table IV is that inflows are positively related to excess revenue sharing, consistent with H5. We find this in our original specification, and also when we allow for the possibility of cannibalization and recapture by including family inflows and redemptions in the regression. We therefore conclude that revenue sharing attracts inflows, and not through cannibalizing inflows from inside the family. In the outflow regressions, excess revenue sharing does not enter significantly, so the regression leaves open whether revenue sharing discourages redemptions.

D. Broker Payments and Performance

Do the funds that pay brokers more subsequently perform better or worse? To address this question we run multiple regressions with the excess load paid to the broker and excess revenue sharing explaining performance over the next 12 months. Performance is measured as a fund's return net of expenses minus the contemporaneous net return of its category. The load payment regressions are in Table V, and the revenue-sharing regressions are in Table VI.

Table V

Future Returns and Excess Load Paid to Broker

This table gives regression estimates of 12-month forward-looking net excess returns as a function of broker payments and other fund and family characteristics. The dependent variable is the compounded monthly fund returns net of expenses from $t+1$ to $t+12$ in excess of the compounded Morningstar investment objective category net returns over the same time period. In regressions 1, 2, and 3 the sample consists of all fund-month observations where the fund reports a nonzero front load collected from investors. Regression 4 is the same sample but with the added requirement that loads are paid solely to unaffiliated or captive brokers. The independent variable of interest is *Excess Load Paid to Brokers*, the residuals from regression 1 of Table II. Also, in specification 3 *New Inflows* are separated into *Inflows Subject to a Load* and *Inflows Not Subject to a Load*, which along with all other independent variables are defined in Appendix A. In Panel A, the table lists coefficient estimates, t-statistics, adjusted R^2s, and the number of fund-month observations for all four regressions. Panel B gives p-values for tests of the difference in coefficients. Both year and Morningstar investment objective fixed effects (38 categories) are included in the regression and the reported t-statistics use robust standard errors as described in Huber (1967) and White (1980) and cluster by fund.

Panel A: Regressions

	Excess Returns Months +1 to +12							
	1		2		3		4	
	Coef	t-stat	Coef	t-stat	Coef	t-stat	Coef	t-stat
Inflows	0.0526	3.10	0.0014	0.09			0.0589	2.96
Inflows Subject to Load					0.0045	0.16		
Inflows Not Subject to Load					0.0758	3.45		
Redemptions	−0.1287	−6.61	−0.0731	−3.97	−0.1290	−6.59	−0.1269	−5.28
Log Family Size	0.0025	5.10	0.0023	5.01	0.0026	5.12	0.0023	4.04
Log Fund Size	−0.0038	−6.48	−0.0041	−7.42	−0.0038	−6.51	−0.0030	−5.02
Category Inflows	−0.0083	−0.16	0.0122	0.24	−0.0111	−0.21	0.0336	0.48
Category Redemptions	0.1579	2.76	0.1224	2.16	0.1574	2.75	0.1935	2.78
Excess Load Paid to Broker	−0.3441	−2.84	−0.3523	−3.01	−0.3338	−2.77		
Excess Load Paid to Broker × Captive							−0.1448	−0.88
Excess Load Paid to Broker × Unaffil							−0.4972	−2.48
Lag Ranked Returns			0.0376	15.80				
Captive							−0.0011	−0.60
Constant	0.0312	3.25	0.0184	2.03	0.0314	3.27	0.0192	1.66
Year Fixed Effects	Yes		Yes		Yes		Yes	
Objective Category Fixed Effects	Yes		Yes		Yes		Yes	
Adjusted R^2	1.54%		3.13%		1.56%		1.48%	
Observations	146,461		146,461		146,461		113,153	

Panel B: Tests

	F-test	p-value	F-test	p-value
New Inflows (Subj Load = Not Subj Load)	3.68	0.0551		
Excess Load Paid to Broker (Captive = Unaffil)			1.96	0.1616

