Dynamic Setting of Distribution Fees in the US Mutual Fund Industry

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ABSTRACT

The distribution strategies of mutual funds directly or indirectly affect both their growth and their revenues. The extent of resources dedicated by a fund to its distribution channel(s) is therefore an important strategic decision. For a sample of US diversified equity mutual funds in the period from 1994 to 2007, we analyze the distribution fees and their components (12b-1 fees and loads) with the aim to identify their economic determinants. In particular, we examine the temporal and cross-sectional relation between distribution fees and past performance, and show that past performance is an important determinant of distribution fees. Our subsequent analysis of the relation between flows and performance supports the hypothesis that management companies strategically adjust their distribution fees in response to reported returns in an attempt to influence future net money flows. We highlight that this strategic behavior is particularly concentrated in the broker-sold segment of funds and, quite surprisingly, among poor performing funds. We suggest that poorly performing funds that use their distribution channels intensively to market improvements in performance experience increased net flows, even if these improvements are merely ameliorated bad performance. Finally, we show that the higher flow benefit enjoyed by poorly performing funds occurs only when an increase in distribution fees is accompanied by a simultaneous decrease in management expenses, which suggests that investors do pay attention to the total cost of investment. Our results also show that mutual funds are always penalized by investors for raising both of these fees simultaneously. This phenomenon is furthermore amplified in the case of funds with good past performance results.

KEYWORDS: Mutual fund performance; mutual fund fees; strategic pricing; flow-performance sensitivity.

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Introduction

On 4 December 2002, in a remark to a roundtable on Investment Company Regulation at the Security and Exchange Commission (SEC), Joel Goldberg, former Director of the SEC's Division of Investment Management at the time of the controversial approval of Rule 12b-1, stated that if a mistake had been committed by the SEC in promulgating this rule, it was that they "…did not foresee that payments out of fund assets would be used as a substitute for a sales load…. [I]t is just astounding that we never thought of it". Since its inception in 1980, Rule 12b-1 has been designed to regulate when and how expenses for share distribution can be made by mutual funds.[1] However, as observed by Freeman (2007), what started as a minor supplemental marketing boost available to mutual funds to garner more new money and support growth has become an industry addiction at the expense of fund shareholders.[2] To give an idea of the economic relevance of the issue, the U.S. mutual fund market, with $12 trillion in assets under management as of year-end 2007, generated a staggering all-time high of $13.4 billion in 12b-1 fees. Furthermore, this figure does not even include the additional proceeds from front- and back-end loads paid by fund shareholders.

The use and abuse of 12b-1 fees and front-end loads remains a controversial topic. Some studies have examined it by asking whether the introduction and adoption of 12b-1 plans have actually conveyed any benefits to shareholders (Ferris and Chance, 1987,

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[1] Contrary to the common belief, Rule 12b-1 was not designed by the SEC to allow funds to pay for distribution costs, but rather to restrict the specific circumstances under which a fund could finance its distribution expenses. Moreover, the introduction of the 12b-1 fee in 1980 was motivated by the will of the SEC to prevent under-the-table payments for distribution.

[2] Immediately following the introduction of the 12b-1 plan, an increasingly large number of funds started charging 12b-1 fees. Consequently, these fees rocketed from no more than 0.25% to over 1% before the National Association of Securities Dealers (NASD) limited the aggregated 12b-1 fees to a maximum of 1% per year in 1998, in an effort to contain potential marketing deception.

McLeod and Malhotra, 1994, Sigglekow, 2004, and Walsh 2005). Another approach has been to investigate the hauling effect of distribution fees on the asset growth of mutual funds (Sirri and Tufano, 1998, Barber et al, 2005, Huang et al., 2007, Jain and Wu, 2000, Nanda et al., 2005). Despite the numerous studies cited above and the increased levels of public scrutiny, we are not aware of any work that has explicitly addressed the question of how mutual funds determine their distribution fees in the first place. What factors do management companies actually consider when they decide to alter their distribution fees? Is it possible to identify a strategy that management companies follow when making these decisions? These are the questions we aim to address in the present study.

Since the fees paid to fund managers are typically determined as a percentage of total assets under management, asset growth is generally a desirable feature from a fund managers' perspective. The literature on mutual funds provides extensive evidence of a convex flow-performance relationship, where funds with recent brilliant performance receive disproportionate net inflows (Ippolito, 1992, Gruber, 1996, Chevalier and Ellison, 1997, Goetzmann and Peles, 1996, Sirri and Tufano 1998, and Lynch and Musto, 2003). Thus, good performance seems to be an effective route to asset growth. However, high volatility and low persistence of fund returns suggest that performance is not a factor that fund managers can easily control. Alternatively, in order to promote asset growth, a fund can manipulate its distribution system by means of 12b-1 fees and loads, which certainly are under the control of the management company.[3] An effective use of the distribution channel could increase net inflows and generate higher revenues - and possibly even

[3] As a safe-guard against abuses perpetrated by advisory companies, the Corporation Act 1940 requires that fee changes be approved by the Board of Directors. However, this conscientious vigilance by the Board over fees is only a legal provision, and the directors' effectiveness in performing this function is handicapped by conflicts of interest.

higher profits.[4] Fund managers may therefore be tempted to increase their distribution fees in order to have more resources for strengthening their distribution channels.

Since the past performance of a fund seems to play such an important role in flow allocation, a natural question arises as to whether the decision to alter distribution fees is independent of realized performance.[5] Indeed, an increase in distribution fees may be more effective in some periods rather than in others - for example immediately after an improvement in performance. Our first hypothesis is that past performance does play a significant role in the determination of distribution fees.

A second question relates to investors' ownership costs. Clearly, any increase in distribution fees has a direct impact on the total cost borne by fund shareholders. This in turn may persuade existing shareholders to disinvest, as well as acting as a deterrent to new investment. With this in mind, our second hypothesis is that the decision to alter distribution fees, in an attempt to stimulate growth, is not independent of changes in other fee components (e.g. management fees) that ultimately affect the shareholders' total cost of ownership.

For a sample of diversified US equity mutual funds during the period 1994 to 2007, we first analyze the temporal and cross-sectional relationships between distribution fees (and their components of 12b-1 fees and front-end loads) and fund performance. We immediately observe a concave relationship between performance and distribution fees for brokered sold (load) funds. In particular, for the worst performing funds, both distribution fee levels and changes in these fees are positively related to performance. On

[4] Higher revenues translate into higher profits if funds experience economies of scale that are not passed onto shareholders via a reduction of fees.

[5] According to a survey conducted by the Investment Company Institute (ICI), investors review a wide range of information before purchasing mutual fund shares. In particular, 69% of them consider the historical performance of the fund, while 74% consider fund's fees and expenses (ICI Fact Book, 2008).

the other hand, the medium and top performing funds exhibit a slightly negative relationship between distribution fees and performance.

We next show that the sensitivity of flows to past performance increases significantly for the poorly performing funds whose distribution fees are higher than the median, among all funds with the same investment objective. In other words, poorly performing funds that use their distribution channels intensively to market improvements in performance experience increased net flows, even if these improvements are merely ameliorated bad performance. In the case of medium and top performing funds, no clear pattern emerges, which is consistent with the findings of Del Guercio and Tkac (2007). These authors suggest that clients use fund brokers merely as order takers, when it comes to choosing top-ranked funds. On the other hand, for low-ranked funds, a major role is obviously played by brokers. This follows from the fact that brokers expose themselves to considerable reputational risk by endorsing such funds in their portfolios.[6] As a result, poorly-ranked funds that seek support from brokers may be forced to offer them compensation for bearing this risk.

Finally, we illustrate that changes in distribution fees are significantly and negatively related to contemporaneous changes in management fees, regardless of performance rankings. This suggests that even though the abuse of distribution fees - 12b-1 fees, in particular - may pass undetected by the final investor, management companies appear to recognize an implicit limit to 12b-1 fee increases. Such a limit is probably induced by the way in which increases in the total cost of ownership deter investment. Our findings show that the higher flow benefit enjoyed by poorly performing funds occurs only when

[6] According to the survey conducted by the ICI, the median mutual fund investor purchases a portfolio of 4 funds rather than a single fund (ICI Fact Book, 2008).

an increase in distribution fees is accompanied by a simultaneous decrease in management expenses, which suggests that investors do pay attention to the total cost of investment. Our results also show that mutual funds are always penalized by investors for raising both of these fees simultaneously. Furthermore, this phenomenon is amplified in the case of funds with better past performance results. As far as we are aware, our study is the first to describe how a simultaneous change in *both* distribution fees and management fees impacts on the growth in the fund net money flows, and to quantify this impact.

The remainder of this paper is organized as follows: in Section I we review the relevant literature. Section II describes the data and empirical methodology employed in our analysis. In Sections III and IV we describe the findings from our econometric model and offer some explanations of these findings, based on an analysis of the flow-performance relationship. Section V summarizes and concludes.

I. Literature Review

Following the introduction of Rule 12b-1, a large number of studies have analysed the roles of distribution channels and marketing for mutual funds, as well as the fees they charge to finance their distribution.[7] A first strand of literature examines the benefits and costs for shareholders of a mutual fund marketing and distribution system. Ferris and Chance (1987), McLeod and Malhotra, (1994), Sigglekow, (2004), and Walsh (2005) investigate whether the introduction of Rule 12b-1 has generated financial benefits to

[7] Freeman (2007) provides an excellent examination of Rule 12b-1's origin, its mechanics, and the development of distribution funding in the industry. He also discusses the abuses and controversial practices related to mutual fund distribution expenses.

fund shareholders. The general finding of these analyses is that, from a shareholder's perspective, Rule 12b-l payments are at best a dead-weight cost borne by them. Bergstresser et al. (2006) study broker-sold and direct-sold mutual funds separately, to assess whether investors in broker-channelled mutual funds enjoy net benefits in exchange for the distribution fees they pay. Their evidence suggests that substantial non-tangible benefits are delivered by the broker-distributed sector, but that brokers experience conflicts of interest.

Following Sirri and Tufano (1998), a second strand of literature has considered the impact of mutual fund marketing and distribution on fund flows. Huang et al. (2007) revisit the analysis of Sirri and Tufano and examine the impact of marketing fees on the shape of the flow-performance relationship. They show that a higher level of marketing fees increases the sensitivity of flows to past performance, for funds in the low and medium ranges of performance, but has the opposite effect for funds in the high range of performance. Along the same lines, Nanda et al. (2005) examine the relationship between fund load structures and the flow-performance relationship, while Christoffersen et al. (2005) explore the differences between funds sold by captive versus unaffiliated brokers, with respect to investors' redemption and purchase decisions. Barber et al. (2005) analyse mutual fund flows and find a negative relationship between flows and front-end-load fees, but no relationship between operating expenses and flows. They present evidence suggesting that marketing and advertising (the costs of which are often embedded in a fund's operating expenses via 12b-1 fees) account for this result.

A complementary set of studies focuses on the relationship between mutual fund *advertising* and investor behavior. The aim here is to establish the extent to which advertising affects the way investors allocate money to funds (Cronqvist, 2005, Gallaher et al. 2004, Mullainathan and Shleifer, 2005, and Reuter and Zitzewitz, 2006).[8]

Although all the above papers focus explicitly on the analysis of marketing, advertising and distribution fees, none of them analyse how distribution and marketing fees are determined. In particular, whether mutual funds set these fees strategically has not been addressed so far. This brings us to the fundamental proposition of the current study, which is that distribution fees are inherently strategic by nature. Our main contribution is to show that management companies set their distribution fees only after taking into account past performance, with the clear objective of optimizing their position with respect to future investment flows. Our analysis represents an attempt to understand how the relationship between distribution fees, fractional rankings of past performance and flows varies through time in a sample of diversified equity mutual funds.

