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What Drives Market Share in the Mutual Fund Industry?*

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Abstract

This paper examines competition and investor behavior in the mutual fund industry for the universe of U.S. mutual funds during 1976-2009. Over this period, industry assets increased by a factor of two hundred, the number of active fund families quadrupled, and the average market share of a family declined by four fifths. We find that price competition and product differentiation are both effective strategies in obtaining market share. Families that pass along economies of scale to investors and those that charge lower fees than the competition gain market share, but only if these fees are above average to begin with. Loads and 12b-1 fees, however, have a positive effect on market share, consistent with the use of these types of fees for marketing and distribution. Families that perform better, offer a wider range of products, and start more funds relative to the competition (a measure of innovation) also have a higher market share. Innovation is rewarded more if the new fund is more differentiated from existing offerings. Overall, our evidence suggests that mutual fund families compete effectively along both price and non-price dimensions.

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What Drives Market Share in the Mutual Fund Industry?

Abstract

This paper examines competition and investor behavior in the mutual fund industry for the universe of U.S. mutual funds during 1976-2009. Over this period, industry assets increased by a factor of two hundred, the number of active fund families quadrupled, and the average market share of a family declined by four fifths. We find that price competition and product differentiation are both effective strategies in obtaining market share. Families that pass along economies of scale to investors and those that charge lower fees than the competition gain market share, but only if these fees are above average to begin with. Loads and 12b-1 fees, however, have a positive effect on market share, consistent with the use of these types of fees for marketing and distribution. Families that perform better, offer a wider range of products, and start more funds relative to the competition (a measure of innovation) also have a higher market share. Innovation is rewarded more if the new fund is more differentiated from existing offerings. Overall, our evidence suggests that mutual fund families compete effectively along both price and non-price dimensions.

1. Introduction

The mutual fund industry has grown at a rapid pace, partly due to the increased desire on the part of individuals to participate in financial markets without having to make individual investment decisions. For example, from 1976 to 2009, assets under management in the fund industry have grown from $51 billion to $11.1 trillion (Investment Company Institute Factbook), while the number of complexes offering funds has increased from 134 to 584 (based on our data). Even after the crash of the dot com bubble and during the recent turmoil in financial markets, the industry has continued to thrive. In addition, some fund families have succeeded in achieving a pre-eminent status in the industry, while others have struggled to maintain market share. For example, in 1976, Fidelity controlled less than 6% of the market and Vanguard controlled 3.6%. At the end of 2009, the market shares of these two families were about 12%. In 1976, two other families, Dreyfus and Putnam had market shares similar to Fidelity and Vanguard, respectively. By the end of 2009, Dreyfus' market share had declined to under 2.5%, while Putnam's share was below 1%.

Perhaps surprisingly, even though competition appears to have intensified during this period, the total costs paid by fund shareholders for fund management services have not declined. In fact, the average expense ratio has increase over time from 1.06% in 1976 to 1.36% in 2009. Some observers, including, for example, Freeman and Brown (2001), have suggested that fund management fees are too high. In fact, Freeman has testified on these allegations before Congress [see Freeman (2004)] and the Office of the Attorney General of New York State (2004) has made statements supporting these allegations. In addition, a number of fund management families have been sued by investors for allegedly charging excessive fees. Other academic work has also supported the view that price competition is not very effective in the fund industry. For example, Sirri and Tufano (1993) using a sample of 632 equity mutual funds from 1970-1990 find little relation between growth in market share and the fees charged for the largest 20 fund complexes. Similarly, Barber, Odean, and Zheng (2005) find no relationship between fund expense ratios and asset inflows.[1] While there appears to be little room for product differentiation in the

[1] Others who have argued that there is not enough competition in the fund industry include Wallison and Litan

fund industry, this evidence appears to suggest that fund families have been able to differentiate their products sufficiently to attenuate price competition. Recent evidence by Wahal and Wang (2011) is consistent with this view. When families start new funds that look very similar in terms of their shareholding to existing funds, the existing providers lower the price. However, this result also suggests that if a new fund is launched in an investment objective — implying increased competition in that objective — but if this fund attempts to achieve its performance using different shareholdings, fees are unaffected upon entry. Coates and Hubbard (2007), on the other hand, show that fund assets are negatively related to fees and argue that this alone is sufficient to demonstrate that there is price competition in the fund industry.

We make two contributions in this paper. First, in light of the debate about the competitiveness of the U.S. fund industry, we re-assess the importance of fees using data on all mutual funds covered by the CSRP Mutual Fund database over the period 1976-2009. Because the decision on the number of funds offered and the price charged for fund management rests with the family, our unit of observation is not an individual fund, but the fund family.[2] Second, we also investigate whether non-price competition (i.e., product differentiation) has an important impact on fund management market share. This helps us understand how firms compete across various dimensions. In particular, we want to understand what strategies have been pursued by fund families and how investors have responded to these strategies. Why have Fidelity and Vanguard flourished while Dreyfus and Putnam declined in terms of their market dominance?

Research at the level of the fund family has started to gain prominence only recently. Most of the early work on mutual funds is at the fund level and focuses on various aspects of their performance [see, for example, Grinblatt, Titman, and Wermers (1995), Brown and Goetzmann (1995), Elton, Gruber, and Blake (1996), Gruber (1996), Wermers (2000)]. Work at the family level includes Khorana and Servaes

(2007).

[2] The process of negotiating fund fees is managed by the fund's board, which is generally chosen by the sponsor who establishes the fund in the first place [see Tufano and Sevick (1997) and Kuhnen (2009) for more details].

(1999) who study the decision by families to open new funds and Nanda, Wang, and Zheng (2004) and Ivkovich (2002) who examine performance spillover effects across funds within a family. Massa (2003) studies the relation between the performance of the fund family and the degree of differentiation of the objectives in which the fund family operates. Gaspar, Massa, and Matos (2006) document that fund families strategically transfer superior performance to their more valuable funds by demonstrating favoritism in IPO allocations. From an investor perspective, Elton, Gruber, and Green (2007) find that mutual fund returns within a family tend to be highly correlated, which limits the benefits of portfolio diversification for investors with exposure to a single fund family.

The variable of interest for our study is the market share of a fund family. Market share is the culmination of all the decisions made by fund families and the investors' response to those decisions. It is the ultimate reflection of the choices made by investors, i.e., the revealed preferences of investors. Market share is also an important variable to study because the revenues of mutual funds families are a function of assets under management. In addition, evidence presented by Baumol, Goldfeld, Gordon, and Koehn (1990) indicates that there are economies of scale and scope in the U.S. mutual fund industry. This implies that family size has an important effect on profitability. Our findings are not only of interest to fund families, but also to regulators and consumers. Regulators, in particular, are concerned about the impact of fees on market share, especially in light of allegations discussed earlier that fees are too high.

To examine the importance of pricing in determining investor choice, we study the effect of fund expenses and loads on market share. Fund expenses include expenses for marketing, distribution, and trading activities, as well as fees charged by the mutual fund advisors. These expenses are incurred on an annual basis. Loads, on the other hand, are charged when investors increase their investment (front-end load) or decrease their investment (back-end load) in a fund. The presence of back-end loads can act as a deterrent for investors to vote with their feet. We also examine whether the effect of expenses is asymmetric, i.e., do investors behave differently when expenses are high or low relative to other funds in the same objective?

To examine whether fund families can gain market share by focusing on aspects other than price, we

study a large number of family-specific characteristics, including prior performance, Morningstar ratings, the degree of asset concentration across funds and objectives, the level of active management within the family, various measures of product innovation, and marketing costs. We also control for the family's experience in the industry and the number of funds offered by the family.

We address these questions by examining the *universe* of all open-end mutual fund families (both active and inactive) in the United States over the 1976-2009 period. Our results indicate that investors pay attention to fees in their asset deployment decision across fund families. Specifically, we find that families have a higher market share when they charge lower objective-adjusted fees relative to other families. This result holds after controlling for the potential endogeneity of fees. In addition, families whose expense ratios decline with fund size, also have higher market share. The greater sensitivity to fund size could be partly attributable to families passing along economies of scale benefits to their shareholders. This evidence casts doubt on the conclusions of earlier work suggesting that price competition is ineffective in the fund industry.

Not all elements of expenses affect market share in the same way, however. Expenses related to marketing and distribution (12b-1 fees) and loads (both back-end loads and front-end loads) have a positive impact on market share. Thus, fund management companies can levy fees to market a fund to new investors without losing market share. In addition, funds with higher loads and 12b-1 fees have higher other expenses as well. Interestingly, the positive effect of front-end loads on market share is confined to the bottom half of fund families in terms of size, suggesting that these fees may reduce search costs for investors.

We also find that the effect of expenses is asymmetric: families whose expenses are above the mean can enhance their market share via expense reduction. This is not the case for low-expense families, which suggests that consumers are more concerned with fees relative to a benchmark than with fees per se.