Table VI

Future Returns and Excess Revenue Sharing

This table gives regression estimates of 12-month forward-looking net excess returns as a function of broker payments and other fund and family characteristics. The dependent variable is the compounded monthly fund returns net of expenses from t+1 to t+12 in excess of the compounded Morningstar investment objective category net returns over the same time period. In regression 1 the sample consists of all fund-month observations where the fund reports a nonzero revenue sharing or unreimbursed 12b-1 payment. Regressions 2 and 3 require that the fund have a nonmissing excess load payment to the broker. The independent variables *Excess Load Paid to Broker* and *Excess Revenue Sharing* are the residuals from regressions 1 and 3, respectively, of Table II. All other independent variables are defined in Appendix A. The table gives coefficient estimates, t-statistics, adjusted R^2s, and the number of fund-month observations. Both year and Morningstar investment objective fixed effects (38 categories) are included in the regression and the reported t-statistics use robust standard errors as described in Huber (1967) and White (1980) and cluster by fund.

	Excess Returns Months +1 to +12					
	1		2		3	
	Coef	t-stat	Coef	t-stat	Coef	t-stat
Inflows	0.0731	1.66	0.0314	0.61	−0.0304	−0.61
Redemptions	−0.0710	−1.49	−0.0292	−0.52	0.0425	0.75
Log Family Size	−0.0006	−0.44	−0.0003	−0.21	−0.0004	−0.32
Log Fund Size	−0.0027	−1.62	−0.0032	−1.69	−0.0038	−2.07
Category Inflows	−0.1398	−0.88	−0.1237	−0.71	−0.0772	−0.45
Category Redemptions	0.1626	1.02	0.2259	1.31	0.1647	0.96
Excess Revenue Sharing	−2.4638	−2.50	−1.1230	−1.23	−1.1464	−1.29
Excess Load Paid to Broker			−1.1236	−2.52	−1.0547	−2.54
Lag Ranked Returns					0.0387	5.19
Constant	0.0819	2.36	0.0484	0.94	0.0334	0.67
Year Fixed Effects	Yes		Yes		Yes	
Objective Category Fixed Effects	Yes		Yes		Yes	
Adjusted R^2	3.20%		2.96%		4.46%	
Observations	19,541		15,346		15,346	

As before, standard errors are adjusted for heteroskedasticity and clustered by fund.[27]

D.1. Load Paid to Brokers and Performance

In the first of the load-sharing regressions, excess load sharing enters significantly negatively. So, consistent with H6, the funds paying relatively more subsequently perform worse. The effect is economically significant to consumers:

[27] The results of Tables V and VI are robust to including expenses as a control variable. Because the results do not change we do not include these regressions in the tables.

the coefficient on the excess load paid to the broker, −0.3441, in the first regression implies that 1% more to the broker predicts a 0.34% decrease in performance over the next year. The second regression controls for potential momentum effects by including lagged ranked return, and finds similar results (see Sapp and Tiwari (2004)).

The regression also finds a smart-money effect in both directions (e.g., Zheng (1999), Gruber (1996), and Keswani and Stolin (2008)), controlling for category effects that turn out not to be smart. That is, category inflows do not enter and category outflows are the opposite of smart, predicting good performance, but, controlling for this, a fund's inflows predict good performance and its outflows predict bad performance.

The literature on performance persistence (e.g., Carhart (1997), Frazzini and Lamont (2008)) casts doubt on the possibility that flows subject to loads are smart, in the sense of earning positive alpha, because the persistence it identifies is small relative to loads and short-lived. Accordingly, we decompose inflows into flows subject and not subject to a load to test whether the predicted content is concentrated in the latter. We do so in the third regression, which provides evidence of positive information in flows not subject to a load, which predict good performance, whereas flows subject to a load predict nothing. The F-test shows that the difference is statistically significant.

Because Table III isolates the effect of the excess load paid to brokers on flows in unaffiliated brokerage, the most relevant question for consumer welfare is whether the amount paid to unaffiliated brokers predicts poor performance. To address this question, the final regression breaks out captive and unaffiliated brokerage channels. The fitted model shows a significant negative relation between the excess load paid to unaffiliated brokers and future performance: the average 2.3% payment to unaffiliated brokers corresponds to a 1.13% reduction in annual performance, so in that sense, the effect of load sharing is potentially a concern for consumers in this channel. The coefficient on captive brokerage is not statistically significantly different from zero.