Christofferersen (2001) provides evidence that money market funds in the bottom and top rankings of performance waive their fees in order to boost their after-fee performance, and consequently benefit from higher fund flows.[9] Christoffersen and Musto (2002) and Gil-Bazo and Ruiz-Verdu (2009) analyse the fee-performance relationship to assess the extent to which mutual fund fees are affected by performance.[10]

[8] For example, Jain and Wu (2000) demonstrate that funds which advertise their past performance attract more money than a control group. They consider only advertisements containing historical performance information. These are the advertisements of funds that exhibit above-normal performance in the period prior to the advertisements. It might be interesting to investigate the impact on investment flows of advertisements that do not contain past performance information (since these are likely to be posted by funds with below-benchmark performance).

[9] The convex relationship between fund flows and performance provides an explanation for fee-waiving by funds at the top of the performance spectrum, but it cannot explain why funds at the bottom might do the same.

[10] The relation between fees and performance has not been neglected by the vast literature on mutual funds. However, mutual fund expenses have mostly been examined with the aim of determining the extent to which they explain or predict performance. Gruber (1996) presents evidence that the most expensive funds are associated with the worst net performance. Carhart (1997) finds similar results and documents a negative relationship between contemporaneous fees (operating expenses and loads) and net performance,

Focusing on money market funds, Christoffersen and Musto (2002) show that funds with high levels of outflows charge higher fees. They propose an explanation based on the hypothesis that investors have different degrees of sensitivity to performance. Since performance-sensitive investors typically abandon funds with poor historical performance, this class of funds experiences less-elastic demand (see also Berk and Tonks, 2007). Consequently, funds with bad past performance strategically increase the level of current fees to exploit the low sensitivity of their investor base. The persistence of performance among bad performers would explain the negative relationship between net returns and fees that has been extensively documented by the literature on mutual fund performance.

Gil-Bazo and Ruiz-Verdu (2009) highlight that a negative relationship between performance and fees exists even when performance is evaluated before fees. Focusing on a sample of US equity funds, they propose an explanation along the lines of the hypothesis of Christoffersen and Musto that investors have different degrees of performance sensitivity. However, in their case it is assumed that mutual funds set fees strategically in response to expected (rather than past) performance. Mutual funds that expect to deliver bad results anticipate their inability to compete for the money of sophisticated price-sensitive investors. Accordingly, they target unsophisticated price-insensitive investors. The propensity of poorly performing funds to charge higher fees is then driven by two possibly simultaneous forces: on the one hand, mutual funds strategically exploit the low sensitivity to performance of the investors they target by increasing the level of their fees (see also Metrick and Zeckhouser, 1999 and Gil-Bazo

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showing that mutual funds are not able to generate (gross) returns that are high enough to cover their costs. Using TNA-weighted measures, Wermers (2003) finds a U-shaped relation between relative (net) performance and the level of expenses (expense ratio) in the following year.

and Ruiz-Verdu, 2008) . On the other hand, targeting less sophisticated investors requires a more intensive marketing effort, which leads to an increase in marketing costs that are ultimately transferred to investors in the form of higher marketing fees. To support the latter hypothesis, Gil-Bazo and Ruiz Verdu (2009) present evidence of a negative relationship between fund (expected) performance and marketing fees.

We depart from the works of Christoffersen and Musto and Gil-Bazo and Ruiz-Verdu (2008, 2009) in several ways. Firstly, without excluding the possibility that investors may be segmented according to their sensitivity to performance, we do not view this sensitivity as an innate trait of investors. Rather, we view sensitivity to performance as something that management companies can manipulate via their marketing policies.[11] Secondly, in contradiction to the approach of Gil-Bazo and Ruiz-Verdu (2009), we take the view that *past* performance – rather than *expected* future performance – actually drives the decisions of management companies with respect to marketing and distribution fees. When investors need to choose a mutual fund, they focus on historical returns to form beliefs about an investment manager's ability to generate future excess returns. Accordingly, reported after-fee returns become the main factor in influencing money flows into (or out of) a fund.

[11] Bergstresser et al. (2006) make a similar point in their discussion of the differences between investors that use the direct channel and those that use the indirect channel for purchasing mutual funds. Their argument is based on a report prepared in 2004 by the ICI (ICI, 2004). This survey showed that clients of both channels claim not to be concerned about short-term fluctuations in performance. According to Bergstresser et al., "…this similarity in self-perception implies that any differences in sensitivity to performance are not the result of self-conscious differences in client attitudes, but may reflect advice they receive."

II. Data and Empirical Methodology

A. Data

The sample data underlying this study comes from the CRSP Survivor-Bias-Free US Mutual Fund Database, for the period January 1994 to December 2007.[12] We focus on diversified US equity mutual funds and exclude fixed-income funds, money market funds, international funds and specialized sector funds from our analysis.[13] To filter the data, we employed some of the investment objectives provided by CRSP. Although the CRSP data has a long history of these objectives, no category covers our entire sample over the period 1994 to 2007. We therefore decided to use a combination of the *Strategic Insights* and *Lipper* investment objective categories, according to the largest number of observations provided by each classification in each period. [14] Consequently, for the sub-period 1994-1999 we used the Strategic Insights objectives, while for the sub-period 2000-2007, we used the Lipper objectives.

[12] The choice of the sample period is based upon the following considerations: Firstly, the CRSP dataset before the 1990's seems to be affected by an omission bias (see Elton at al., 2001) due to observations being reported with different frequencies (monthly, quarterly, or yearly) for different funds. Consequently, in the presence of mergers (or liquidations) we could underestimate (overestimate) the merger rates of those funds with monthly (yearly) data. Secondly, the SEC approved in 1994 the rule 94-60 proposed by the NASD. According to this rule, funds are prohibited from reporting performance rankings calculated on periods of less than one year. The NASD amendment aims to limit possible misleading marketing practices of mutual fund by imposing that these rankings be related to the most recent - not any arbitrarily chosen - calendar quarter.

[13] We further remove from our sample funds whose name contains strings which are inconsistent with our selected policy codes. The adopted filters are the following: B&P, Bal, Bonds, C & I, GS, Leases, MM, or TFM. These filters contributed to the elimination of 353 funds.

[14] We selected funds with the following Strategic Insight objective codes: AGG, GRI, GRO, ING, SCG, or GMC. From Lipper, we selected the following codes: G, GI, LSE, MC, MR, or SG.

We restricted our sample to actively managed equity mutual funds and eliminated all index and institutional funds.[15] Because we also want to analyse the sensitivities of fees to past performance, we separated each fund into its various fund-classes, by recursively searching for the share class identifiers in each fund name.[16] Multiple share classes with different fee schedules provide investors with a wide range of alternatives for investing in a mutual fund. Funds compete in each share-class, and hence the decomposition of a fund into its fund classes is essential for an analysis of the relation between fees and fund performance. Moreover, in order to capture the effect of the structure of the mutual fund industry, we first grouped the funds into families using the management company codes provided by CRSP, after which we manually checked the dataset to expand the number of missing codes for each management company name. This procedure increased the number of unique company codes by 15.77%, when compared to those available in CRSP, and increased fund coverage by 13.16%.

For a fund to be in our sample, it must have reported on total net assets under management and returns. We also considered only those funds with at least one year of reported returns. Consistent with previous research, we calculated the growth rate in net fund flows in each month as follows:

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[15] Because the CRSP database does not provide a flag to distinguish passive from active funds, we classified and eliminated all those funds whose names contain any of the following terms: Index, Idx, Ix, Indx, Nasdaq, Dow, Mkt, DJ, S&P, Barra, 100, 400, 500, 1000, ETF, Exchange, Vanguard, Balanced. In relation to institutional versus retail funds, the CRSP dataset has a flag to differentiate funds. However, even after removing those funds classified by the database as "institutional", we had to further filter additional funds whose names contained any of the following terms: Inst, /Y, /I, Class Y, Class I. The combined filtering of index and institutional funds (using also the CRSP "institutional fund" flag) eliminated 2369 funds.

[16] Class-A funds typically charge high front-end loads and low 12b-1 fees, while class- B and class-C funds typically charge high 12b-1 fees and a contingent differed sales load. In separating the cross-section of mutual funds in cross-section of fund share classes, in addition to coding the extraction of share classes (on the basis of whether they are contained in the fund name), we also expanded the dataset by manually checking the fund names. This increased the available data by 3%.

$$\frac{TNA_{i,t} - TNA_{i,t-1} \cdot (1 + R_{i,t}) - M_{i,t}}{TNA_{i,t-1}}$$

where $TNA_{i,t}$ is the total net assets of fund i in month t, $R_{i,t}$ is the after-fee return reported by fund i in month t, and $M_{i,t}$ is the aggregate total net assets of all the dead funds merged into fund i in month t.[17]

A.1. Mutual Fund Fees

Mutual fund fees are generally computed as a percentage of total assets under management. They are charged as total operating expenses, and are computed on a daily basis. Annual operating expenses include management fees, 12b-1 fees, and other minor expenses, such as custodial, legal and administrative costs, which are not classified separately in the CRSP dataset.

In addition to on-going operating expenses, mutual funds also charge *una tantum* fees referred to as *loads*. These lump sums are paid only at purchase or redemption, unlike the operating expenses, which are deducted from fund returns. The loads that are charged at purchase are referred to as front-end loads or sales loads, while the loads charged at redemption are called back-end loads or deferred sales charges. Front-end loads are

[17] If no TNA is available for the dead fund at the merging date, we recursively trace back the last available TNA in any of the previous three months starting from the merging date. The reason for this (see also Elton et al., 2001) is that the CRSP merger date is sometimes more than one month removed from the actual merger date (where in most instances the last TNA of the dead fund is reported in CRSP). On this point, Elton et al. show that the date mismatching errors and splits in CRSP dataset do not seem to induce any systematic pattern. However, Huang et al. (2007) reached opposite conclusions. In order to deal with this problem and reduce any effect of outliers on the coefficient estimates we windsorized the monthly growth rate in flows at the ninety-ninth percentile. Our results do not change if no windsorization is applied to the distribution of the net flows.

usually used to compensate outside brokers. Although the SEC does not impose a limit on them, the Financial Industry Regulatory Authority (FINRA) limits them to 8.5% of all distribution charges, including 12b-1 fees. Back-end loads, are deducted at redemption, and are proportional to whatever is smaller between the initial investment and the redemption value. Relative to the 1980's, the majority of funds now tend to waive back-end loads. This is particularly the case for deferred sales charges when investors hold the shares beyond a certain period (between 6 and 7 years for share classes A and B, and just 1 year for class C). For this reason, we choose not to consider the back-end loads in our analysis.[18] Following the approach initially proposed by Sirri and Tufano (1998), and widely adopted in the literature, we distribute front-end loads based on an assumed holding period of 7 years. Using data from a large US discount broker, Barber et al. (2005) found that 25% of more than 30,000 households never sold fund shares during the almost 6 years covered by their data.[19]

The CRSP database provides separate observations for total operating expenses and its component of 12b-1 fees that are charged for marketing and distribution. In our analysis, we further compute three separate measures of annual shareholder costs: *Total ownership costs* (calculated as the sum of annual operating expenses and one-seventh of front-end loads, if any); *management fees* (computed as total operating expenses net of 12b-1 fees) to proxy for the fund management costs; and *distribution fees* (determined as the sum of 12b-1 fees and one-seventh of front-end loads, if any). The latter two costs serve as proxies for fund management costs and distribution costs, respectively.

[18] We excluded the back-end loads from our calculation also because after 1993 in the CRSP dataset they are often inclusive of a redemption fee, with the possibility of obtaining spurious results.
[19] In order to quantify the sensitivities of our results to the assumed investor's holding period, we divide the loads by $j = 2, 7$, and 10 years. Our conclusions do not seem to be qualitatively affected by the choice of the investment period.