We also study the impact of non-price competition on a family's ability to attract additional assets. This analysis is important to understand the broader context of competition in the industry. First, families that outperform the competition have a higher market share, especially if one of their funds is a top

performer. In addition, families with higher Morningstar ratings attract more funds, even after controlling for performance. Given that the Morningstar ratings are less granular than traditional performance measures, such as abnormal returns, this evidence suggests that investors prefer to pay attention to simple performance metrics.

Second, innovation, as measured by new product introductions, also leads to higher market share, especially if the portfolio characteristics of the new funds differ more from the existing offerings in the marketplace, and take place in segments in which fewer existing funds operate. Very high levels of innovation, however, have an adverse impact on market share. These findings indicate that the cannibalization of existing funds is not a significant problem at moderate levels of innovation, and that fund investors are sophisticated enough to understand the subtle differences in product offerings.

The remainder of the paper is organized as follows. Section 2 discusses the hypotheses. Section 3 describes the data and methodology used for the analysis. Section 4 contains the results and Section 5 concludes.

2. Hypotheses

In general, consumers purchase a product at a certain price because the underlying product features increase their expected utility. The market share of fund families is the outcome of these individual consumer decisions. Holding the actual or perceived features of the product constant, the price charged for the product is an important aspect of competition. However, firms will try to differentiate their product, partly to lessen the importance of price competition.[3] In this section, we outline how pricing and different aspects of product differentiation influence competition and investor choice.

2.1. Price Competition

One could argue that mutual funds are very much like standard commodities. In addition, all funds

[3] See Hortaçsu and Syverson (2004) for a model of search costs and product differentiation applied to the mutual fund industry.

are required by law to provide standardized services such as record keeping and the provision of liquidity. Hence, to gain a competitive advantage, the price charged for the services rendered may be the most significant determinant of a family's ability to attract additional capital. If this is the case, we expect to find an inverse relationship between a family's market share and the fees charged to investors.

The existing evidence on the importance of fees is mixed. Wilcox (2003) provides experimental evidence, which indicates that consumer pay close attention to fees when selecting mutual funds. On the other hand, Capon, Fitzsimons, and Prince (1996) present survey evidence to suggest that only about one quarter of mutual fund investors consider management fees to be important in selecting funds. The remainder of the investors care more about performance and other services offered by the fund families. Evidence presented by Sirri and Tufano (1993), Freeman and Brown (2001), and Barber, Odean, and Zheng (2005) also suggests that price competition is not important in the industry, and Elton, Gruber, and Busse (2004) report that investors in S&P500 index funds do not necessarily choose the fund with the lowest expenses. Christoffersen and Musto (2002) find similar evidence for money-market funds. Finally, in experimental work, Choi, Laibson, and Madrian (2010) find that 85% to 95% of individuals do not choose the lowest cost S&P500 index funds.

It is important to recognize that two facets of price competition are at work here: (1) the extent to which fund families pass along potential economies of scale benefits to their shareholders and (2) the extent to which investors respond to fund fees. The market share of a fund family is the final outcome of the responses of both the fund families and its investors. It may be in the interest of fund families not to pass along lower costs to shareholders. However, if shareholders themselves respond to (the lack of) expense reductions by redeploying their assets, then these external market forces will act to mitigate this effect.

We also examine whether the relationship between fees and market share is symmetric. It is possible that investors are more sensitive to fees when they are particularly high relative to the universe of funds in the objective and less sensitive when they are below the objective norm.

As we discussed in the introductory section, the evidence presented by Baumol, Goldfeld, Gordon,

and Koehn (1990) suggests that there are economies of scale in the fund industry. However, Freeman and Brown (2001) have argued that fund management companies pass few of the savings from these economies of scale on to their clients. To investigate this, we compute the relationship between fund fees and fund assets for each family over our sample period and examine whether families whose fees decline in relation to fund assets (i.e., those families who pass along more economies of scale benefits to the investors) have higher market share.

We use total fund expenses as a proxy for the price charged by a family for the services rendered. In addition, assuming a seven-year holding period, we increase the expenses by one seventh of the initial and/or back-end load to capture the sum of all possible expenses and fees paid by fund shareholders. To measure expenses relative to other families in the industry, we make adjustments for differences in these load-adjusted expenses across the various investment objectives. To determine whether loads have the same effect as non-load related expenses, we also study them separately. Front-end loads are often employed to compensate financial advisors for selling the fund (this will be discussed in the section on marketing and distribution). Back-end loads make it expensive for investors to leave poorly performing funds. If they take this reduced ability to vote with their feet into account when making the investment decision, back-end loads may hurt fund family market share. If not, the increased cost of leaving may enhance market share.

2.2. Product Differentiation

2.2.1. Past Performance

Performance may well be the most important way for fund managers to differentiate themselves. Those managers that can earn excess performance are expected to attract more capital and therefore increase the fund family's market share [see, for example, Berk and Green (2004)]. There is heated debate as to whether (some) fund managers can consistently earn excess returns. Various studies have demonstrated that most fund managers are unable to beat standard performance benchmarks on a risk-adjusted basis, after taking into account expenses [see, for example, Carhart (1997)], but there is some

evidence in support of the "hot hands" phenomenon. Hendricks, Patel, and Zeckhauser (1993), Grinblatt, Titman, and Wermers (1995), Elton, Gruber, and Blake (1996), Chevalier and Ellison (1999), and Cremers and Petajisto (2009), among others, provide evidence that there is some persistence in the ability of managers to outperform or underperform the competition, while Gruber (1996) and Zheng (1999) document some skill on the part of mutual fund investors to pick winning managers, at least in the short run.

Moreover, Berk and Green (2004) argue that the lack of evidence in favor of excess performance or persistence does not imply a lack of skill on the part of fund managers. They argue that this is to be expected in a competitive market for asset management services, if we assume that the ability of a fund manager to outperform the benchmark declines with fund size. Managers with excess performance will attract enough new funds such that expected excess performance, net of fees, is zero. This argument still implies a negative relationship between fees and assets under management. Higher fees will lead to lower net-of-fees performance, and consequently lower assets under management.

While performance is traditionally measured using abnormal returns, many investors pay attention to a fund's Morningstar rating. In fact, Del Guercio and Tkac (2008) demonstrate that changes in Morningstar ratings have an effect on fund flows, independent of the effect of abnormal returns. We therefore also investigate whether Morningstar fund ratings affect market share.

Ippolito (1992) and Sirri and Tufano (1998), among others, find that funds with positive abnormal performance attract more assets in subsequent years, while poor performers do not experience outflows of the same magnitude. This asymmetric response suggests that families can experience an increase in their market share, even if they are average performers as a whole, as long as they have one or more top performers in their portfolio of product offerings.[4] In light of these arguments, one strategy that could be followed by families is to start multiple funds in an objective to increase the likelihood of having a top-performing fund. We discuss this possibility in more detail in our analysis of innovation.

[4] See also Lynch and Musto (2003) for a rational model of portfolio management in which an asymmetric relation between fund flows and performance emerges.

2.2.2. Product Innovation

There are three reasons why families may want to open new funds. First, a family may offer a new fund with a variation on an existing product line that may appeal to new investors. Mamaysky and Spiegel (2002) argue that the characteristics of new funds should differ as much as possible from those of existing funds, both across families and within the family. To explicitly examine whether the degree of differentiation of new funds affects market share, we construct a variety of measures. We expect investors to respond more favorably towards families that offer a differentiated product rather than a small variation on an already existing product, albeit that the recognition of these subtle differences requires a great deal of sophistication from investors. We also investigate whether the impact of fund starts on market share is less significant in an already crowded segment.

Innovation does not necessarily increase market share, however. The new funds may simply cannibalize existing funds in the family, either because the new funds appear to be a better investment option, or because marketing efforts and allocations of shares with expected superior performance are directed to the new funds [see Gaspar, Massa, and Matos (2006)]. Differentiating the new product offering from existing offerings is therefore an important consideration [see, for example, Tirole (2004)]. It is also possible that the introduction of additional funds creates confusion in the mind of the potential customer, who may prefer to invest with a more focused family.

The second reason why families may open new funds is not to be innovative per se, but to increase the likelihood of having a top-performing fund as discussed in the subsection on performance. In our sample, 56% of the families with more than 20 funds in 2009 have at least one fund in the top 5% in terms of performance (within a particular investment objective), compared to only 16% of families with 20 funds or less.

Finally, families may open new funds because their current funds have done poorly and fail to attract new asset inflows. Again, this motivation is unrelated to innovation per se and reflects the market reality that inflows are higher in funds that have performed well in the past. However, even if new funds are

started for this reason, we still expect families to attain higher market share subsequently, after controlling for prior performance.