D.2. Revenue Sharing and Performance

We test the effect of revenue sharing on performance with multiple regressions analogous to those in Table V. As before, the sample is the smaller subset of funds with defensive 12b-1 plans. Since load and revenue sharing are likely driven by similar forces, we run two regressions, one with excess revenue sharing as an explanatory variable, and one with both excess revenue sharing and the excess load paid, to identify the effect of revenue sharing that is distinct from the effect of loads paid to brokers.

The main result is that, consistent with H7, the robust relationship of future performance is with load payment, not revenue sharing. Revenue sharing enters when the excess load payment to the broker is excluded, but when it is included only load sharing enters, and it enters negatively as before. Thus, recalling the warnings from regulators and practitioners about the dangers of compensating brokers from loads and revenue, the data show significant evidence of the former but not the latter, which is consistent with the direct exposure of the broker to the consumer's welfare that revenue sharing, but not load sharing, imparts.

IV. Summary and Conclusion

Consumers are warned by regulators and practitioners alike that payments to mutual fund brokers may skew brokers' incentives. This paper is the first to examine whether this occurs, and if so whether it affects consumers' welfare. The data for this analysis, which come directly from SEC filings, contain details on payments both out of the sales loads consumers pay and out of the investment advisers' revenue. We find significant evidence that these payments do skew brokers' incentives, particularly when the brokers are not affiliated with the funds paying them, and also that the payments predict worse performance, particularly the payments from sales loads, which do not impart continuing exposure to the investment's performance.

Mutual funds selected through brokers play a large role in consumers' lifecycle savings. This role, combined with the recent poor performance of these savings, has brought renewed regulatory attention, including the direction by the Dodd-Frank Wall Street Reform and Consumer Protection Act that the SEC revisit its constraints on brokers' compensation, incentives, and duty of care. Our results identify a cost of the current industrial organization of investment advice, where the latitude fund sponsors enjoy to pay more or less to their brokers has real consequences for their brokers' clients. This does not mean that the sponsors should not enjoy this latitude, though it does argue for letting consumers see the cross-section of payments and filter their brokers' advice accordingly. Similarly, the stronger evidence for upfront load sharing, as opposed to revenue sharing, as a predictor of poor performance argues for letting consumers know whether broker payments expose the brokers to realized returns.

The SEC data shed light on several other dimensions of mutual fund operations, particularly the distinction between a captive and an unaffiliated sales force. Unaffiliated brokers bring not only more competition for inflows on price (both the price consumers pay and the brokers' share of this price), but also more competition on past performance, rendering their inflows significantly more convex in past performance. On the other hand, captive brokerage is associated with lower investor turnover, which is generally beneficial for longer-term investors (Johnson (2004)) and greater recapture of outflows from elsewhere in the family. These are all potentially important considerations for regulators interested in altering the investment-advice industry for the benefit of consumers. These findings also show that a fund sponsor's choice between marketing strategies is strategically rich, and a promising area for future research.