B. Empirical Methodology

Our measure of fund performance is calculated on an after-fee basis. We estimate risk-adjusted performance using the Carhart (1997) four-factor regression, which is calculated as follows:

$$r_{i,t} = \alpha_i + \beta_i \cdot RMRF_t + \gamma_i \cdot SMB_t + \varsigma_i \cdot HML_t + \eta_i \cdot PR1YR_t + \varepsilon_{i,t}, \qquad (1)$$

where $r_{i,t}$ is the month t return on fund i (net of T-bill rate); $RMRF_t$ is the month t excess return on a value-weighted aggregate market proxy; and SMB_t, HML_t and $PR1YR_t$ are the month t returns on a value-weighted, zero-investment, factor mimicking portfolio for size, book-to-market equity, and 1-year momentum in stock returns, respectively.[20] As in Carhart (1997), we employ an overlapping three-year estimation period. If less than three years of previous data is available for a specific fund in a given estimation month, then we require this fund to have at least 30 months of available observations for it to be included in the estimation.

In addition to the previous measures of performance, we also segmented the raw and risk-adjusted returns into fractional rankings in order to capture the asymmetric flow-to-performance relationship documented in the literature. For each year, we ranked funds from 0 (worst) to 1 (best), according to their performance over that year (absolute or

[20] We repeated our analysis using the Fama and French (1993) three-factor model and a conditional factor model *a' la* Ferson and Schadt (1996). The results are qualitatively similar to those obtained with the Carhart (1997) model, and can be obtained upon request from the authors. The data used to compute risk-adjusted returns are obtained from Kenneth French's website. We thank Kenneth French for making it available.

adjusted for investment objectives). On this basis we were able to attribute a fractional rank to each fund (see Sirri and Tufano, 1998). These were specified as follows: $LOWPERF_{i,t-1}$ (bottom quintile), defined as min(0.2, $Rank_{i,t-1}$); $MIDPERF_{i,t-1}$ (middle three quintiles) defined as min(0.6, $Rank_{i,t-1}$-$LOWPERF_{i,t-1}$); and $HIGHPERF_{i,t-1}$ which corresponds to the best performing quintile. Splitting fund performance into three separate ranks enables us to decompose the *sensitivity* of the dependent variable (flows or fees) to performance across the performance ranks.[21]

To examine the relationships between fees and performance and flows and performance, while controlling for the level of fees, we pool the time-series and cross-sectional data and use least squares estimation with the fixed-effects approach. Since the timing of fee-setting by mutual funds is crucial, we employ the actual date range for the fee information of each fund (rather than an arbitrary calendar date for all funds). All regressions include year-dummies to ensure that the estimated coefficients capture the cross-sectional relationships between the variables, without possible distortions induced by the correlation of the residuals across different funds (cross-sectional dependence). We also include dummy variables for investment objectives and fund share classes in the regression. Furthermore, since the assumption of independent residuals of OLS regression is often violated in panel data (particularly in the case of a panel of mutual funds), we decided to cluster the standard errors of estimates. We remain uncommitted about the form of the correlation within clusters, and produce standard errors clustered by

[21] In this regard, we would like to stress that each fund in each year receives a ranking for all three performance segments (low, medium, and high). As a result, a high sensitivity of, say, flows to the bottom performance quintile (e.g. low), and an insignificant sensitivity of flows to the residual fractional rankings (e.g. medium, and high) would highlight that the loading of flows on performance is mostly concentrated into the low performance *relative to* the effect exerted by the medium and high segments.

fund, time, and fund and time (see Petersen, 2008). Clustering in two dimensions produces standard errors with less bias.

C. Summary Statistics

In Table I we present annual summary statistics for our sample of US diversified equity mutual funds. The average values of the variables are consistent with previous studies. The mean net flow growth rate is around 16%, with a standard deviation of about 55%.[22] The average age of a fund is almost 7 years since its first report to the SEC with a percentile deviation that ranges between 1.6 and 60 years of operation.[23] Focusing on the characteristics of size and number of funds across families, the average aggregate TNA of a family is $19,962 million, while each family contains 22 funds on average. The reason for the skewed distributions (see percentiles 1, 25, and 50) of family TNA and funds per family is that single-fund families receive a zero for their total TNA and a 1 for their total number of funds. The mean management fee calculated over 43,626 observations, for the entire period, is 1.18% with a 1.32% standard deviation, while the mean distribution fee is 80 bp with a 38 bp standard deviation. Most importantly, and in agreement with Carhart (1997), Wermers (2000), Kosowski et al. (2006), Bollen and Busse (2005), and Fama and French (2008)' both the three-factor and the four-factor models of risk adjusted returns clearly highlight that funds on average underperform their benchmarks on average

[22] The exclusion of the extreme 1% of the distribution of net flows to control for the potential effect of outliers and errors in the merge and liquidation dates in the CRSP dataset generates a linearly interpolated level of flows in the bottom 1% (top 99%) of the distribution of -57% (232.8%).
[23] We also rule out the possibility that our results may be driven by young incubation funds (Evans, 2004). An incubation fund is a fund with less than 3 years since inception. Therefore, we run all our regression specifications by controlling for the potential influence of selection bias of successful incubated funds. Our conclusions do not seem to be affected by this bias.

by about the same amount as the fees and expenses charged. Moreover, the distribution of returns indicates that there is a small number of funds with superior information (or extraordinary luck). However, the positive impact of these high-performing funds on the distribution is more than offset by funds with poor stock-picking abilities (or bad luck).

[Table I about here]

III. Determinants of Fund Distribution Fees

In this section we set out to analyse and discuss the determinants of mutual fund distribution fees. Our main hypothesis is that when mutual funds set their distribution fees they take into account their realized past performance, and the impact that distribution fees have on the total ownership cost to shareholders.

A. Sensitivities of Fees to Past Performance

If both past performance and distribution efforts affect fund flows, as previously documented in the literature, then the response of a fund to a change in its reported performance could be strategic in nature. Our expectation is that the relationship between distribution fees and past performance remains significant, even after controlling for all the other fund characteristics that are likely to have an impact on fees.

We begin our analysis of the relationship between distribution fees and past performance by comparing it to the relationships between past performance and other measures of fund expenses – in particular total ownership costs (TOC) and management fees. The aim is to detect whether distribution fees behave differently from other fees, with respect to past performance. Figure 1 illustrates the univariate relationships between performance and TOC (panel A), performance and management fees (panel B), and performance and distribution fees (panel C). For each year, all funds in our sample were ranked from worst to best, according to their reported returns net of expenses, and these rankings were used to form 20 groupings with equal numbers of funds. We then calculated the average fees in the next year for the funds in each grouping. In agreement with previous findings in the literature, we find a negative relationship between total ownership costs and past performance (panel A).[24] The salient feature of this relationship appears to be that it is most significant for funds in the bottom quarter of performance (ranks 1-5), and becomes less pronounced for the remaining part of the sample (ranks 5-20). The decomposition of the TOC into its main components of management fees (panel B) and distribution fees (panel C) suggests that the above-mentioned negative relationship is driven mostly by the management fee component. Indeed, distribution fees appear to be strongly positively related to the bottom quartile of fractional performance rankings, while this relationship becomes weaker and even negative for the medium and top performance categories. This pattern is at odds with the explanation proposed by Gil-Bazo and Ruiz-Verdu (2009), who suggest that the negative relationship between TOC and performance is a consequence of the worst performing funds charging higher distribution fees, in an attempt to target unsophisticated investors.

[24] See Gruber (1996), Carhart (1997), Harless and Peterson (1998), Wermer (2000; 2003), Barber et al (2005), Kosowski et al (2006), Gil-Bazo and Ruiz-Verdu (2009).

[Figure 1 about here]

We examine the link between fees and past performance more formally, using a linear regression for our sample of diversified equity mutual funds over the period 1994 to 2007. More precisely, for each fund *i* at time *t*, we fit the following regression model for fund fees:

$$\begin{aligned} f_{i,t} &= \lambda_{0,t} + \lambda_1 \cdot LOWPERF_{i,t-1} + \lambda_2 \cdot MIDPERF_{i,t-1} + \lambda_3 \cdot HIGHPERF_{i,t-1} \\ &\quad + \delta_1 \cdot LOWPERF_{i,t-1} \cdot D_{i,t-1} + \delta_2 \cdot MIDPERF_{i,t-1} \cdot D_{i,t-1} \\ &\quad + \delta_3 \cdot HIGHPERF_{i,t-1} \cdot D_{i,t-1} + \vartheta \cdot C_{i,t-1} + \varepsilon_{i,t} \end{aligned} \qquad (2)$$

where $LOWPERF_{i,t-1}$, $MIDPERF_{i,t-1}$, and $HIGHPERF_{i,t-1}$ are the performance fractional ranks of fund *i* in period *t-1*, while $D_{i,t-1}$ is a dummy variable to control for the small fund effect. All regressions include year-dummies, dummy variables for investment objectives, and dummy variables for different fund share classes. In line with the literature on fund fee determinants (Ferris and Chance, 1987, Tufano and Sevick, 1997, Malhotra and McLeod, 1997, Gil-Bazo and Ruiz-Verdu, 2009), we include several control variables ($C_{i,t-1}$) that could affect the level of fees, such as fund size and family size, fund age, volatility of monthly returns, and the level of net inflows adjusted for investment objective. We decided to use the logarithm of TNA as a proxy for fund size (denoted by *TNA* in the tables). This reduces the likelihood that our results may be driven by small funds. We also consider the log of one plus the total family TNA (*TNA Family*) to control for flows to those funds that are part of large families. This variable is calculated as the total TNA of a family minus the TNA of a constituent fund. If a fund is not part of a family, it gets a TNA of zero. The idea of controlling for the variable *TNA Family* is that fund expenses could actually be a function of the size of the family, since larger funds may benefit from economies of scale. We also determine the total number of funds in a family (*NumFunds*

Family) so that we may control for economies of scope (Capon et al., 1996). Also the logarithm of fund age (*Age*) is used to remove any distortion due to fund families that cross-subsidize young funds with new investment flows (see also Barber et al., 2005). Finally, standard errors are computed with fund and time clustering (see Petersen, 2008).

Table II illustrates the coefficients of the regression outlined in equation (1). As a robustness check, we ran the model for both raw (in column A, C, and E) and risk-adjusted (in column B, D, and F) returns. Regardless of the performance measure used, the estimated loadings of the different fee components on fractional ranks of performance confirm the pattern already highlighted in Figure 1. Starting with columns C-F for TOC and management fees, the negative relationship between fees and past performance is limited to the worst performing funds ($LOWPERF_{i,t-1}$), and is not significant for the medium and top fractional rankings ($MIDPERF_{i,t-1}$ and $HIGHPERF_{i,t-1}$). *Ceteris paribus*, a decrease in past performance by five percentiles, for a fund in the $LOWPERF_{i,t-1}$ category induces an average increase of about 80 basis points in management fees, and therefore also in TOC.

[Table II about here]

We obtain the opposite results when it comes to distribution fees. Poorly performing funds appear to charge higher distribution fees as their relative performance improves. In this case, a fund experiencing a five percentile increase in the bottom performance quintile ($LOWPERF_{i,t-1}$) increases its distribution fees by about 8 basis points on average, for both raw and risk-adjusted returns. On the other hand, among those funds inhabiting the top quintile ($HIGHPERF_{i,t-1}$) of risk-adjusted performance, a five percentile variation, say from the 80^{th} to the 85^{th} percentile, generates a statistically significant reduction in marketing expenses of more than 11 basis points. In addition, the high R-squared coefficient of the regressions in columns A and B is mostly due to the strong relationship between distribution fees and fund share classes (*Classes A*, *B*, and *C*).