2.2.3. Marketing and Distribution

Resources employed for marketing and distribution can reduce the search costs for potential investors, hence, creating an opportunity to increase market share. To examine whether firms can enhance market share through increased marketing expenses, we examine the effect of 12b-1 fees and loads charged by the family. Marketing and distribution (12b-1) fees are charged directly to the assets of the fund. However, the 12b-1 fees are also a component of the expenses that both existing and new investors have to bear, and therefore, they could have a negative impact on market share similar to other fees charged. Alternatively, 12b-1 fees and front-end loads may allow funds to compensate financial advisors for attracting funds from investors who would otherwise be unable to invest in certain assets [see Stoughton, Wu, and Zechner (2011) for a model of intermediated investment management and for a detailed discussion of this topic]. By considering 12b-1 fees and loads separately, we ascertain whether these components of expenses have a differential impact on market share.[5]

2.2.4. Degree of Family Focus

There exists a significant degree of heterogeneity in both the total number of funds and the types of funds offered by fund families. Some families are extremely focused in terms of the types of funds offered (for example, Edward D. Jones only offers money market funds), whereas other families compete by offering a plethora of funds in different investment objectives.

A priori, we do not know whether a more diversified family possesses a greater ability to attain market share relative to a more focused fund family. Mamaysky and Spiegel (2002) develop a theory of mutual fund design, which suggests that fund families should diversify across investment styles to enhance

[5] Some 12b-1 fees may be employed to compensate advisors for past sales of the fund, and not to attract new investors. Data on the exact use of 12b-1 fees are not available.

investor welfare. The objective of such a strategy is to impose few restrictions on investors in terms of their ability to adjust their asset allocation over time.[6] Alternatively, more focused families may possess a greater ability to develop expertise and economies of scale in a particular investment style or asset class, and hence attain higher market share via actual or perceived superior performance. Siggelkow (2003) provides evidence to support this notion: funds that are a part of more focused families are able to deliver higher returns. Massa (2000) evaluates the trade-off between diversification (category proliferation) and focus in his model of mutual fund starts. According to Massa (2000), category proliferation improves risk-hedging because it makes the portfolio of the mutual fund family more diversified. Focus, on the other hand, allows the company to obtain economies of scale from "learning-by-doing". We examine investor response to these strategies by analyzing their impact on the market share of fund families.

We employ two measures to examine how the diversity of product offerings affects the overall market share of the family: (1) the Herfindahl index computed at the objective level within the family and (2) the Herfindahl index computed at the fund level within the family. The Herfindahl index is computed as the sum of the squared fractions of the family's assets invested in each objective/fund.

2.2.5. Active Versus Passive Management

There is significant variation in the degree to which families pursue active portfolio management strategies. A measure of the degree to which funds are actively managed is the level of portfolio turnover. Some families, in particular Vanguard, are well known for their low portfolio turnover approach to fund management, mainly because many of their funds track standard stock market indices. The relation between market share and the degree of active management could be either positive or negative. On one

[6] Böckem (1994) and Wolinsky (1986) develop models to examine the optimal level of product differentiation. However, both papers focus on differences in product differentiation across industries, not across firms within a particular industry. One implication of Wolinksy's work, which applies directly to this paper, is that firms become more specialized as their industry becomes more competitive. This is not consistent with our findings of an increase in the scope of a family's product offerings over time (reported in Section 3 of the paper).

hand, high portfolio turnover could be perceived by a certain group of investors as an indicator of the quality of fund management. In fact, Wermers (2000) suggests that high-turnover equity funds have superior stock picking ability, and Cremers and Petajisto (2009) and Petajisto (2010) show that more active portfolio managers outperform their benchmarks. On the other hand, given prior evidence that active managers have underperformed standard benchmarks (after adjusting for expenses), investors may be attracted to the index-based approach associated with lower portfolio turnover.

As a measure of the degree of active management in a fund family, we adjust the level of turnover in a fund for the average turnover in the investment objectives in which the family operates and average this across all funds in the family.

2.3. Control Variables

We include the level of industry experience as a control variable. Families with greater experience are likely to have a more established track record of performance, which could lead to higher market share. We measure experience as the number of years that the family has been in existence.

We also control for the number of funds offered by the family. This is important to ensure that results on fund starts and top-performing funds are not spurious.

3. Data, Sample Description, and Research Design

3.1. Data and Sample Description

We use the CRSP Mutual Fund database which is free of survivorship bias. Information is available at the individual fund level and includes the fund name, the family name, the investment objective, monthly total returns, net asset values, total assets in the fund, expenses, portfolio turnover, load structure, the date on which the fund started and ceased to exist, and a variety of other data items. Our analysis covers the 1976-2009 period and includes funds in *all* investment objectives.[7] The database contains several

[7] The name of the fund family is only available from 1992 onwards. To determine the fund family name for prior periods we employ the following approach. If the fund is still in existence in 1992, we assume that the fund

classifications of investment objectives for each fund. We employ the most detailed level of classification available, but we aggregate multiple objectives into broader categories.[8] For example, all money market mutual funds are grouped together into a single objective and so are all municipal bond funds. Note that the 12b-1 fees and back-end loads are available on the CRSP database only since 1992. Our analysis of these sets of fees is therefore limited to a shorter sample period.

We combine the above information with data from the Morningstar Ondisc and Principia CDs, which are available from 1992 onwards. From Morningstar, we gather information on a fund's characteristics (employed to compute the degree of differentiation of new funds), and its star rating.

Table I contains summary statistics on the evolution of the mutual fund industry over the 1976-2009 period based on five sample years. We document an increase in the number of families competing in the industry from 134 in 1976 to 584 families in 2009. Over the same time period, total assets under management increase from $48.1 billion to $10.8 trillion. As a result, the size of an average (median) fund family increases from $359 million ($59 million) to $18.5 billion ($369 million). We also document that the level of innovation as measured by the average number of new funds started increases from 0.19 in 1976 to 1.72 in 1992, but declines to only 0.08 by 2009. Notice that the median family does not start any new funds in a given year.

The average family increases the mean (median) number of funds offered from 2.87 (2.00) to 19.61 (3.00); there is a corresponding increase in the mean (median) number of objectives offered by a family

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management company remains the same in the pre-1992 period. If the fund is not in existence we search Barron's and the Wall Street Journal to obtain the fund management company name.

[8] The following objective categories are used in our sample: Asian equities, Balanced, Canadian equities, Convertible bonds, Corporate bonds, Emerging markets equity, Equity income, European equity, Global balanced, Global bonds, Global equities, GNMA securities, Government bonds, Growth and income, Growth, Income, International Bonds, International equities, Large cap equity, Latin American equity, Midcap equity, Money market, Mortgages, Multi cap equity, Municipal bonds, Small cap equity, Specialty commodities, Specialty consumer, Specialty environment, Specialty finance, Specialty healthcare, Specialty materials, Specialty natural resources, Specialty precious metals, Specialty real estate, Specialty technology, Specialty utilities, and Specialty other.

from 1.80 (1.00) to 4.67 (2.00). It is interesting to note that the median family offers few funds in any given objective. Families have also become less focused, both in terms of the number of funds offered and the number of investment objectives in which they operate. For example, the mean (median) Herfindahl index across funds declines from 0.73 (0.83) in 1976 to 0.59 (0.55) in 2009.

The industry has become more fragmented over time; the average (median) market share of a family declines from 0.75% (0.12%) to 0.17% (0.003%). Interestingly, the market share of the five largest families remains relatively constant at approximately 35-40%. There appears to be a slight increase in average (median) expenses over time, from 1.06% (0.92%) in 1976 to 1.36% (1.22%) in 2009. Marketing and distribution (12b-1) fees are small for the median family, but the average figure indicates that some families have marketing and distribution fees that are substantial.

3.2. Research Design

The variable of interest for our study is a fund family's market share. We compute market share at the end of each year as the sum of all assets under management by each family divided by all assets under management in the industry. We estimate several specifications of the following panel regression model:

$$\begin{aligned}\text{Market share of family } i \text{ in year } t = {} & \alpha_0 + \beta_1 (\text{market share})_{i,t-1} + \beta_2 (\text{family expenses})_{i,t-1} \\ & + \beta_3 (\text{family performance})_{i,t-1} + \beta_4 (\text{family innovation})_{i,t-1} + \beta_5 (\text{family focus})_{i,t-1} \\ & + \beta_6 (\text{family turnover})_{i,t-1} + \beta_7 (\text{number of funds offered by family})_{i,t-1} \\ & + \beta_8 (\text{family experience})_{i,t-1} \qquad (1)\end{aligned}$$

We employ three measures of family performance. The first measure captures the objective-adjusted return earned by the family, and is computed as follows:

$$\text{Family Abnormal Return} = \sum_{i=1}^{N} \left\{ w_i \left[R_i - \sum_{j=1}^{M} w_j R_j \right] \right\} \qquad (2)$$

where w_i is the weight of a fund within the family; w_j is the weight of a fund within the investment objective; R_i is the return of the fund for which the objective-adjusted return is being computed; R_j is the return of a fund in the objective, which is employed to compute the weighted average objective return; M

is the number of funds in the objective employed to compute the weighted average objective returns; and N is the number of funds in the family.