Appendix A. Variable Definitions

Table AI

Variables Using N-SAR Data

Variable	Definition
Captive	= 1 if fund i received loads through captive brokers (Q33) but not unaffiliated brokers (Q32) in *NSAR(i,t),* = 0 otherwise.
Unaffil	= 1 if fund i received loads through unaffiliated brokers (Q32) but not captive brokers (Q33) in *NSAR(i,t),* = 0 otherwise.
Brokered	= 1 if fund i received loads through unaffiliated brokers (Q32) or captive brokers (Q33), = 0 otherwise.
Revenue Sharing Indicator	= 1 if fund i indicates that it participates in a defensive 12b-1 plan (Q44), = 0 otherwise.
Revenue Sharing	Amount of payments made pursuant to a defensive 12b-1 plan (Q44) divided by average net assets (Q75). Because we use the semiannual data, this number is multiplied by two to annualize.
Inflows	$\frac{\text{Investments in fund } i \text{ in month } t \text{ from Q28a to Q28f of the NSAR}}{\text{Total net assets in fund } i \text{ at the end of month } t \text{ from Morningstar}}$
Proportion Inflows Subject to Load	$\frac{\text{Inflows subject to Load (Q28h)}}{\text{Total new inflows (Q28g1 + Q28g2 + Q28g3)}}$
Inflows Subject to Load	New Inflows × Proportion Inflows Subject to Load
Inflows Not Subject to Load	New Inflows × (1−Proportion Inflows Subject to Load)
Redemptions	$\frac{\text{Redemptions in fund } i \text{ in month } t \text{ from Q28a to Q28f of the NSAR}}{\text{Total net assets in fund } i \text{ at the end of month } t \text{ from Morningstar}}$
Front Load	$\frac{\text{Front loads paid by consumers from Q30a of the NSAR}}{\text{Inflows subject to a load from Q28h of the NSAR}}$
Load Paid to Broker	$\frac{\text{Front loads paid to unaffiliated and captive brokers (Q32 + Q33 of the NSAR)}}{\text{Inflows subject to a load from Q28h of the NSAR}}$
Expenses	Total net expenses of the fund (Q97x) minus reimbursements (Q97y) divided by average net assets for the reporting period (Q75b). Because we use semiannual data, this number is multiplied by two to annualize. Expenses include 12b-1 fees and are reported as decimals.
Back Load	$\frac{\text{Back loads paid by consumers from Q35 of the NSAR}}{\text{Outflows Q28a to Q28f of the NSAR}}$
Category Inflows and Redemptions	Total flows (new inflows, redemptions) to fund i's investment objective category as a percentage of the category's net assets in month t.
Redemption Fee	= 1 if a fund collects a fee separate from deferred sales charges for redemptions, = 0 otherwise.

Table AII

Variables from Morningstar Asset-Weighted across All Share Classes of the Same Fund

Variable	Definition
Lag Ranked Return	Fractional rank of the fund's net return (between 0 and 1) from the end of month $t-13$ to the end of month $t-1$ among funds in the same investment objective category.
Log Fund Size	Log of total assets (in thousands) of fund i at the end of month t.
Fund Age	Current age of the fund in years since the fund's inception.
Index Fund	Takes the value one if the fund is an index fund and zero otherwise.
Log Family Size	Log of total assets (in thousands) of all funds in i's family with available N-SAR data as of month t.
Proportion Share Class (A, B, C, etc.)	Portion of assets held in five different share class categories ranging from 0 to 1: A, B, C, Institutional and Retirement. Share class designations are determined from the Morningstar's "Share Class Type" variable.
Objective Category	Morningstar sorts funds into 38 categories. We group these categories into equity, fixed income, international, municipal, specialty, and balanced.
Excess Returns	Compounded monthly fund returns net of expenses over a 12-month horizon (+1 to +12 months) in excess of the compounded Morningstar investment objective category net returns over the same time period (reported in decimals).

Table AIII

Family-Level Variables

Variable	Definition
Family Inflows	This variable is calculated by summing all the monthly inflows in all other funds in a family and dividing this by the total net assets of all other funds in the family.
Family Redemptions	This variable is calculated by summing all the monthly redemptions in all other funds in a family and dividing this by the total net assets of all other funds in the family.
Family Average Load Paid to Broker	This variable is calculated by averaging the average amount paid to the broker (Q32+Q33) as a percent of inflows subject to a load for all other funds (excluding the fund of interest) in the family.
Family Average Revenue Sharing	This variable is calculated by averaging the revenue sharing arrangements (Q44) in all other funds in the family and dividing by the average net assets of all other funds in the family.