The coefficients of the control variables are generally consistent with those documented in the literature. In particular, distribution fees are negatively related to the size and the age of a fund, and positively related to the size of a family, the number of different funds offered by a family, the volatility of monthly risk-adjusted returns, and the specific share classes offered to shareholders. In order to exclude the possibility that our results are driven by small funds, we let each fractional rank of performance interact with a dummy variable ($SMALLFUND_{i,t-1}$), which equals 1 if the fund TNA is in the bottom 10% of the TNA distribution, and zero otherwise. We find that these interaction terms are insignificant.[25]

B. Load versus No-load Mutual Funds

In this section, we refine our analysis of the relationship between distribution fees and performance to investigate whether it is affected by the distribution channel chosen by a mutual fund. In order to be able to allocate mutual funds on the basis of the distribution channel they use, we decided to draw upon the NASD rule No. 2830 introduced in 1993. This allows us to separate funds into those with load fee structures and those with no-load fee structures. According to the NASD classification, a fund has a "load" structure only if

[25] In an unreported table, we repeated the same analysis using a dummy variable for incubation funds. The findings are not different from those reported when using a dummy variable of small funds.

it imposes a front-end load, a redemption fee, a contingent deferred sale charge (CDSC), or if it charges a 12b-1 fee exceeding 25 basis points. A load structure is typical of funds that use advice channels, such as full-service brokers, financial planners and advisers, and insurance agencies. On the contrary, a fund can be classified as "no-load" if it does not charge any loads and its 12b-1 fees are below 25bp. Most of the time these funds conduct share transactions directly with the final investors. Thus, the NASD classification may be considered as a proxy to distinguish between the two main distribution systems of brokered and direct channels used by mutual funds.

Table III reports the descriptive statistics for no-load (*NL*) and load (*L*) funds. The percentage of load funds in our sample is approximately 90% of the total. Several interesting patterns emerge from Table III. Firstly, *L* funds are characterized by higher average growth rates in assets due to new investment (almost 4%) relative to *NL* funds, notwithstanding the fact that load funds have a higher average TNA and realize lower average after-fee risk-adjusted returns than *NL* funds. [26] Secondly, most of this difference in growth rates is concentrated in the bottom 1-25 percentiles of the distribution of net flows where the net flows of *L* funds seem to suffer less from investor withdrawals. Finally, the difference in total ownership cost between *NL* and *L* funds is explained almost exclusively by the higher distribution fees of *L* funds.

[Table III about here]

[26] In an unreported table, we separated the entire sample according to quartiles of fund TNA and found that net money flows as a percentage of TNA decrease with the size of the fund.

Given the different natures of the distribution systems of *L* and *NL* funds, we decided to repeat the analysis of Table II, this time introducing the dummy variable *NOLOAD,* which equals 1 if the fund can be classified as "no load" according to the NASD rule. In this case, our dependent variable is constituted by distribution fees or their components (12b-1 fees and one-seventh of front-end loads). The results are reported in Table IV. For *L* funds, the relationships between distribution fees and performance are similar to those documented in Table II. In particular, for those funds in the bottom quintile of performance, the coefficients are positive and statistically significant at 1% level for both distribution and 12b-1 fees. On the other hand, for *NL* funds we notice a strong negative relationship between these fees and poor performance. Thus, the positive relationship between distribution fees and past performance illustrated in Table II for poor performing funds is driven exclusively by *L* funds.

[Table IV about here]

C. *Determinants of Changes in Distribution Fees*

The findings for the distribution fees suggest a scenario where a fund with a low ranking in the previous period charges higher distribution costs after an increase in performance. A possible explanation for this behavior is that management companies may attempt to increase investors' recognition of the relative improvement in previous bad performance through a combination of 12B-1 fees and front-end loads. However, because the previous cross-sectional regression does not control for the time series variation of the distribution fees, no conclusion can be drawn on the existence of possible strategic fee setting on the part of the management companies. For this reason, we decided to analyse in Table V the annual variations of fund distribution fees over the sample period. Contrary to the evidence in Gil-Bazo and Ruiz-Verdu (2009), who found that only 16.86% of the funds in their sample changed their distribution fees, the funds in our sample vary their distribution fees almost 30% of the time (see panel A), with the decisions to increase or decrease fees being symmetric.[27] This percentage variation is mostly explained by the intertemporal change in 12b-1 fees, as opposed to loads, confirming that funds do not tend to vary their loads very often. When measured in basis points, fee increases and fee decreases are mostly symmetric. On average, a fund increases its 12b-1 fees by the same amount as it decreases them (6 bp). For instance, for an average size mutual fund with a TNA of $624 million, an increase in its 12b-1 fees would translate into an *additional* $375 thousand being channelled into its distribution system for the current year.

The same pattern holds when we separate our sample according to the share classes A, B, and C. Most of the change in fees obtained on the entire sample is explained by the variation that takes place for share class-A funds (panel B), which is not surprising considering that this class represents the largest proportion of our sample. Notice that the basis point variation in 12b-1 fees for class-A funds is lower than that of class- B and C funds whereas the opposite seems to hold for loads. This difference arises from the diverse fee structure of share classes A, B, and C.

[Table V about here]

[27] The average frequency of management fee variations (77.1%) is instead comparable to the 74.68% reported by Gil-Bazo and Ruiz-Verdu (2009).

In order to determine whether distribution fees are dynamically set in response to variations in past performance, we regress changes in distribution fees against changes in risk-adjusted performance over the previous period, for each fund. We use the change in Carhart (1997) risk-adjusted performance rather than the Sirri and Tufano (1998) fractional rankings, since the latter cannot be interpreted as a year-on-year variation. To account for the different sensitivities of change in distribution fees in period *t+1* to fund performance in period *t*, we first separate the cross-section into three groups: bottom quintile (*LOWPERF*), middle three quintiles (*MIDPERF*), and top quintile (*HIGHPERF*). For each of these groups, we then calculate the increase or decrease in risk-adjusted performance as at period *t*. We report the findings of our analysis in Table VI. These results support our expectation that when poorly performing funds improve their relative rankings, they subsequently increase their distribution fees. The coefficient of the variation in distribution fees on the variation in the rankings for those funds that entered the bottom performance quintile ($LOWPERF_{i,t-1}$) in the previous measurement period is positive (0.161) and statistically significant. The coefficient becomes negative for the medium three performance quintiles (-0.119), while no clear pattern arises for the best performing funds ($HIGHPERF_{i,t-1}$). We controlled for the possibility that our findings might be the result of autocorrelation in the distribution fees by including the lagged variation in the dependent variable as at *t-1*. The loadings on this variable indicate the existence of a negative yearly serial correlation in the variations of distribution fees.

[Table VI about here]

In addition, since our results may be driven by fund fee strategies where a variation in one component of mutual fund fees is not independent of a variation in other components of fees, we also include the contemporaneous change in the management fees (a major constituent of the expense ratio) amongst the independent variables as an explanatory variable. The negative and significant coefficients for all but the top performing quintile suggest that when mutual funds alter their distribution fees, they do take into account the way management fees vary, simply because they may be concerned about the detrimental effect exerted on total cost to shareholder. Indeed, an increase in total ownership costs could make the fund less appealing to investors, and also adversely affect its future performance. This pattern finds stronger support when we consider the 12b-1 fees (rather than the distribution fees) as the dependent variable in the regression. An analysis of 12b-1 fees represents a better test than front-end loads of the fee strategies put in place by management companies. Indeed, the low intertemporal variation of loads smoothes out the simultaneous correlation between distribution fees and management fees. The coefficients of the management fees are negative and highly significant for all the three performance categories. For instance, for those funds in the bottom performance quintile ($LOWPERF_{i,t-1}$) a decrease of one standard deviation in the annual management fees is associated with an increase of 5 bp (or an almost 10% variation) in the annual 12b-1 fees in the same period. Notice that now the loading of the 12b-1 fees on performance is significant only in the case of the poor performing funds. In particular, a fund that experienced a 1% increase in its risk-adjusted performance would increase its 12b-1 fees by almost 8.7 bp. To appreciate the economic significance of this variation, note that since funds in the bottom quintile of performance have an average TNA of $312 million, this increase in 12b-1 fees translates into an additional $271 thousand being poured into its distribution system for the coming year by such a fund.

The negative loadings of the 12b-1 fees on the change in fund TNA reflect the existence of economies of scale. In addition, the coefficient of the 12b-1 on the percentage variation of the flows, adjusted for the median flows into the same investment objective, is significantly positive. This may be indicative of funds - particularly poorly performing funds - rewarding their brokers for keeping the level of the net money flows above those of their competitor funds. The premium to brokers seems to be financed mostly through an increase in 12b-1 fees, given the almost identical coefficient obtained when distribution fees are used as the dependent variable.

IV. Strategic Setting of Distribution Fees: The Fund Flows Hypothesis

In this section, we propose a possible explanation for the aforementioned relationship between distribution fees and performance. According to this explanation, fund distribution fees may be viewed as the result of a strategic decision process, in which mutual funds adapt their distribution fees in response to recent past performance, in an attempt to manipulate future net investment flows.

A. Level of 12b-1 fees and Growth in Net Money Flows

Various studies have documented the existence of a convex relationship between past performance and net flows (Ippolito, 1992, Gruber, 1996, Chevalier and Ellison, 1997, Goetzmann and Peles, 1996, Sirri and Tufano 1998, and Lynch and Musto, 2003). Following the contribution of Sirri and Tufano (1998), a branch of literature has examined the way in which mutual fund expenses affect the flow-performance relationship, with a particular focus on the role of marketing expenses (Bergstresser et al, 2006, Barber et al, 2005, Huang et al, 2007). According to Bergstresser et al (2006), distribution strategies directly or indirectly affect mutual fund revenues, costs and performance. Barber et al (2005) document that funds that charge higher 12b-1 fees are able to garner higher net money flows (while funds with higher other operating expenses display lower net money flows). Huang et al (2007) illustrate that marketing expenses significantly influence the sensitivity of flows to performance, showing that distribution fees affect flows differently according to the specific fractional rank of performance considered. If we assume that investment flows into mutual funds reflect sensitivity to performance on the part of investors, then the possibility that the marketing efforts of fund brokers may alter the shape of the flow-performance relationship suggests that this sensitivity is not an exogenous variable, but rather an attitude that funds can (and apparently do) endogenize. Therefore, it appears that a more realistic model should characterise investors according to their sensitivity to marketing, as well as to performance.

In Table VII, we revisit the effect of distribution fees on the flow-performance relationship, using our sample of mutual funds.[28] In column A, we replicate the analysis of Sirri and Tufano (1998) on the flow-to-performance sensitivity over the sample period

[28] It is important to notice that we have data only on net flows. Thus, we cannot disentangle the effects of marketing on inflows from those on outflows. With data on inflows and outflows we could test more accurately both the precise impact of marketing flows (see Ivkovic and Weisbenner (2008) for a recent study that examined the flow-performance relation using data on both inflows and outflows).

1994 to 2007. We find that past performance in period *t-1* affects current flows. Moreover, the flow-performance relationship appears to be more linear than in the case of Sirri and Tufano. This difference may be attributed to the different periods considered for the analysis. Indeed, Sirri and Tufano investigated the relation from 1971 through 1990. The decrease in convexity of the flow-performance relation is an appealing result *per se*, because it implies a more recent increase in the steepness of the flow-performance function for the worst performing funds.[29]

[Table VII about here]

In columns B and C, we analyse the impact of distribution fees on the sensitivity of flows to performance, focusing only on previous year rankings formed on raw and Carhart (1997) risk-adjusted net returns, respectively. We interact the fractional rankings of performance with a dummy variable *HIGH12B1* which equals 1 if the fund charged a 12b-1 fee (corrected for the average 12b-1 fees in the same investment objective category) above the cross-sectional median.[30] In line with Huang et al. (2007), we find that 12b-1 fees significantly affect the performance sensitivity of flows for poor performing funds ($LOWPERF_{i,t-1}$). The coefficient of 0.563 for raw returns and 0.398 for risk-adjusted returns suggest that the shape of the flow-performance relation is significantly altered when these funds adopt a more aggressive distribution strategy.