The computation of this measure requires three steps. First, we compute the value weighted average return for each investment objective, where the weight is the relative size of the fund within that objective (w_j). Second, we subtract this average objective return from the return earned by each fund in the family with that objective. Third, we compute the weighted average of these objective-adjusted returns across all funds within the family, where the weight is the relative size of the fund within the family (w_i). This variable measures abnormal family performance.[9]

The second performance measure is similar to the first, except that we replace the return with the Morningstar rating, expressed numerically from 1 to 5. Thus, this measures the objective-adjusted star rating, averaged across all funds in the family.[10] These data are available from 1992 onwards.

The third performance measure captures the presence of a top-performing fund within a family. We define a top-performing fund as any fund that performs in the top 5% of all funds in an objective in a given year, and construct a top 5% dummy which equals one if at least one fund in the family meets this criterion. This variable is designed to incorporate the fact that funds with superior performance may serve as a catalyst for new inflows into the entire family. We recognize that families with more funds are more likely to have a top performer. To take this possibility into account, we control for the number of funds offered by the family in all regression specifications. The top 5% dummy therefore captures the effect of having a top-performing fund, after taking into account the positive relationship between family size and the number of funds offered.

[9] We compute abnormal returns using the fund's objective as a benchmark, rather than a benchmark based on a multi-factor model because there is little guidance as to what factors should be used for funds other than domestic equity funds. Other papers that use multi-factor models limit their analysis to domestic equity funds while we study all funds in the U.S mutual fund universe.

[10] The Morningstar ratings are based on risk-adjusted performance in an investment objective. See Blume (1998) and Del Guercio and Tkac (2008) for a more detailed discussion of the construction of the Morningstar ratings.

Our measure of total expenses includes regular expenses as well as front-end and back-end loads charged by the family. To spread the load over time, we assume a seven-year investment horizon.[11] Thus, total expenses are measured as: Regular expenses + Total load/7. Back-end loads are only available from 1991 onwards. For the pre-1991 period, we are only able to measure front-end loads. Expenses are also adjusted for the average in each objective and then averaged across all of the funds in the family. This approach mimics the procedure used to compute family abnormal performance.

It is possible that expenses are actually a function of the size of the fund, because larger funds may benefit from economies of scale. Moreover, expenses may also be a function of turnover since expenses include trading costs. To incorporate this possibility in our empirical analysis, we also compute an alternative measure of expenses. This measure is constructed by estimating annual regressions of the expense ratio at the fund level on the logarithm of fund size, fund turnover, and objective-dummies, and extracting the residual from this regression equation.[12] This residual represents that part of expenses not explained by fund size, turnover and objective. We then perform our analyses using this transformed variable.

We also study the extent to which fund families pass along economies of scale benefits (to the extent that they exist) to fund investors in the form of lower fees, and the response of investors to such actions. To measure this, we estimate the following regression model using fund-level data for each fund family:

$$\text{Fund expenses (including loads)} = \beta_1 \text{ Log Fund assets} + \text{Year dummies} + \text{Objective dummies} \quad (3)$$

In this specification, assets are inflation-adjusted. The coefficient on the logarithm of fund assets (β_1) measures the extent to which expenses decline with fund assets. This measure is employed in our analyses to estimate fund economies of scale: negative (positive) values of β_1 suggest that fund expenses decline (increase) with fund size. We estimate the above equation for each family starting in 1975 up to the year preceding the year for which family market share is being analyzed. Only families with at least 20 fund-

[11] We obtain similar results for horizons ranging from four to ten years.

[12] Our results are very similar if we control for both fund size and family size in these regressions or if we estimate separate regression by year and by investment objective.

year observations are employed in the estimation. We set a dummy variable equal to one if the coefficient on fund assets (β_1) is negative, and zero otherwise. If families that pass along economies of scale to investors gain market share, we expect the coefficient on the "economies of scale" dummy to be positive. Note that the goal of this analysis is not to determine whether economies of scale exist in the fund industry [see Dermine and Röller (1992)], but solely to determine whether fund families have lower expense ratios in larger funds. Finding this relationship would indicate that economies of scale exist *and* that families pass these economies of scale benefits on to customers in the form of reduced fees.

Turnover is also adjusted for the average level of turnover in each investment objective and averaged across all of the funds in the family. This procedure is the same as for returns and expenses.

As mentioned in the previous section, we employ Herfindahl indices computed across all objectives in the family and across all funds in the family as a measure of focus.

We construct several measures to capture the effect of innovation on market share. First, we simply count the total number of funds started by the family in a given year.[13] As mentioned previously, we include the squared term of the innovation measure in our regression specifications to capture non-linearities and potential adverse consequences of starting a large number of new funds.

Second, we develop a measure of the extent to which new funds can be differentiated from existing funds. We do this based on three characteristics for stock funds: price-to-book ratio, earnings growth, and the median market capitalization of the stocks in which the fund is invested, and three characteristics for bond funds: the average price, maturity and coupon rate of the bonds in which the fund is invested. We compute the number of standard deviations that each fund characteristic is away from the mean based on the entire universe of funds. We then sum these three standard deviations (one for each characteristic) to compute an aggregate distance measure for each new fund, and sum them across all fund openings in the

[13] In the last two decades, many fund families have introduced different share classes of the same fund. These classes differ only in the fees charged. We do not consider the introduction of an additional share class to be an innovation. Moreover, we aggregate all share classes into a single observation before computing the number of funds, economies of scale, and various measures of family focus.

family in that year (distance from existing funds). Hence, this measure of differentiation can be large because a family starts many new funds, and/or the new fund is truly a differentiated product offering. We therefore control for the number of funds started in our specifications to isolate the impact of differentiation.

As a final measure of differentiation, we compute the number of starts as a fraction of the number of existing funds in the objective, and sum these fractions across all objectives in the family. This allows us to test whether fund initiations in an already crowded objective have a smaller impact on market share.

The 12b-1 fees, which are employed to measure marketing and distribution expenses, are adjusted for the objective mean, and averaged across all funds in the family, in a similar manner as returns, expenses, and turnover. When we include loads separately, we make the same type of adjustment as described above. Finally, Experience is measured as (log of) the total number of years the family has been in existence.

We estimate the family market share model (1) for the unbalanced panel of families active in the industry over the 1976-2009 period. All models include year dummies. Because we include the lagged dependent variable in our model, OLS estimates would be inconsistent [see, for example, Kievit (1995)]. We therefore estimate our models using the system GMM approach proposed by Arellano and Bover (1995) and Blundell and Bond (1998). Under this approach, we estimate a system of equations in both differences and levels. The lagged values of the levels serve as instruments in the difference equation and the lagged values of the differences serve as instruments in the levels equation. Instruments are required because the levels and differences themselves are endogenous in their respective equations. We report two goodness of fit tests for all models. The first test checks whether there is second-order serial correlation of the error term. The use of endogenous variables dated t - 2 as instruments is only valid if the error term is serially uncorrelated, implying a first-order moving average error term in the differenced model. The second test checks the validity of the instruments (Hansen test for overidentifying restrictions).[14]

We take the natural logarithm of the market share and employ this transformed variable as the

[14] See Roodman (2006) for a detailed discussion on the estimation of system GMM models.

dependent variable. Using a log specification facilitates the interpretation of our results in that changes in the explanatory variables have the same percentage impact on market share. Such a specification is more realistic since policy changes within a fund family that affect the explanatory variables are likely to have a smaller impact on the level of market share of smaller families.

4. Results

4.1. Determinants of Family Market Share

Table II contains the results of several specifications of the family market share regressions. Model (i) is the base case specification. Our results indicate that both price and non-price competition have an important effect on the market share of mutual fund families. Competing on price is an effective way of obtaining market share. The coefficient on objective-adjusted expenses is negative and highly significant. The economic effect of the coefficient is also large: increasing abnormal expenses from the 25th percentile of the distribution (-0.05%) to the 75th percentile of the distribution (0.71%) leads to a 19% decline in market share.[15] The fact that expensive families lose market share suggest that price competition is effective.

Not surprisingly, performance also matters for market share. Both performance measures, i.e., objective-adjusted performance and the presence of a top-performing fund, have a positive and significant impact. For example, a performance improvement from the 25th (-4.50%) to the 75th percentile (2.09%) results in an increase in market share of 4.7%. The effect of having a top 5% fund on family market share appears to be the strongest of all explanatory variables. After controlling for the number of funds in the family, we find that increasing the top 5% dummy from 0 to 1 increases market share by 42%.