Appendix B. The Determinants of Fund Distribution

In this appendix, we examine the determinants of a fund's distribution channel. The test design is the two-stage model of Heckman (1979), where the first stage (Panel A) is the fund's selection to sell through a broker rather than directly, and the second stage (Panel B) is the fund's decision to sell through unaffiliated rather than captive brokers in the subset of funds that are broker-sold. The analysis is run on a subset of the data including the five domestic equity fund objectives, growth, growth and income, equity income, small company, and aggressive growth. Because fund-level distribution at inception is used as one of the independent variables in the second stage regression, the first observation for each fund in the sample is dropped. The results are given in Table BI.

The results of the selection equation in Panel A show, not surprisingly, that the fund family's principal distribution channel plays a major role in whether the fund is sold through a broker. If funds in the family are predominantly broker-sold, it is 70% more likely that the fund will also be broker-sold. The fund family's inception decade is also an important determinant since fund families started in the 1950s through 1980s are more likely to have funds that are broker-sold than those families introduced after 1990. In the principal equation, we see that, among brokered funds, the only statistically significant determinant of whether a fund is currently sold through an unaffiliated or captive broker is the fund's distribution channel at inception. Even after controlling for current variables such as a fund's recent performance and flows, nothing else enters. This evidence suggests that the choice of using a captive or unaffiliated channel is exogenous to our explanatory variables.

Table BI

The Determinants of Fund Distribution

Using data on domestic equity funds, this table provides the marginal effects from a Heckman (1979) selection model determining a fund's principal distribution channel. The maximum likelihood estimation simultaneously estimates two equations: a selection equation, Panel A, and the principal equation, Panel B. The dependent variable in the selection equation is an indicator variable taking the value one if the fund is currently distributed through a *Brokered* channel. The dependent variable in the principal equation takes the value one if the fund is currently distributed through an unaffiliated broker rather than a captive broker given the fund has selected to sell through a broker. For independent indicator variables, the second column in the table lists the omitted variable (i.e., comparison group) that the marginal effects are measured against. *Family Distribution Channel* is calculated as the distribution channel currently used by the majority, >50%, of funds in the family, excluding the fund being analyzed. *Fund Family Inception Decade* is an indicator variable for each decade in which a fund family was started. *Fund Original Distribution Channel* takes the value one if the distribution channel at the fund's inception was unaffiliated and zero otherwise. *Lag S&P 500 Return* is the percentage return on the S&P 500 index over the previous six-month period. *Net Flows* (*Category Net Flows)* are the difference between *Inflows (Category Inflows)* and *Redemptions (Category Redemptions)* as defined in Appendix A. The independent variables *Lag Ranked Return*, *Index Fund*, *Fund Age, Log Fund Size, Log Family Size, and Objective Category* are also defined in Appendix A. Those independent variables that are marked *Lag* are lagged one month. Year-month fixed effects are included and standard errors are clustered by fund.

Panel A: Selection Equation—brokered and Nonbrokered Distribution Channels			
	Comparison Group	Marginal Effect	t-stat
Family Distribution Channel			
Brokered	Nonbrokered	0.709	17.97

(*Continued*)

Table BI—*Continued*

Panel A: Selection Equation—Brokered and Nonbrokered Distribution Channels			
	Comparison Group	Marginal Effect	*t*-stat
Fund Family Inception Decade			
1950s		0.219	6.33
1960s	Fund Family	0.126	1.66
1970s	starting after 1990	0.105	1.84
1980s		0.129	3.58

Panel B: Principal Equation—Unaffiliated and Captive Distribution Channels			
	Comparison Group	Marginal Effect	*t*-stat
Fund Original Distribution Channel			
Unaffiliated	Captive	0.7197	23.60
Index Fund	Active Fund	0.0226	0.30
Lag Fund Age		0.0008	1.33
Lag Net Flows		0.0002	1.50
Lag Category Net Flows		0.0024	1.82
Lag Log Fund Size		−0.0024	−0.43
Lag Log Fund Family Size		−0.0043	−1.02
Lag S&P 500 Returns		0.1250	1.60
Lag Ranked Returns		−0.0037	−0.25
Objective Category			
Growth		−0.0230	−1.03
Growth and Income	Aggressive	−0.0154	−0.53
Equity Income	Growth	0.0394	1.16
Small Company		−0.0234	−0.70
Observations		96,074	

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