[29] The higher sensitivity of the net flows to the performance of those funds in the $LowPerf_{i,t-1}$ rank is also documented by Sigurdsson (2005) for individual funds, and by Gallaher, Kaniel and Starks (2005) for mutual fund families.

[30] We focus on 12b-1 fees rather than distribution fees following the findings of Barber et al (2005) who suggest that fund flows will be less positively affected by front-end loads because investors have been shown to avoid those funds with high loads. Nevertheless, we repeated our analysis using as a dummy variable the high distribution fees and obtained qualitatively similar results.

We also controlled for the contemporaneous level of both 12b-1 fees and management fees. The direct effect of fees on fund flows is positive for 12b-1 fees but negative for management fees (as documented also by Barber et al., 2005).

When we ran the same specification of our model for both raw and risk-adjusted returns in the two sub-periods 1994-1999 (column D and E) and 2000-2007 (column F and G) we found a significant and positive coefficient on $LOWPERF_{i,t-1}*HIGH12b1$, predominantly in the second sub-period, which is the one mostly characterised by a flat market.

These results seem to suggest an intriguing phenomenon where higher (than the median) distribution fees positively impact on the growth rate of funds in the bottom performance quintile. This is particularly the case in periods of relatively poor performing markets.[31] One possible explanation for the observation above is that investors may seek the advice of experienced brokers under difficult market conditions, and they may be willing to pay an additional amount for assistance during such times.

B. Investors' Response to a Contemporaneous Change in Distribution and Management Fees

Since the separation of the sample in low versus high 12b-1 fees does not directly capture the effect of fee changes on the flow-to-performance relationship, we estimate the sensitivities of flows to performance at the fund level by splitting the sample according to whether a fund increased or decreased its distribution and 12b-1 fees for the current

[31] In their analysis of the persuasive nature of mutual fund advertising, Mullainathan and Shleifer (2005) documented that the marketing strategies of funds change depending on the previous market returns. Funds tend to report their returns after the market returns have been high, and take them out after the market returns have been low.

reporting period. Another reason for separating the sample on the basis of the variation in its distribution and 12b-1 fees is that the positive relationship between flows and performance could also be attributed to factors other than distribution strategies. In particular, the positive sensitivity of flows to performance for the worst performing funds may be simply the outcome of higher redemption rates suffered by the industry in more recent periods (as documented by O'Neal, 2004), rather than the result of distribution strategies. Therefore, if redemptions alone are driving the flow-performance relationship, we should expect this relation to persist regardless of the sign of the change in the distribution fees. In addition, since distribution fees are only one component of the total ownership costs that is charged to shareholders, it is plausible to assume that mutual funds may vary their distribution fees, and at the same time opt for a variation in their management fees. To disentangle the effect on the flow-performance sensitivities of a change in distribution fees from that induced by a simultaneous change in management fees, we also let the fractional rankings of performance interact with a dummy variable $\Delta^{+}MGMT_{t}$ which equals 1 if the fund decided to increase its management fees over the reported period. Therefore, the response of net money flows to (raw or risk-adjusted) performance is separated into four possible scenarios depending on the sign of the change in both distribution and management fees. Table VIII displays the results of our analysis. All regressions are estimated at the fund level, and include dummy variables for investment objectives, share classes, and years. Standard errors (in parentheses) are clustered by fund.

[Table VIII about here]

For a poorly performing fund that decided to increase its distribution fees (refer to panel A for both raw and risk-adjusted returns), net money flows are significantly and positively related to an increase in the fund performance rankings in the previous period (0.506 for raw returns and 0.383 for risk-adjusted returns), but only in the case where the fund either did not alter or decreased its management fees. This result supports our hypothesis that the strategic price adjustment of a fund is undertaken across the two different components of the total shareholder cost, namely management and distribution fees. Furthermore, our results are not driven exclusively by changes in management fees as no clear relationship arises between future flows and $LOWPERF_{i,t-1}$ when the fund decided to decrease, rather than increase, its distribution fees (refer to panel B). On the other hand, those worse performing funds that approved an increase in both distribution fees and management expenses (panel A) do not seem to particularly benefit from an improvement in performance. Indeed, the sensitivity of net flows is greatly reduced (0.20 for raw returns) or even eliminated (0.03 for risk-adjusted returns) if the poorly performing fund charged at the same time higher distribution fees and higher advisory fees. The same scenario applies also to better performing funds ($HIGHPERF_{i,t-1}$), which appear to be strongly penalised by investors' money flows in the next period if the fund previous top performance is followed by an increase in total ownership costs.

The previous findings do not change when we consider the effect of a strategic variation in 12b-1 fees (rather than distribution fees) on the flow-performance sensitivity. New money (net of withdrawals) seems to flow into those poor performing funds that previously experienced – by luck or skill – an improvement in their rankings if they balance the increase in their 12b-1 fees with a decrease in management fees. As panel (C) shows, the net effect of the strategic variation of the two components of the total operating expenses is a positive and statistically significant coefficient of flows on the variable $LOWPERF_{i,t-1}$. The estimated coefficients for the other two fractional rankings, namely $MIDPERF_{i,t-1}$ and $HIGHPERF_{i,t-1}$, are similar to those previously documented in the case of distribution fees.

These results are robust to the inclusion of several control variables previously used in our analysis. In particular, we controlled for the serial correlation in fund flows (adjusted for median flows of the investment objective) and the level of volatility of monthly returns in the previous measurement period. The positive sensitivity of fund flows to volatility in panel (A) and (C) could be interpreted as investors being more exposed to brokers' deception because high volatility may induce greater level of confusion surrounding the previous fund performance rankings.[32]

V. Conclusion

Nowadays, 12b-1 fees are commonly used for purposes other than those initially envisaged by the SEC in 1980. According to the Investment Company Institute (2008), 98% of 12b-1 fees are used to pay financial advisers, traditional brokers, dealers and bank trust departments. Only a small fraction (2%) of 12b-1 fees is actually used for advertising and promotion. It therefore appears that the primary role of these fees is to incentivize brokers to achieve more in terms of share distribution. Previous research

[32] We also conducted an analysis of the extent of the estimation error of risk-adjusted returns potentially committed by investors around the reported period. We found that the estimation error (which could be interpreted as investor's confusion) widens the more we move towards the extreme (bottom and top) quintiles of the distribution of returns.

clearly highlighted the efficacy of distribution fees, and particularly of 12b-1 plans, in driving new assets into mutual funds. In this paper, we examine the relationship between fees and fractional rankings of performance, and the simultaneous impact of this relationship on fund flows. We demonstrate that distribution fees are positively related to performance for poorly performing load funds. We also demonstrate that poorly performing funds that use an improvement in their after-fee returns in their targeted campaigns to buy business experience an increase in net flows, even if this improvement is actually just a reduction of bad performance. The efficacy of distribution strategies on net money flows may depend on the ability of fund-affiliated brokers to manipulate investor perceptions of reported fund performance. The greater the resources dedicated by a fund to its distribution channel, the greater the incentive for brokers to encourage investment in funds that experienced an improvement in previously modest performance. Fund-affiliated brokers may therefore simply try to influence investors' perceptions of the relative performance realized by a fund. Of course, the outcome of this strategy depends not only on the high degree of product differentiation in the industry (or the difficulty to clearly establish the quality of the product offered) but also on the way investors frame their gains and losses. If the performance-chasing behavior of investors is compromised by broker deception, then investors may continue to purchase funds that are no better at substantially higher costs. Our analysis controls for the possibility that fee-setting strategies implemented by mutual funds may be more sophisticated than was previously thought. Since distribution and 12b-1 fees are only one component of the total ownership cost borne by fund shareholders, with management fees being (one of) the other(s), we decided to isolate the effect on flows of a simultaneous variation in management fees. Our findings highlight that only those underperforming funds that simultaneously increase distribution charges and reduce management expenses benefit from net money inflows, while those funds that increase both fees are always penalized by investors, with this penalty increasing with the past performance of the fund.

Despite the intensive regulation imposed on the fund management industry by the SEC over the last 60 years, mutual funds continue to provide examples of dysfunctional governance. The large number (75%) of independent directors required by mutual fund regulation does not prevent a costly distribution system, in which improper use of expenses is rampant. The fact that massive payments are made to the broker-adviser community through loads and 12b-1 fees should raise public concern and attract the SEC's attention.

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Figure 1

Fees Across Different Past Performance Rankings

In each year from 1994 to 2007, funds are ranked on the basis of their past after-fee total returns adjusted for the performance of all the funds in the same investment objective. The funds are then assigned to 20 equal ranking groups, and the average values of the following different components of fund fees are calculated: distribution fees (12B-1 fees plus 1/7th of the front-end loads), management fees (operating expenses minus 12B-1 fees), and total ownership cost (operating expenses plus 1/7th of the front-end loads). We also plot the fourth degree polynomial interpolation (bold line) as best fit of each fee-performance relationship (dotted line) as well as the median fee across all groups.