The evidence on the impact of focus is mixed. We find no evidence that fund families focused on

[15] Note that this is a percentage change, not a change in percentage points. For example, a firm with a market share of 10% would experience a reduction in market share to 8.1% (a decline of 19%). Because the dependent variable is expressed as the log of market share, the change in market share is computed as $e^{-28.29*(0.0071-(-0.0005))}-1$, where 28.29 is the coefficient on the expense ratio.

fewer objectives have lower market share. But, in model (ii), where we measure focus using the Herfindahl index computed at the fund level, we do find that focus negatively affect market share. Clearly, any potential benefits of focus on few funds are outweighed by the ability to attract new money through the diversity of product offerings.

Innovation, as measured by the number of new funds started, has a positive effect on market share for virtually all of the families in our sample. For example, opening just one fund increases market share by 8.6%. The negative coefficient on the squared term indicates that the positive effect of additional fund starts becomes smaller and actually turns negative for high levels of innovation. However, only 16 families are on the downward sloping part of the curve, which begins at 31 new fund starts. Only three families open more than 61 funds in a given year, which is the point where the effect of innovation becomes negative. Of course, this does not imply that it is optimal to start a large number of funds because the startup costs are likely to be substantial. In Section 4.3 we study the effect of innovation on market share in greater detail by employing more refined measures of innovation.

There is weak evidence that families with high objective-adjusted turnover have a lower market share, but the economic significance of this finding is negligible: increasing turnover from the 25^{th} to the 75^{th} percentile reduces market share by less than 1%. Not surprisingly, the control variables, family experience and number of funds offered, are also positively related to market share.

In models (iii) and (iv) of Table II, we also take into account that larger funds and funds with lower turnover may have lower expenses to begin with, and substitute total expenses by residual expenses. The negative impact persists, but the coefficients are somewhat smaller than those reported in models (i) and (ii).

As illustrated in model (iv) of Table II, the coefficient on the "economies of scale" dummy is positive and significant, suggesting that families which potentially experience economies of scale benefits and pass them on to investors have a higher market share. The effect on market share is over 17%.

In Table III, we re-estimate model (i) of Table II separately for four broad categories of funds: equities, balanced, bonds, and money market. In these specifications, market share is computed within the

broad category only and families not active in that category are excluded from the analysis. All explanatory variables are also computed within each broad objective. The Herfindahl index across funds or objectives is not included in the reported specifications because we are exploring market share within categories. When included, it is never significant. The results are similar across all categories, even though the coefficients are not always estimated with the same precision. We are unable to reject equality of the regression coefficients across the four models, implying that our findings apply to all investment categories.

Overall, the results presented in Tables II and III highlight the presence and importance of price competition in the fund industry. Families that charge lower fees and pass along economies of scale benefits to fund investors have higher market share. From a policy perspective, these findings suggest that there is no immediate need for more fee disclosures or explicit regulation of fund fees. Next, we turn to a more detailed analysis of the various components of fees.

4.2. Breaking Up the Expense Ratio

Fees paid by fund shareholders consist of three broad components: (1) fees charged when investing in the fund (front-end loads) or redeeming money from the fund (back-end loads), (2) fund operating expenses, including management fees, and (3) 12b-1 fees, which are fees charged explicitly for marketing and distribution. We now investigate the effect of these components separately. As in the previous analyses, all measures are objective-adjusted and summed across all funds in the family. This analysis is limited to the post-1992 period which corresponds with the availability of both back-end load and 12b-1 fee data.

Our findings are reported in Table IV. The results are striking. While regular expense ratios (and the residual expense ratio) continue to have a significant negative impact on market share, this is not the case for the other components of expenses. Front-end loads, back-end loads and 12b-1 fees have a positive and significant effect on market share, although the statistical significance of the front-end load coefficient is weak. These findings are consistent with the work of Stoughton, Wu, and Zechner (2011), who suggest

that these costs facilitate the participation of small investors in actively managed portfolios. The result on back-end loads is also consistent with the notion that these fees act as a deterrent for investors to leave existing funds. These effects are also substantial economically. For example, increasing 12b-1 fees from its 25th percentile (-0.17%) to its 75th percentile (0.06%) increases market share by over 10%, based on model (i). The same increase in front-end (back-end) load leads to an increase market share of 5.5% (2%). We also investigate whether these effects apply to both large and small fund families. Investors in smaller families face higher search costs and those families may therefore find it worthwhile to increase spending on market and distribution. We find that the positive effect of front-end loads on market share is confined to the bottom half of fund families in terms of size (not reported in a table). For larger families, the effect is insignificant, supporting the view that front-end loads reduce search costs for investors.

Overall, these results indicate that investors respond differently to various types of fees: the effect of loads and 12b-1 fees is positive while effect of other expenses is negative. Loads are often used to support fund distribution, while 12b-1 fees are *explicitly* earmarked for fund distribution and marketing. It is important to recognize that the fees for marketing and distribution are charged to existing investors partly with the prospect of attracting new investors into the fund. Thus, while 12b-1 fees may help attract new shareholders to the fund, one way for existing shareholders to benefits from these fees would be a possible reduction in subsequent expenses charged as a result of operating a larger fund. Next, we investigate whether this is the case and examine other potential benefits from levying loads and 12b-1 fees.

Perhaps families levying loads and 12b-1 fees have lower other (non-marketing and non-distribution related) expenses, and looking at the impact of loads and 12b-1 fees on market share, while holding other expenses constant, may paint the wrong picture. To investigate this, we estimate the following regression model at the *fund* level:

$$\text{Expenses} = \beta_1 (\text{Log fund assets}) + \beta_2 (\text{Log family assets}) + \beta_3 (\text{Front-end load}) + \beta_4 (\text{Back-end load}) + \beta_5 (\text{12b-1 fee}) \quad (4)$$

In this specification, expenses do not include loads because our goal is to determine whether loads affect other expenses. Moreover, when 12b-1 fees are included as an explanatory variable, they are excluded from the dependent variable. All models also include objective dummies and year dummies. The goal of

this analysis is not to ascribe causality, but simply to ascertain whether different aspects of a fund's fee structure are related. Table V contains the results of our analyses. Model (i) shows that the relationship between front-end loads and expenses is actually positive. In model (ii) we split expenses into 12b-1 fees and other expenses.[16] In this specification, the coefficients on both loads and 12b-1 fees are positive; i.e., funds that charge loads and 12b-1 fees also have higher other expenses. Thus, investors do not appear to benefit from 12b-1 fees and loads through a reduction in other expenses. Overall, these findings are consistent with Stoughton, Wu, and Zechner (2011) who show theoretically that payments of some of the 12b-1 fees and loads to advisors are associated with higher portfolio management fees. They are also consistent with the empirical work of Ferris and Chance (1987) who find that funds with 12b-1 fees have higher expense ratios.

Another possibility is that loads and 12b-1 fees do not result in lower fees per se, but that they allow funds to enjoy greater economies of scale and to pass them along to fund investors. To investigate this, we re-estimate the previous models, but include interaction terms between the log of fund assets and three dummies. The dummies capture whether or not the fund has a front-end load, a back-end load, or charges 12b-1 fees. We show the findings in model (iii) of Table V. We find no evidence that funds with loads or 12b-1 fees decrease other expenses faster as assets increase compared to funds without loads or 12b-1 fees. Front-end loads and 12b-1 fees have no effect on the relation between fees and assets, while back-end loads have a positive effect. The economic impact of all these effects is minor, however. For example, increasing fund assets from the 25th to the 75th percentile reduces expenses by 9 basis points for funds without back-end loads and 6 basis points for funds with back-end loads. This evidence does not support the economies of scale arguments.

4.3. Detailed Analysis of Innovation

The results discussed in Section 4.1. suggest that families gain market share when they start new

[16] Note that this model is estimated for the post-1991 period only because of lack of availability of 12b-1 fees prior to 1992.

funds, unless the number of starts is extremely high. In this section, we analyze innovation in more detail. In particular, we address two questions. First, we investigate whether investors pay attention to the characteristics of the new funds compared to those of existing product offerings. Second, we analyze whether the effect of fund starts depends on the number of existing funds already available in an objective.

Table VI addresses these questions. In model (i), we study whether the degree of newness of fund openings affects market share. The measure employed in this model is the degree of newness relative to all existing funds, as described in section 3.2 (referred to as the "distance from existing funds"). It is based on Morningstar data available in the post-1991 period only. We also include the number of starts in this model to make sure that the newness measure does not proxy for the number of funds started. There is generally a positive relation between family market share and the distance measure, although the negative coefficient on the squared term indicates that the benefits taper off as distance increases. Only three families have a distance measure beyond the point where the effect on market share is decreasing. In addition, after controlling for distance, the number of fund openings itself has little effect on market share. The coefficients on the distance measures imply that if a family starts a fund whose sum of the deviations of fund characteristics is one standard deviation away from the universe of funds, it will result in an increase in market share of 4%.[17] We re-estimate these models with the distance measure computed relative to other funds in the family and relative to other funds within the investment objective in the family (not reported in the table). However, these measures do not have a significant impact on market share. This indicates that fund investors are more concerned with differentiation relative to all available product offerings than with differentiation relative to the family's other offerings.