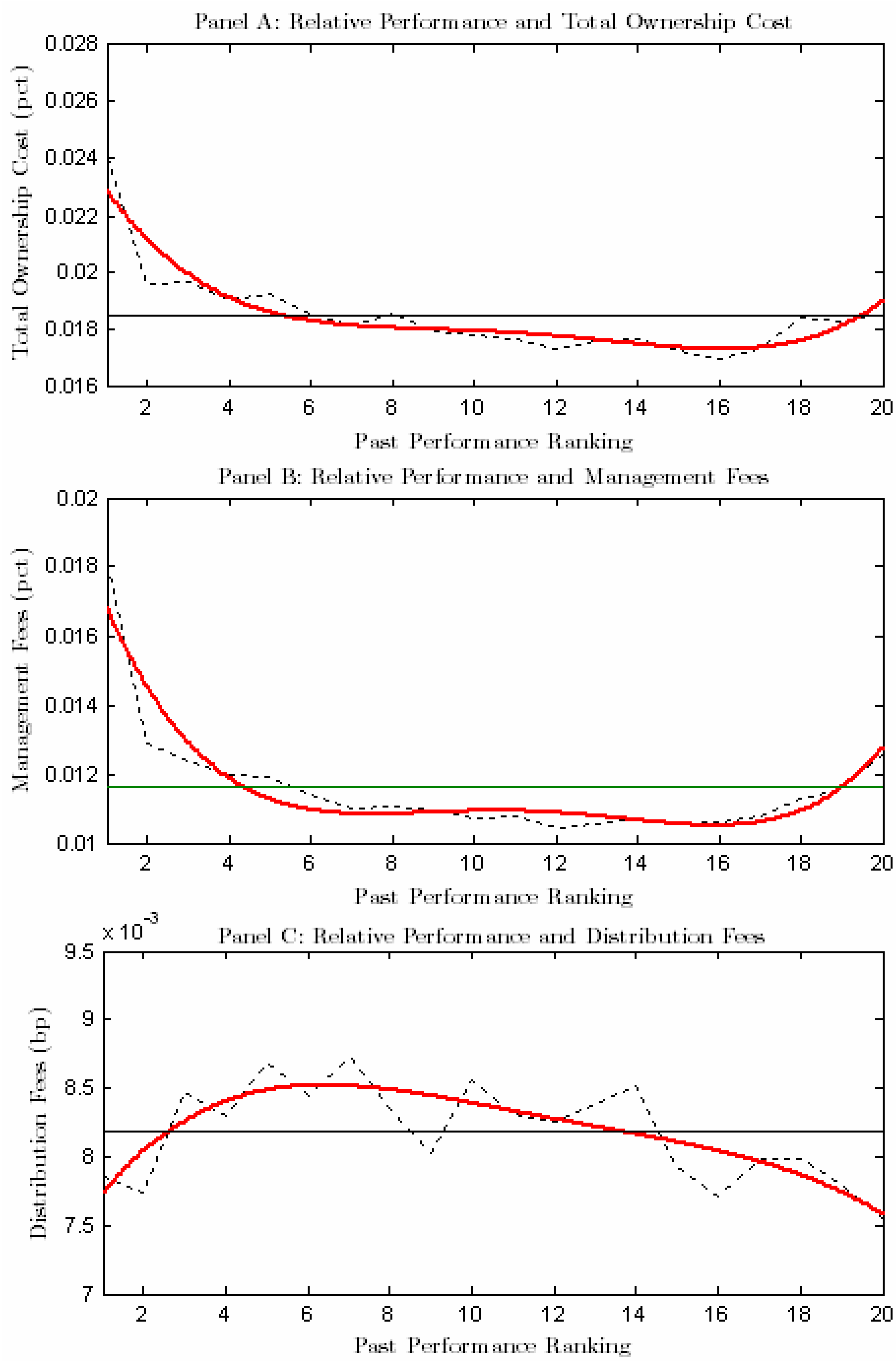

Table I

Summary Statistics

This table reports the summary statistics of our sample of diversified US equity mutual funds from 1994 to 2007. Over the full sample period, we compute the yearly descriptive statistics of the following fund characteristics: total net asset (TNA), reported after-fee returns, yearly net money flow rate, 12B-1 fees, operating expense ratios, distribution fees (12B-1 fees plus 1/7th of the front-end loads), management fees (operating expenses minus 12B-1 fees), total ownership cost (operating expenses plus 1/7th of the front-end loads), Fama-French (FF) three-factor and Carhart four-factor after-fee risk-adjusted returns (alpha), yearly volatility of monthly reported returns, logarithm of the TNA of the fund, logarithm of fund age (since inception), logarithm of the TNA of the fund family, and average number of funds in a family.

Variables	Obs.	Mean	Standard Deviation	Percentiles				
				1%	25%	50%	75%	99%
Net Flows (%)	41,360	15.8%	54.4%	-57.0%	-14.7%	0.5%	28.9%	232.8%
TNA (in millions)	42,177	624.0	3086.6	0.1	11.5	56.7	268.3	10322.9
log (TNA fund)	42,177	3.97	2.37	-2.30	2.44	4.04	5.59	9.24
log fund Age	42,096	1.92	0.84	0.46	1.32	1.87	2.40	4.14
TNA Family (in $mio)	43,669	19962.0	68501.3	0.0	0.0	963.6	9897.4	423424.8
log (TNA Family)	43,669	5.49	4.32	0.00	0.00	6.87	9.20	12.96
NumFund Family	43,669	22.84	28.67	1.00	1.00	10.00	36.00	135.00
Returns (af)	42,095	8.96%	20.57%	-42.32%	-0.90%	9.87%	19.69%	64.76%
FF alpha (af)	29,656	-1.25%	5.78%	-16.48%	-3.90%	-1.37%	1.18%	15.83%
Carhart alpha (af)	29,656	-1.36%	5.43%	-15.81%	-3.87%	-1.42%	1.08%	14.24%
Tot Ownership Cost	43,645	1.90%	1.37%	0.41%	1.49%	1.96%	2.22%	3.50%
Distribution Fees	39,878	0.79%	0.38%	0.00%	0.70%	1.00%	1.00%	1.32%
Management Fees	43,626	1.18%	1.32%	0.08%	0.92%	1.11%	1.33%	2.67%
12B-1	38,384	0.54%	0.39%	0.00%	0.25%	0.35%	1.00%	1.00%
Opex	43,626	1.65%	1.37%	0.25%	1.20%	1.58%	2.02%	3.29%
Volatility	42,095	4.33%	2.33%	1.15%	2.76%	3.81%	5.36%	12.87%

Table II

Sensitivities of Mutual Fund Fees to Past Performance

This table examines the sensitivities of several components of mutual fund fees to past performance in the period January 1994 – December 2007. The dependent variable is constituted by one of the following formulations of mutual fund fees (in percentage terms): distribution fees (12B-1 fees plus 1/7th of the front-end loads), total ownership cost (operating expenses plus 1/7th of the front-end loads), and management fees (operating expenses minus 12B-1 fees). Each year the performance of a fund is separated into three fractional ranks. The bottom performance quintile (LOWPERF) is defined as the Min($Rank_{t-1}$, 0.2). The middle three performance quintiles are gathered into one group (MIDPERF) defined as Min(0.6, $Rank_{t-1}$ – LOWPERF). The top performance quintile (HIGHPERF) is defined as $Rank_{t-1}$-LOWPERF-MIDPERF. The control variables include: logarithm of *TNA* and *TNA Family* to proxy for the size of both fund and family of funds; *Age*, calculated as the logarithm of the number of years since fund inception; *Volatility* of monthly returns; *NumFunds Family*, computed as the number of funds in the family; *ObjFlows,* is the aggregate net money flow into the same investment objective. We introduce a dummy variable (*SmallFund*) that equals 1 if the size of the fund is in the bottom 10% in the fund size distribution in that year. All regressions also include year dummies, and dummies for share classes and investment objectives. The table also reports the statistical significance of the coefficients calculated using robust standard errors (in parentheses) clustered by fund and time (Petersen, 2008).

Dependent variable	Distribution Fees		Total Ownership Cost		Management Fees	
	(A)	(B)	(C)	(D)	(E)	(F)
TNA (t-1)	-0.001***	-0.001***	-0.012***	-0.013***	-0.010***	-0.012***
	(0.000)	(0.000)	(0.002)	(0.002)	(0.001)	(0.002)
TNA Family (t-1)	0.000**	0.000	-0.001***	-0.002***	-0.002***	-0.002***
	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)	(0.001)
Age (t-1)	-0.002**	-0.002*	0.009**	0.009**	0.010***	0.011**
	(0.001)	(0.001)	(0.004)	(0.004)	(0.004)	(0.004)
NumFunds Family (t-1)	0.000***	0.000***	0.000***	0.000***	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Volatility (t-1)	0.036	0.064***	0.593***	0.736***	0.550***	0.663***
	(0.023)	(0.024)	(0.162)	(0.208)	(0.162)	(0.209)
LOWPERF (t-1)	0.015***	0.017**	-0.155***	-0.286***	-0.169***	-0.302***
	(0.006)	(0.007)	(0.056)	(0.091)	(0.055)	(0.090)
MIDPERF (t-1)	-0.003**	-0.002	0.004	0.007	0.007	0.010*
	(0.001)	(0.002)	(0.006)	(0.006)	(0.006)	(0.006)
HIGHPERF (t-1)	-0.007	-0.023***	0.027	-0.006	0.037*	0.012
	(0.006)	(0.007)	(0.024)	(0.026)	(0.020)	(0.025)
Interaction term: SMALL FUND						
LOWPERF*SMALLFUND (t-1)	-0.027	-0.002	0.030	0.177	0.058	0.167
	(0.017)	(0.041)	(0.093)	(0.230)	(0.095)	(0.239)
MEDPERF*SMALLFUND (t-1)	0.009	0.054***	-0.055	0.153	-0.065	0.121
	(0.007)	(0.019)	(0.054)	(0.321)	(0.052)	(0.323)
HIGHPERF*SMALLFUND (t-1)	-0.015	-0.111	0.465	-1.084	0.464	-1.064
	(0.036)	(0.140)	(0.776)	(1.258)	(0.745)	(1.252)
Obj_Flows (t-1)	0.000	-0.001	-0.000	0.005	-0.001	0.006
	(0.001)	(0.001)	(0.002)	(0.006)	(0.002)	(0.006)
Class A (t-1)	0.057***	0.059***	0.057***	0.058***	-0.009***	-0.011***
	(0.002)	(0.002)	(0.004)	(0.004)	(0.003)	(0.003)

Table II – *Continued*

Dependent variable	Distribution Fees		Total Ownership Cost		Management Fees	
	(A)	(B)	(C)	(D)	(E)	(F)
Class B (t-1)	0.053***	0.055***	0.055***	0.054***	-0.009***	-0.013***
	(0.003)	(0.003)	(0.002)	(0.003)	(0.002)	(0.003)
Class C (t-1)	0.053***	0.054***	0.049***	0.046***	-0.014***	-0.019***
	(0.002)	(0.002)	(0.004)	(0.005)	(0.004)	(0.005)
Adjusted R^2	50.0%	52.9%	15.1%	15.3%	9.1%	10.5%
Number of obs. panel	27970	18855	30811	21178	30807	21178

+ Columns (A), (C), and (E) are based on raw returns. Columns (B), (D), and (F) are based on risk-adjusted returns

++ Standard errors in parentheses: * p<0.1 ** p<0.05 *** p<0.01

Table III

Summary Statistics for Load and No-Load Funds

In this table, we first separate the sample of diversified US equity mutual funds from 1994 to 2007 into the two groups of load funds and no-load funds. A fund has a load structure if it imposes a front-end load, a redemption fee, a contingent deferred sale charge (CDSC), or if it charges a 12b-1 fee exceeding 25 basis points. A fund can be classified as no-load if it does not charge any loads and its 12b-1 fees are below 25bp. Over the full sample period, we compute the yearly descriptive statistics for the following fund characteristics: total net asset (TNA), reported returns after-fees, yearly flow rate, 12B-1 fees, distribution fees (12B-1 fees plus 1/7th of the front-end loads), management fees (operating expenses minus 12B-1 fees), total ownership cost (operating expenses plus 1/7th of the front-end loads), Carhart four-factor model after-fee risk-adjusted returns (alpha), yearly volatility of monthly reported returns, TNA of the fund, logarithm of fund age (since inception), and number of funds in a family.

A. Load Funds

Variables	Obs.	Mean	Standard Deviation	Percentiles 1%	25%	50%	75%	99%
Net Flows (%)	26,713	19.42%	57.07%	-53.97%	-13.72%	2.68%	34.11%	244.01%
TNA (in millions)	27,567	523.43	2877.65	0.10	10.33	48.80	214.30	8384.10
Log fund Age	27,506	1.83	0.82	0.46	1.23	1.76	2.29	4.14
Num Funds in Family	27,628	28.81	28.73	1	3	22	44	133
Returns (af)	30,875	8.41%	19.98%	-42.32%	-1.20%	9.63%	19.08%	62.47%
Carhart alpha (af)	21,069	-1.65%	5.11%	-14.99%	-4.09%	-1.70%	0.72%	12.68%
Tot Ownership Cost	27,616	2.09%	0.94%	0.96%	1.86%	2.07%	2.29%	3.49%
Distribution Fees	27,557	0.95%	0.21%	0.25%	0.94%	1.00%	1.03%	1.36%
Management Fees	27,599	1.15%	0.92%	0.10%	0.90%	1.10%	1.31%	2.50%
12B-1	26,646	0.64%	0.37%	0.00%	0.25%	0.75%	1.00%	1.00%
Opex	32,009	1.77%	0.89%	0.55%	1.34%	1.81%	2.12%	3.25%
Volatility	27,453	4.42%	2.32%	1.24%	2.79%	3.95%	5.49%	12.67%

B. No-Load Funds

Variables	Obs.	Mean	Standard Deviation	Percentiles 1%	25%	50%	75%	99%
Net Flows (%)	2,547	15.85%	55.34%	-62.06%	-15.07%	0.69%	27.86%	239.26%
TNA (in millions)	2,701	353.26	958.81	0.10	10.50	50.40	245.70	4988.30
Log fund Age	2,671	1.94	0.87	0.46	1.32	1.87	2.45	4.19
Num Funds in Family	2,791	9.83	15.95	1	1	3	9	68
Returns (af)	2,328	8.26%	24.85%	-47.87%	-3.26%	8.64%	19.01%	83.21%
Carhart alpha (af)	1,887	-1.09%	6.86%	-21.69%	-3.83%	-1.00%	2.05%	18.76%
Tot Ownership Cost	2,791	1.48%	1.98%	0.46%	1.16%	1.35%	1.55%	3.85%
Distribution Fees	2,791	0.19%	0.06%	0.02%	0.15%	0.18%	0.23%	0.25%
Management Fees	2,791	1.26%	1.98%	0.35%	0.94%	1.13%	1.34%	3.60%
12B-1	2,791	0.19%	0.06%	0.02%	0.15%	0.18%	0.23%	0.25%
Opex	2,401	1.47%	1.36%	0.45%	1.16%	1.35%	1.55%	3.48%
Volatility	2,685	4.76%	2.77%	0.12%	2.94%	4.11%	5.88%	14.99%

Table IV

Sensitivities of Mutual Fund Fees to Past Performance for Load and No-Load Funds

This table shows the sensitivities of several components of mutual fund fees to past performance in the period January 1994 – December 2007 for the two groups of load funds and no-load funds. A fund has a load structure if it imposes a front-end load, a redemption fee, a contingent deferred sale charge (CDSC), or if it charges a 12b-1 fee exceeding 25 basis points. A fund can be classified as no-load if it does not charge any loads and its 12b-1 fees are below 25bp. The dependent variable is constituted by one of the following formulations of mutual fund fees (in percentage terms): distribution fees (12b-1 fees plus $1/7^{th}$ of the front-end loads), 12b-1 fees, and one-seventh of the front-end loads. Each year the performance of a fund is separated into three fractional ranks. The bottom performance quintile (LOWPERF) is defined as the Min($Rank_{t-1}$, 0.2). The middle three performance quintiles are gathered into one group (MIDPERF) defined as Min(0.6, $Rank_{t-1}$ – LOWPERF). The top performance quintile (HIGHPERF) is defined as $Rank_{t-1}$-LOWPERF-MIDPERF. The control variables include: logarithm of *TNA* and *TNA Family* to proxy for the size of both fund and family of funds; *Age*, calculated as the logarithm of the number of years since fund inception; *Volatility* of monthly returns; *NumFunds Family*, computed as the number of funds in a family; *ObjFlows,* is the aggregate net money flow into the same investment objective. The dummy variable *NO LOAD* equals 1 if the fund does not charge any loads and its 12b-1 fees are below 25bp. All regressions also include year dummies, and dummies for share classes and investment objectives. The table also reports the statistical significance of the coefficients calculated using robust standard errors (in parentheses) clustered by time (Petersen, 2008).

Dependent variable	Distribution Fees		12b-1 Fees		$1/7^{th}$ FE Loads	
	(A)	(B)	(C)	(D)	(E)	(F)
TNA (t-1)	-0.000	-0.000	0.000	0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
TNA Family (t-1)	0.000	0.000	0.000***	0.000***	-0.000***	-0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Age (t-1)	-0.001***	-0.000	-0.000**	-0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
NumFunds Family (t-1)	0.000	-0.000	-0.000	-0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Volatility (t-1)	-0.007	0.003	-0.002	0.002	-0.005	-0.004
	(0.005)	(0.006)	(0.005)	(0.003)	(0.004)	(0.005)
LOWPERF (t-1)	0.010***	0.010***	0.011***	0.004***	0.003	-0.004
	(0.003)	(0.003)	(0.001)	(0.001)	(0.002)	(0.006)
MIDPERF (t-1)	-0.001	-0.001	-0.000	-0.001***	-0.000	0.001
	(0.000)	(0.001)	(0.000)	(0.000)	(0.001)	(0.001)
HIGHPERF (t-1)	-0.000	-0.007**	0.000	0.001	0.002	-0.002
	(0.002)	(0.003)	(0.002)	(0.001)	(0.003)	(0.002)
Interaction term: NO LOAD FUND						
LOWPERF*NOLOAD (t-1)	-0.099***	-0.089***	-0.020***	-0.013**		
	(0.010)	(0.011)	(0.004)	(0.006)		
MIDPERF*NOLOAD (t-1)	0.007***	0.009***	0.003***	0.003		
	(0.001)	(0.002)	(0.001)	(0.002)		
HIGHPERF*NOLOAD (t-1)	-0.016	-0.011	-0.016	-0.012		
	(0.010)	(0.014)	(0.011)	(0.015)		
Class A (t-1)	0.005***	0.005***	-0.003***	-0.002**	0.003***	0.002***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)

Table IV – *Continued*

Dependent variable	Distribution Fees		12b-1 Fees		$1/7^{th}$ FE Loads	
	(A)	(B)	(C)	(D)	(E)	(F)
Class B (t-1)	0.002***	0.002***	0.006***	0.005***	-0.009***	-0.010**
	(0.001)	(0.001)	(0.001)	(0.001)	(0.003)	(0.004)
Class C (t-1)	0.002***	0.002***	0.006***	0.006***	-0.009***	-0.010***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.003)	(0.003)
Lagged Depend. Variable (t-1)	0.746***	0.786***	0.705***	0.694***	0.849***	0.839***
	(0.026)	(0.028)	(0.017)	(0.018)	(0.046)	(0.058)
Adjusted R^2	84.0%	86.8%	86.5%	87.1%	92.8%	90.1%
Number of observations panel	24873	16194	24022	15596	12158	8458

++ Standard errors in parentheses: * p<0.1 ** p<0.05 *** p<0.01

Table V

Descriptive Statistics of Mutual Fund Fee Changes

In this table we document the proportion (out of the total sample) of the increase (decrease) in distribution fees (12b-1 fees plus 1/7th of the front-end loads), management fees (operating expenses minus 12B-1 fees), 12b-1 fees and one-seventh of the front-end loads. We also report the basis point variations calculated as an yearly average over the sample period between 1994 and 2007. The statistics are computed for: (i) the entire sample of diversified US equity mutual funds (panel A); (ii) share class A funds (panel B); (iii) share class B funds (panel C), and (iv) share class C funds (panel D).

	Δf>0	Δf<0	Δf+ (bp)	Δf- (bp)
	Panel A: Entire Sample			
Distribution Fees	15.5%	13.5%	11.8	-9.4
Management Fees	34.9%	42.2%	11.7	-10.6
12B-1	14.1%	12.7%	5.9	-5.7
Loads (1/7th)	2.4%	2.9%	24.1	-27.6
	Panel B: Class A Shares			
Distribution Fees	7.4%	5.2%	14.0	-8.9
Management Fees	10.9%	12.5%	10.9	-9.9
12B-1	6.2%	5.1%	4.2	-4.3
Loads (1/7th)	2.1%	0.7%	23.0	-27.4
	Panel C: Class B Shares			
Distribution Fees	2.6%	2.4%	9.2	-6.4
Management Fees	7.4%	8.6%	10.8	-10.6
12B-1	2.7%	2.5%	6.8	-6.3
Loads (1/7th)	0.0%	0.0%	0.0	0.0
	Panel D: Class C Shares			
Distribution Fees	2.5%	2.9%	9.1	-7.8
Management Fees	6.3%	7.2%	11.1	-10.6
12B-1	2.4%	2.4%	7.6	-5.4
Loads (1/7th)	0.0%	1.4%	14.3	-14.9

Table VI

Strategic Pricing

In this table, the dependent variables – change in distribution fees (12B-1 fees plus 1/7th of the front-end loads) or change in 12B-1 fees - are regressed on several control variables with fund fixed-effect over the sample period 1994 to 2007. The control variables include: changes in logarithm of *TNA* and *TNA Family* to proxy for the marginal impact exerted by the size of the fund and the size of the family of funds; *Age* calculated as the logarithm of the number of years since fund inception; change in *Volatility* which is measured as the standard deviation of the monthly return over the measurement period; *Obj_Flows* is the aggregate net money flow into the same investment objective. In order to test the strategic responses of fees to yearly changes in fund performance rankings, we separate the analysis according to whether a fund is in the bottom quintile (*LOWPERF*), medium three quintiles (*MIDPERF*), or top quintile (*HIGHPERF*) of performance. The performance rankings are computed on reported Carhart's after-fee risk-adjusted returns. For each performance group we then consider the year-on-year variation in risk-adjusted performance. In all regressions, we control for the serial correlation in the dependent variables and the correlation between distribution fees and management fees. The table also reports the statistical significance of the coefficients calculated using robust standard errors (in parentheses) clustered by fund and time (Petersen, 2008).

Dependent variable	Δ (Distribution Fees)			Δ (12B-1)		
Lagged Interaction term (I_{t-1}):	*LowPerf*	*MidPerf*	*HighPerf*	*LowPerf*	*MidPerf*	*HighPerf*
Δ TNA (t-1) * I (t-1)	-0.028**	-0.008	-0.027**	-0.029***	-0.003	-0.021***
	(0.012)	(0.009)	(0.011)	(0.007)	(0.004)	(0.005)
Δ TNAFamily (t-1) * I (t-1)	0.002**	-0.001	0.000	0.001	-0.001**	-0.000
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Age (t-1) * I (t-1)	0.001	0.001	-0.001	0.001	-0.002	0.002
	(0.004)	(0.003)	(0.003)	(0.003)	(0.002)	(0.002)
Δ NumFundFamily (t-1) * I (t-1)	-0.000	0.000	-0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Δ Management Fees (t) * I (t-1)	-0.003**	-0.099***	-0.032	-0.030***	-0.114***	-0.150***
	(0.001)	(0.030)	(0.026)	(0.003)	(0.006)	(0.008)
Δ Performance (t-1) * I (t-1)	0.161**	-0.119**	-0.043	0.087**	-0.025	-0.036
	(0.080)	(0.058)	(0.054)	(0.037)	(0.026)	(0.033)
Δ Volatility (t-1) * I (t-1)	-0.289	0.229	0.058	-0.094	0.156**	0.323***
	(0.176)	(0.154)	(0.125)	(0.101)	(0.070)	(0.081)
Obj_Flows (t-1) * I (t-1)	0.025**	0.012	0.026**	0.026***	0.001	0.015**
	(0.010)	(0.010)	(0.011)	(0.008)	(0.005)	(0.006)
Class A (t-1)	0.023***	0.027***	0.029***	0.006	0.006**	0.001
	(0.006)	(0.005)	(0.006)	(0.005)	(0.002)	(0.003)
Class B (t-1)	-0.003	0.011***	0.004	0.001	0.004	-0.001
	(0.005)	(0.003)	(0.005)	(0.005)	(0.003)	(0.004)
Class C (t-1)	-0.002	0.008**	0.002	0.005	0.004	0.000
	(0.005)	(0.004)	(0.005)	(0.006)	(0.003)	(0.004)
Δ Depend Variable (t-1) * I (t-1)	-0.231**	-0.072***	-0.055	-0.166***	-0.030***	-0.022**
	(0.115)	(0.027)	(0.037)	(0.014)	(0.007)	(0.011)
Δ Management Fees (t-1) * I (t-1)	-0.001	0.005	-0.006	0.011***	0.013**	-0.018***
	(0.001)	(0.013)	(0.006)	(0.004)	(0.005)	(0.007)
Adjusted R^2	15.9%	5.6%	4.0%	15.0%	13.4%	21.9%
Num observations	3313	5356	5049	3186	5138	4831

++ Standard errors in parentheses: * p<0.1 ** p<0.05 *** p<0.01

Table VII

Flow-Performance Sensitivities of Mutual Funds and Distribution Fees

This table documents the estimated coefficients of a pooled OLS regression with year fixed-effect of annual growth rate in fund net money flows in period *t* on several fund characteristics in the previous period *t-1*. The sample period ranges from January 1994 to December 2007. The growth rate in fund net money flows in period *t* is calculated as $(TNA_{i,t} - TNA_{i,t-1}*(1+R_{i,t}) - M_{i,t})/TNA_{i,t-1}$, where $TNA_{i,t}$ is the fund *i*'s total net assets at time *t*, $R_{i,t}$ is the return of fund *i* at time *t*, and $M_{i,t}$ aggregate total net assets of funds that were merged into fund *i* in period *t*. We calculate fund performance fractiles (LOWPERF, MIDPERF, and HIGHPERF) on either raw returns (columns A, B, D, and E) or Carhart's risk-adjusted alpha (column C, F and G). *TNA* and *TNA Family* are proxies for the size of the fund and the size of the family of funds. *Age* is the logarithm of the number of years since fund inception. *NumFunds Family* is the number of funds in a family. *ObjFlows* is the aggregate net money flow into the same investment objective. *Volatility* measures the standard deviation of the monthly return over different performance measurement periods. *HIGH12B-1* is a dummy variable that equals 1 if the 12B-1 fee charged by the fund (and adjusted for the median 12B-1 fee charged by funds in the same investment objective category) is above the median in that year. In all regressions, we control for the relationship between fund flows and both 12b-1 fees and management fees. The table also reports the statistical significance of the coefficients calculated using robust standard errors (in parentheses) clustered by fund and time (Petersen, 2008).