Model (ii) of Table VI examines the second question: do fund starts have a differential effect on market share depending on the degree of crowdedness of the segment? The number of funds started as a proportion of the number of existing funds in the objective, summed across all funds started by the family, is used to capture the degree of crowdedness. This measure is also significant: opening funds in a

[17] Note that the interpretation of economic significance is based on the joint effect of the number of starts and the distance measure.

crowded segment leads to a smaller increase in market share. The economic effect is small, however. For example, if a firm starts 1 new fund, then increasing the degree of crowdedness from its 25th percentile to its 75th percentile reduces market share by 0.50%.

Overall, the analysis in this section suggests that investors are quite sophisticated in assessing new funds and tend to invest in them if the product is truly differentiated from existing offerings. Thus, simply starting funds to attract additional assets is not rewarded in the marketplace.

4.4. The Impact of Morningstar Rankings

For the post-1991 period, we also investigate whether Morningstar ratings have an independent effect on market share. Regressions, similar to our base case model, but with the inclusion of objective-adjusted Morningstar ratings, averaged across all funds in the family are presented in Table VII. Both models in this table are the same, except that we employ residual expenses as an explanatory variable in model (ii). The results are striking. The coefficient on the Morningstar rating is highly significant, both statistically and economically. Changing the family Morningstar rating from its 25th percentile (-0.21) to its 75th percentile (0.30) increases market share by 34%, based on the coefficient in model (i). Also note that after including the Morningstar ratings, the impact of abnormal performance declines (compared to the models in Table II), but remains statistically significant. This evidence suggests that investor rely on simple performance metrics.

4.5. Asymmetries in Expenses and Performance

In this section, we examine whether the negative effect of expenses on market share is linear, or whether there are asymmetries in the effect of expenses on market share. It is possible that investors are sensitive to expenses if they are above a certain threshold; if they are below this level, further reductions may not have the same effect on market share. This could be the case because investors pay little attention to fees if they are deemed to be "reasonable."

To examine this possibility we re-estimate our base case model, but allow the effect of expenses to differ depending on whether they are above or below the median. This model is reported in Table VIII.

The results are remarkable. The coefficient on lagged expenses is only significant for high-cost families. For low-cost families, the coefficient is not significant, and the difference between the two coefficients is significant at the 1% level. This has two implications for fund families: (1) reductions in fees only result in increased market share when fees are high and (2) when fees are low, families could move their fees closer to the median (as long as they remain below the median on an objective-adjusted basis) without adversely affecting market share.

In addition, to asymmetries in fees, we also analyze whether there is any asymmetric impact of performance on market share. Specifically, we examine whether a certain magnitude of positive abnormal performance increases market share to the same extent as negative abnormal performance decreases market share. We find no evidence in support of the asymmetric performance hypothesis (after controlling for the top 5% effect).

Finally, Goldstein and Krutov (2000) argue that investors pay less attention to expenses when returns are above historical norms, because they care about fees relative to returns, not fees per se. We do not find evidence in support of this claim: market share is equally sensitive to fees when prior returns are high or low.

4.6. Additional Tests

We conduct three additional tests to examine the robustness of our results and to provide further evidence on the effect of price and non-price competition on market share.

First, we examine whether the effect of price competition, documented in our previous regression models, is actually caused by differences in expected performance. If funds with low expense ratios are expected to perform better in the future, then the price effect we document could be caused by anticipated performance. Indeed, we find that families with lower objective-adjusted expense ratios have better future performance. This result holds even using returns computed gross of expenses, consistent with Gil-Bazo and Ruiz-Verdu's (2009) finding that the worst performing funds on a pre-expense basis have the highest expense ratios. However, our results continue to hold if we also control for future performance (as a

proxy for anticipated performance) in our models. This suggests that the effect of price competition documented in the paper is not caused by anticipated differences in performance.

Second, up to this point we have focused on market share based on assets under management as the variable of interest. However, families with a large share of assets may not necessarily have a large share of fee income. The market share of assets may thus be an imperfect measure of the fee-generating ability of the family. To address this concern, we re-compute market share based on the dollar amount of fees received by fund families. That is, we compute total expenses charged by a fund family (including one seventh of the load) and divide it by the sum of expenses charged by all fund families active during the year.[18] The correlation between the two market share measures is 0.89. Nevertheless, there are some dramatic shifts at the top of the distribution. Based on 2009 data, Vanguard is the largest family in terms of assets under management, with an asset market share of 12.7%. However, its share of fee income drops to 3.6%. The largest family in terms of expenses is American Funds with a 14.7% market share. We repeat our base case regression in Table IX, but use the log of market share based on expense income as the dependent variable. Our results are similar to those that use market share based on assets under management. In particular, the coefficient on objective-adjusted expenses continues to be negative. This indicates that families with lower expenses are actually able to capture a *larger* fraction of the total dollar expenses paid by investors. However, the effect of expenses on the market share of expenses is only about half as large as the effect of expenses on the market share of assets documented in Table II. While not surprising, this indicates that a family's incentive to lower fees to gain market share may not be as strong as initially perceived.

Finally, we examine whether there are any interaction effects between our explanatory variables. We give two examples of why such effects may exist: (1) innovation may only result in higher market share when families have exhibited superior performance; and (2) the success of an innovation may depend on the number of funds currently offered by the family. We find little evidence of such interaction effects.

[18] Total expenses paid by fund investors have also grown dramatically over time, from $632 million in 1976 and $28 billion in 1995 to $84.7 billion in 2009.

There is some evidence that fund starts have less of an impact on market share for families with a greater number of existing funds, but the effect is economically small.

5. Conclusion

This paper investigates dimensions along which U.S. mutual funds compete in light of recent arguments and evidence suggesting that price competition is not very effective in the industry. Using the universe of all U.S. fund families that were active at some point during the period 1976-2009, we show that price competition is effective. Fund families that charge higher fees and fail to pass along potential economies of scale benefits to investors have lower market share. However, not all fees have a negative impact on market share. First, we find a positive relationship between market share and fees charged directly for marketing and distribution (12b-1 fees), as well between market share and loads. We perform several tests to determine whether loads and 12b-1 fees reduce other expenses or improve economies of scale, but do not find that this is the case. We do find evidence to suggest that front-end loads are related to search costs, because their positive impact on market share is confined to the smaller fund families. Second, we find no evidence to suggest any sensitivity of market share to fees for low-cost families. Low-cost families could move fees toward the median without losing assets under management, as long as the fee increase is not "too high". High fee families, on the other hand, are more likely to lose market share if they increase fees during the year.

Several aspects of product differentiation also have a positive effect on market share. First, various elements of performance enhance market share: (1) the objective-adjusted returns earned by the family; (2) the objective-adjusted Morningstar rating averaged across all funds in the family; and (3) the presence of a top performer in the family. Second, families that innovate more than the competition and introduce a more differentiated product in less crowded segments are able to attract a larger share of the market. However, very high levels of innovation have a detrimental impact on market share. The fact that investors pay close attention to the assets held in the new funds indicates that they are quite sophisticated, and that simply starting new funds that look like existing funds has less of an impact on market share.

Our findings indicate that there is no need to regulate fees or mandate further fee disclosures. However, investors should pay careful attention to various fee components and ensure that the types of fees paid are consistent with their respective needs for investment management services.

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Table I. Summary statistics for five sample years

Number of families is the total number of families in existence in a particular year. Assets under management are total assets managed by all open-end mutual fund families in a particular year. Family size is total assets under management by a mutual fund family across all its funds. Number of funds started is the total number of new funds started by a family in a given year. Herfindahl index across funds is the sum of the squared fractions of each fund's share of total family assets. Herfindahl index across objectives is the sum of the squared fraction of each investment objective's share in total family assets, i.e., individual fund shares are aggregated within an objective before computing the Herfindahl index. Family market share is the ratio of assets managed by the fund family and all assets managed by the open-end mutual fund industry. Market share of top five families is the proportion of assets managed by the five largest mutual fund families in a given year. Total expenses is the weighted average expense ratio computed across all the family's funds, where the expense ratio includes one seventh of the front-end and back-end loads. 12b-1 fees are the weighted-average 12b-1 fees averaged across all funds in the family. 12b-1 fees are available starting in 1992 and back-end loads are available starting in 1991. Families with top 5% fund is a dummy equal to one if the family has a fund which is performing in the top 5% of all funds in its investment objective. Mean values are reported along with median values (where relevant) in parentheses.