Dependent variable	Net Fund Flows (%)						
	[1994-2007]			[94-99]	[00-07]	[94-99]	[00-07]
	(A)	(B)	(C)	(D)	(E)	(F)	(G)
TNA (t-1)	-0.021***	-0.038***	-0.025***	-0.046***	-0.036***	-0.020***	-0.028***
	(0.003)	(0.003)	(0.003)	(0.006)	(0.003)	(0.004)	(0.003)
TNA Family (t-1)	0.003***	0.005***	0.005***	0.005***	0.004**	0.003*	0.004***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)
Age (t-1)	-0.000	-0.012*	-0.009**	-0.010	-0.011	-0.003	-0.009**
	(0.004)	(0.007)	(0.004)	(0.010)	(0.010)	(0.010)	(0.004)
Num_Fund_Family (t-1)	-0.000***	-0.000*	-0.001***	0.001***	-0.000*	0.001	-0.001***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Obj_Flows (t-1)	0.418***	0.339***	0.450***	0.293***	0.360***	0.500***	0.431***
	(0.026)	(0.019)	(0.026)	(0.031)	(0.019)	(0.068)	(0.024)
LOWPERF (t-1)	0.279***	0.039	-0.173*	0.369**	-0.015	0.169**	-0.257***
	(0.098)	(0.127)	(0.089)	(0.179)	(0.149)	(0.082)	(0.100)
MIDPERF (t-1)	0.210***	0.296***	0.076***	0.519***	0.200***	0.044	0.090***
	(0.051)	(0.066)	(0.027)	(0.077)	(0.061)	(0.050)	(0.030)
HIGHPERF (t-1)	0.901***	1.117***	0.244	1.229***	1.082***	-0.006	0.334***
	(0.179)	(0.256)	(0.156)	(0.237)	(0.360)	(0.493)	(0.125)
LOWPERF (t-2)	0.013						
	(0.069)						
MIDPERF (t-2)	0.037						
	(0.028)						
HIGHPERF (t-2)	-0.202						
	(0.142)						
LOWPERF (t-3)	-0.004						
	(0.073)						
MIDPERF (t-3)	-0.004						
	(0.038)						
HIGHPERF (t-3)	0.068						
	(0.131)						

Table VII – *Continued*

Dependent variable	Net Fund Flows (%)						
	[1994-2007]			[94-99]	[00-07]	[94-99]	[00-07]
	(A)	(B)	(C)	(D)	(E)	(F)	(G)
Volatility (t-1)	-1.416*	-0.810	-0.939	0.616	-1.066	0.232	-1.192
	(0.820)	(0.770)	(0.691)	(1.176)	(0.831)	(0.867)	(0.760)
Volatility (t-2)	1.043						
	(0.651)						
Volatility (t-3)	-0.410						
	(0.632)						
Interaction term: HIGH 12b-1 (t)							
Bottom performance quintile		0.563***	0.398***	0.364***	0.585***	0.021	0.524***
LOWPERF (t-1) * HIGH 12b-1		(0.052)	(0.074)	(0.086)	(0.045)	(0.041)	(0.058)
Middle three performance quintiles		-0.070*	0.017	-0.165***	-0.023	0.075**	-0.002
MIDPERF (t-1) * HIGH 12b-1		(0.040)	(0.025)	(0.062)	(0.032)	(0.038)	(0.028)
Top performance quintile		0.113	0.041	0.529	-0.078	-0.050	0.085
HIGHPERF (t-1) * HIGH 12b-1		(0.237)	(0.165)	(0.416)	(0.266)	(0.343)	(0.200)
12b-1 Fees (t)		0.024**	0.023***	0.016	0.001	0.012	0.010
		(0.012)	(0.007)	(0.024)	(0.009)	(0.013)	(0.006)
Management Fees (t)		-0.314***	-0.155*	-0.185	-0.434***	-0.101	-0.209*
		(0.114)	(0.091)	(0.123)	(0.096)	(0.103)	(0.111)
Adjusted R^2	36.9%	40.6%	34.6%	44.6%	38.0%	33.0%	34.9%
Number of observations panel	21021	23853	16347	7158	16695	4220	12127

++ Standard errors in parentheses: * p<0.1 ** p<0.05 *** p<0.01

Table VIII

Effect of Variations in Distribution and Management Fees on the Flow-Performance Relationship

This table documents the estimated coefficients of a pooled OLS regression with fund fixed-effect of annual percentage growth rate in fund net money flows in period *t* on several fund characteristics in the previous period *t-1*. The regressions are separated according to whether funds increased (panel A and C) or decreased (panel B and D) their distribution costs or 12b-1 fees in period *t*. The sample period ranges from January 1994 to December 2007. The percentage growth rate in fund net money flows in period *t* is calculated as $(TNA_{i,t} - TNA_{i,t-1}*(1+R_{i,t}) - M_{i,t})/TNA_{i,t-1}$, where $TNA_{i,t}$ is the fund *i*'s total net assets at time *t*, $R_{i,t}$ is the return of fund *i* at time *t*, and $M_{i,t}$ are the aggregate total net assets of funds that were merged into fund *i* in period *t*. We calculate fractional rankings of performance (LOWPERF, MIDPERF, and HIGHPERF) for each fund on either their raw or Carhart's risk-adjusted returns. *TNA* and *TNA Family* are expressed in logarithm and represent proxies for the size of the fund and the size of the family of funds. *Age* is the logarithm of the number of years since fund inception. *NumFunds Family* is the number of funds in managed by the family. *ObjFlows* is the aggregate net money flow flocking into the same investment objective. *Volatility* measures the standard deviation of the monthly return over the measurement period. $\Delta^{+}(MGMT)$ is a dummy variable that equals 1 if the fund increased its management fee over the period. *Management fees* is a variable that controls for the effect exerted by the level of management fees in period *t* on net money flows. The table also reports the statistical significance of the coefficients calculated using robust standard errors (in parentheses) clustered by fund (Petersen, 2008).

Dependent variable	Net Fund Flows (%)							
	Panel A		Panel B		Panel C		Panel D	
	Δ(Distribution)>0		Δ(Distribution)<0		Δ(12b-1)>0		Δ(12b-1)<0	
	Raw	Risk-Adj.	Raw	Risk-Adj.	Raw	Risk-Adj.	Raw	Risk-Adj.
TNA (t-1)	-0.161***	-0.142***	-0.212***	-0.172***	-0.165***	-0.147***	-0.203***	-0.166***
	(0.008)	(0.011)	(0.021)	(0.023)	(0.008)	(0.012)	(0.020)	(0.023)
TNAFamily (t-1)	0.007***	0.008***	-0.004	-0.000	0.007***	0.008***	-0.001	0.004
	(0.002)	(0.002)	(0.004)	(0.004)	(0.002)	(0.002)	(0.004)	(0.003)
Age (t-1)	-0.113***	-0.198***	0.073*	0.045	-0.109***	-0.199***	0.057	0.045
	(0.011)	(0.016)	(0.033)	(0.047)	(0.012)	(0.017)	(0.033)	(0.052)
NumFund Family (t-1)	-0.002***	-0.001***	0.001	0.000	-0.002***	-0.002***	0.001	-0.001
	(0.000)	(0.000)	(0.001)	(0.001)	(0.000)	(0.000)	(0.001)	(0.001)
LOWPERF (t-1)	0.506***	0.383***	0.090	0.077	0.522***	0.393***	0.072	0.008
	(0.069)	(0.081)	(0.205)	(0.252)	(0.072)	(0.085)	(0.186)	(0.209)
MIDPERF (t-1)	0.245***	0.143***	0.259***	0.192**	0.247***	0.138***	0.264***	0.195**
	(0.019)	(0.024)	(0.044)	(0.070)	(0.020)	(0.025)	(0.041)	(0.064)
HIGHPERF (t-1)	1.434***	0.328**	1.410***	0.236	1.441***	0.359**	1.580***	0.220
	(0.113)	(0.126)	(0.276)	(0.343)	(0.119)	(0.130)	(0.257)	(0.332)
Dummy (D): Δ^{+}(MGMT)t								
LOWPERF (t-1)* D	-0.300***	-0.349***	0.140	-0.143	-0.336***	-0.389***	0.179	-0.091
	(0.047)	(0.050)	(0.124)	(0.142)	(0.049)	(0.053)	(0.116)	(0.137)
MIDPERF (t-1)* D	0.065*	-0.011	-0.170*	-0.013	0.068*	0.001	-0.158*	-0.030
	(0.028)	(0.029)	(0.081)	(0.085)	(0.029)	(0.031)	(0.072)	(0.078)
HIGHPERF (t-1)* D	-0.679***	-0.231	1.512*	0.008	-0.659**	-0.290	0.890	-0.180
	(0.192)	(0.189)	(0.723)	(0.485)	(0.203)	(0.200)	(0.653)	(0.436)
Volatility (t-1)	0.972***	0.798***	-0.522	-0.276	1.087***	0.885***	-0.548	-0.185
	(0.139)	(0.158)	(0.612)	(0.503)	(0.145)	(0.169)	(0.664)	(0.557)

Table VIII– *Continued*

Dependent variable	Net Fund Flows (%)							
	Panel A		Panel B		Panel C		Panel D	
	Δ(Distribution)>0		Δ(Distribution)<0		Δ(12b-1)>0		Δ(12b-1)<0	
	Raw	Risk-Adj.	Raw	Risk-Adj.	Raw	Risk-Adj.	Raw	Risk-Adj.
Obj_Flows (t-1)	0.187***	0.240***	0.139***	0.207***	0.188***	0.240***	0.116***	0.177***
	(0.009)	(0.016)	(0.034)	(0.039)	(0.009)	(0.017)	(0.031)	(0.038)
Management Fees (t)	0.090**	0.114***	-0.279***	-0.146	-0.263	-0.133	-0.230*	-0.200*
	(0.035)	(0.025)	(0.100)	(0.099)	(0.227)	(0.193)	(0.102)	(0.104)
Adjusted R^2	39.4%	26.1%	33.9%	18.7%	39.7%	26.5%	33.1%	15.8%
Number of obs. panel	3455	2250	3293	2089	3390	2275	2981	2157

++ Standard errors in parentheses: * p<0.1 ** p<0.05 *** p<0.01