	Year				
	1976	1984	1992	2000	2009
Number of families	134	201	424	743	584
Asset under management ($mm)	48,118	302,915	1,485,260	6,138,263	10,800,438
Family size ($mm)	359	1,507	3,503	8.261	18,494
	(59)	(182)	(321)	(292)	(369)
Number of funds started	0.19	0.38	1.72	0.17	0.08
	(0)	(0)	(0)	(0)	(0)
Number of funds per family	2.87	4.02	9.56	11.68	19.61
	(2.00)	(2.00)	(4.00)	(3.00)	(3.00)
Number of objectives per family	1.80	2.06	4.60	4.49	4.67
	(1.00)	(2.00)	(3.00)	(2.00)	(2.00)
Herfindahl index across funds	0.73	0.66	0.53	0.56	0.59
	(0.83)	(0.67)	(0.43)	(0.51)	(0.55)
Herfindahl index across objectives	0.82	0.78	0.60	0.64	0.68
	(0.99)	(0.94)	(0.51)	(0.63)	(0.77)
Family market share (%)	0.75	0.50	0.24	0.13	0.17
	(0.12)	(0.06)	(0.02)	(0.005)	(0.003)
Market share of top 5 families (%)	37.65	42.14	34.09	33.50	41.76
Expenses (%)	1.06	0.89	1.16	1.32	1.36
	(0.92)	(0.84)	(1.00)	(1.12)	(1.22)
Total expenses (%) (including loads)	1.49	1.12	1.36	1.47	1.52
	(1.44)	(1.02)	(1.24)	(1.25)	(1.38)
12b-1 fees (%)	-	-	0.13	0.13	0.11
			(0.00)	(0.02)	(0.02)
Families with top 5% fund (%)	0.127	0.184	0.255	0.237	0.260
	(0)	(0)	(0)	(0)	(0)

Table II. Determinants of family market share

This table reports system GMM regressions of family market share. The natural logarithm of the market share of a fund family in a given year is the dependent variable. Total expenses are weighted average objective-adjusted expenses computed across all funds in the family. Total expenses include one seventh of the front-end and back-end loads (starting in 1991). Residual expenses are computed by regressing total expenses on fund size, turnover and objective dummies on a yearly basis, and taking the residual from this regression to subsequently compute objective-adjusted expenses. The "economies of scale" dummy is set equal to one if the relationship between fund expenses and fund assets under management for a given family is negative, and zero otherwise. It is only computed for families with at least 20 funds in the sample in the years before the estimation year. Performance is measured as objective-adjusted family abnormal return. Top 5% performance is an indicator variable that equals one if a family has at least one fund that is performing in the top 5% of all funds in a particular investment objective. Herfindahl index across objectives is the sum of the squared fractions of each investment objective's share in total family assets, i.e., individual fund shares are aggregated within an objective before computing the Herfindahl index. Herfindahl index across funds is computed as the sum of the squared fractions of each fund's share of total family assets. Number of funds started is the number of funds started by a family in a given year. Turnover is the average objective-adjusted turnover computed across all funds in the family. Family experience is the natural logarithm of the number of years a family has been in existence. The models include year dummies. *P-values* are reported in parentheses. The AR(2) *p-value* is the *p-value* of a test of second order serial correlation in the error term. The *p-value* of the Hansen test of overidentifying restrictions is the *p-value* of a test to determine whether the instruments employed in the system GMM are exogenous.

	Model (i)	*Model (ii)*	*Model (iii)*	*Model (iv)*
Lagged market share	0.39 (0.00)	0.35 (0.00)	0.44 (0.00)	0.28 (0.00)
Total expenses $_{t-1}$ (including loads)	-28.29 (0.00)	-28.26 (0.00)		
Residual expenses $_{t-1}$ (including loads)			-20.58 (0.00)	-27.35 (0.00)
Performance $_{t-1}$	0.62 (0.00)	0.70 (0.00)	0.61 (0.00)	0.71 (0.00)
Top 5% performance $_{t-1}$	0.35 (0.00)	0.31 (0.00)	0.33 (0.00)	0.38 (0.00)
Economies of scale dummy				0.16 (0.09)
Herfindahl index across objectives $_{t-1}$	-0.11 (0.57)		-0.09 (0.59)	-0.73 (0.00)
Herfindahl index across funds $_{t-1}$		-0.73 (0.00)		
Number of funds started $_{t-1}$	0.08 (0.00)	0.08 (0.00)	0.08 (0.00)	0.10 (0.00)
(Number of funds started $_{t-1}$)^2	-0.001 (0.00)	-0.001 (0.00)	-0.001 (0.00)	-0.003 (0.00)
Turnover $_{t-1}$	-0.02 (0.09)	-0.02 (0.10)	-0.02 (0.04)	-0.03 (0.05)
Number of funds in family $_{t-1}$	0.02 (0.00)	0.02 (0.00)	0.02 (0.00)	0.02 (0.00)
Family experience $_{t-1}$	0.52 (0.00)	0.49 (0.00)	0.46 (0.01)	0.54 (0.00)
Number of observations	12365	12365	12365	5483
AR(2) in first differences, p-value	0.29	0.23	0.13	0.11
Hansen test of overid. restric., p-value	0.99	0.99	0.99	0.99

Table III. Determinants of market share for various asset classes

This table reports system GMM regressions of family market share, estimated for four different asset classes. The natural logarithm of the market share of a fund family in a given year in a given asset class is the dependent variable. Families not active in a specific asset class in a given year are excluded from the model. Total expenses are weighted average objective-adjusted expenses computed across all funds in the asset class in the family. Total expenses include one seventh of the front-end and back-end loads (starting in 1991). Performance is measured as objective-adjusted family abnormal return in the asset class. Top 5% performance is an indicator variable that equals one if a family has at least one fund that is performing in the top 5% of all funds in a particular investment objective. Number of funds started is the number of funds started by a family in a given year in a given asset class. Turnover is the average objective-adjusted turnover computed across all funds in the family in a given asset class. Family experience is the natural logarithm of the number of years a family has been offering funds in a particular asset class. The models include year dummies. *P-values* are reported in parentheses. The AR(2) *p-value* is the *p-value* of a test of second order serial correlation in the error term. The *p-value* of the Hansen test of overidentifying restrictions is the *p-value* of a test to determine whether the instruments employed in the system GMM are exogenous.

	Equities	*Balanced*	*Bonds*	*Money market*
Lagged market share	0.20 (0.00)	0.36 (0.00)	0.35 (0.00)	0.47 (0.00)
Total expenses $_{t-1}$ (including loads)	-25.48 (0.00)	-28.84 (0.00)	-17.17 (0.01)	-31.22 (0.16)
Performance $_{t-1}$	0.62 (0.00)	0.97 (0.01)	0.31 (0.45)	1.26 (0.72)
Top 5% performance $_{t-1}$	0.24 (0.00)	0.97 (0.01)	0.27 (0.00)	0.43 (0.00)
Number of funds started $_{t-1}$	0.13 (0.00)	0.02 (0.41)	0.08 (0.00)	0.14 (0.00)
(Number of funds started $_{t-1}$)^2	-0.005 (0.00)	-0.001 (0.02)	-0.003 (0.00)	-0.017 (0.00)
Turnover $_{t-1}$	-0.08 (0.02)	-0.06 (0.10)	0.01 (0.52)	0.01 (0.76)
Number of funds in family/objective $_{t-1}$	0.04 (0.00)	0.06 (0.00)	0.04 (0.00)	0.05 (0.00)
Family experience in objective $_{t-1}$	0.81 (0.00)	0.51 (0.00)	0.43 (0.00)	0.23 (0.00)
Number of observations	7798	1689	4527	1906
AR(2) in first differences, p-value	0.84	0.78	0.82	0.51
Hansen test of overid. restric., p-value	0.99	0.99	0.99	0.99

Table IV. The effect of different fee components on family market share

This table reports system GMM regressions of family market share. The natural logarithm of the market share of a fund family in a given year is the dependent variable. Expenses are weighted average objective-adjusted expenses computed across all funds in the family. Front-end (back-end) loads are weighted average objective-adjusted front-end (back-end) loads computed across all funds in the family. 12b-1 fees are weighted average objective-adjusted 12b-1 fees computed across all funds in the family. Performance is measured as objective-adjusted family abnormal return. Top 5% performance is an indicator variable that equals one if a family has at least one fund that is performing in the top 5% of all funds in a particular investment objective. Herfindahl index across objectives is the sum of the squared fractions of each investment objective's share in total family assets, i.e., individual fund shares are aggregated within an objective before computing the Herfindahl index. Number of funds started is the number of funds started by a family in a given year. Turnover is the average objective-adjusted turnover computed across all funds in the family. Family experience is the natural logarithm of the number of years a family has been in existence. The models include year dummies, and are estimated for the post-1991 period because data on 12b-1 fees are not available prior to 1992. *P-values* are reported in parentheses. The AR(2) *p-value* is the *p-value* of a test of second order serial correlation in the error term. The *p-value* of the Hansen test of overidentifying restrictions is the *p-value* of a test to determine whether the instruments employed in the system GMM are exogenous.

	Model (i)	Model (ii)
Lagged market share	0.14 (0.00)	0.17 (0.00)
Expenses – 12 b-1 fees $_{t-1}$ (excluding loads)	-44.76 (0.00)	
Residual expenses – 12 b-1 fees $_{t-1}$ (excluding loads)		-35.72 (0.00)
Front-end load $_{t-1}$	3.76 (0.10)	2.84 (0.22)
Back-end load $_{t-1}$	9.40 (0.04)	8.96 (0.04)
12b-1 fee $_{t-1}$	43.53 (0.04)	47.42 (0.03)
Performance $_{t-1}$	0.85 (0.00)	0.87 (0.00)
Top 5% performance $_{t-1}$	0.47 (0.00)	0.46 (0.00)
Herfindahl index across objectives $_{t-1}$	-0.10 (0.66)	-0.07 (0.76)
Number of funds started $_{t-1}$	0.08 (0.00)	0.08 (0.00)
(Number of funds started $_{t-1}$)^2	-0.001 (0.00)	-0.001 (0.00)
Turnover$_{t-1}$	-0.02 (0.15)	-0.02 (0.12)
Number of funds in family $_{t-1}$	0.02 (0.00)	0.02 (0.00)
Family experience $_{t-1}$	0.81 (0.00)	0.78 (0.00)
Number of observations	8966	8966
AR(2) in first differences, p-value	0.86	0.40
Hansen test of overid. restric., p-value	0.99	0.99

Table V. The relation between the components of expense ratios

This table reports clustered OLS regressions at the fund level of various components of expenses on fund assets and interactions between fund assets and dummy variables that capture facets of the fund's fee structure. Standard errors are clustered at the fund level. Fund assets is expressed in millions of dollars. Front-end load dummy is an indicator variable set equal to 1 if the fund charges a front-end load. Back-end load dummy is a dummy set equal to 1 if the fund charges a back-end load. The 12b-1 dummy is an indicator variable set equal to 1 if the fund charges 12b-1 fees, and zero otherwise. All models include year and investment objective dummies. Models (ii) and (iii) are estimated for the period 1992-2009. *P-values* are in parentheses.

	Dependent variable		
	Expenses (excl. loads)	Expenses (excl. loads) – 12b1 fees	Expenses (excl. loads) – 12b1 fees
	Model (i)	Model (ii)	Model (iii)
Log (fund assets)	-0.0004 (0.00)	-0.0003 (0.00)	-0.0003 (0.00)
Log (family assets)	-0.0005 (0.00)	-0.0007 (0.00)	-0.0007 (0.00)
Front-end Load	0.0577 (0.00)	0.0282 (0.00)	0.0240 (0.00)
Back-end Load		0.0423 (0.00)	0.0333 (0.00)
12b-1 fees		0.0801 (0.00)	0.0727 (0.00)
Log(fund assets) * Front-end Load dummy			0.0000 (0.83)
Log(fund assets) * Back-end Load dummy			0.0001 (0.00)
Log(fund assets) * 12b-1 dummy			0.0000 (0.79)
Number of observations	170931	149582	149577
Adjusted R-squared	0.27	0.39	0.29

Table VI. The impact of innovation on family market share

This table reports system GMM regressions of family market share. The natural logarithm of the market share of a fund family in a given year is the dependent variable. Residual expenses are computed by regressing total expenses on fund size, turnover and objective dummies on a yearly basis, and taking the residual from this regression to subsequently compute objective-adjusted expenses. Total expenses are weighted average objective-adjusted expenses computed across all funds in the family. Total expenses include one seventh of the front-end and back-end loads (starting in 1991). Performance is measured as objective-adjusted family abnormal return. Top 5% performance is an indicator variable that equals one if a family has at least one fund that is performing in the top 5% of all funds in a particular investment objective. Herfindahl index across objectives is the sum of the squared fractions of each investment objective's share in total family assets, i.e., individual fund shares are aggregated within an objective before computing the Herfindahl index. Number of funds started is the number of funds started by a family in a given year. Distance from existing funds measures the extent to which new funds are differentiated from existing funds and is measured based on the following three characteristics for stock (bond) funds: price-to-book ratio, earnings growth, and the median market capitalization of the stocks in which the fund is invested (average price, maturity, and coupon rate). The number of standard deviations that each fund characteristic is away from the mean value for the entire universe of funds is then computed. These standard deviations are summed to compute the aggregate measure of distance for each new fund and then summed across all fund openings in the family in a particular year. Funds started / Existing funds is the number of starts in an objective as a fraction of the number of existing funds in the objective; these fractions are then summed across all objectives in the family. Turnover is the average objective-adjusted turnover computed across all funds in the family. Family experience is the natural logarithm of the number of years a family has been in existence. The models include year dummies. *P-values* are reported in parentheses. The AR(2) *p-value* is the *p-value* of a test of second order serial correlation in the error term. The *p-value* of the Hansen test of overidentifying restrictions is the *p-value* of a test to determine whether the instruments employed in the system GMM are exogenous. Model (i) is estimated over the period 1992-2009 because characteristics of fund holdings are not available for prior years.

Table VI (continued)

	Model (i)	Model (ii)
Lagged market share	0.20 (0.00)	0.41 (0.00)
Residual expenses $_{t-1}$ (including loads)	-28.89 (0.00)	-21.39 (0.00)
Performance $_{t-1}$	0.96 (0.00)	0.62 (0.00)
Top 5% performance $_{t-1}$	0.49 (0.00)	0.34 (0.00)
Herfindahl index across objectives $_{t-1}$	-0.02 (0.92)	-0.18 (0.33)
Number of funds started $_{t-1}$	0.02 (0.21)	0.08 (0.00)
(Number of funds started $_{t-1}$)^2	-0.0007 (0.04)	-0.0013 (0.00)
Distance from existing funds $_{t-1}$	0.067 (0.00)	
(Distance from existing funds $_{t-1}$)^2	-0.0007 (0.04)	
Funds started / Existing funds $_{t-1}$		0.99 (0.04)
(Funds started / Existing funds $_{t-1}$)^2		-0.88 (0.06)
Turnover $_{t-1}$	-0.03 (0.05)	-0.02 (0.04)
Number of funds in the family $_{t-1}$	0.02 (0.00)	0.02 (0.00)
Family experience $_{t-1}$	0.75 (0.00)	0.48 (0.00)
Number of observations	7911	12365
AR(2) in first differences, p-value	0.39	0.12
Hansen test of overid. restric., p-value	0.99	0.99

Table VII. The impact of Morningstar ratings on market share

This table reports system GMM regressions of family market share. The natural logarithm of the market share of a fund family in a given year is the dependent variable. Total expenses are weighted average objective-adjusted expenses computed across all funds in the family. Total expenses include one seventh of the front-end and back-end loads (starting in 1991). Residual expenses are computed by regressing expenses on fund size, turnover and objective dummies on a yearly basis, and taking the residual from this regression to subsequently compute objective-adjusted expenses. Performance is measured as objective-adjusted family abnormal return. Morningstar rating is the average objective-adjusted Morningstar rating computed across all funds in the family. Top 5% performance is an indicator variable that equals one if a family has at least one fund that is performing in the top 5% of all funds in a particular investment objective. Herfindahl index across objectives is the sum of the squared fractions of each investment objective's share in total family assets, i.e., individual fund shares are aggregated within an objective before computing the Herfindahl index. Number of funds started is the number of funds started by a family in a given year. Turnover is the average objective-adjusted turnover computed across all funds in the family. Family experience is the natural logarithm of the number of years a family has been in existence. The models include year dummies. *P-values* are reported in parentheses. The AR(2) *p-value* is the *p-value* of a test of second order serial correlation in the error term. The *p-value* of the Hansen test of overidentifying restrictions is the *p-value* of a test to determine whether the instruments employed in the system GMM are exogenous.

	Model (i)	Model (ii)
Lagged market share	0.00 (0.88)	0.02 (0.66)
Total expenses $_{t-1}$ (including loads)	-35.61 (0.00)	
Residual expenses $_{t-1}$ (including loads)		-27.33 (0.00)
Performance $_{t-1}$	0.34 (0.01)	0.33 (0.01)
Morningstar rating $_{t-1}$	0.58 (0.00)	0.60 (0.00)
Top 5% performance $_{t-1}$	0.48 (0.00)	0.47 (0.00)
Herfindahl index across objectives $_{t-1}$	-0.39 (0.16)	-0.32 (0.25)
Number of funds started $_{t-1}$	0.08 (0.00)	0.08 (0.00)
(Number of funds started $_{t-1}$)^2	-0.001 (0.00)	-0.001 (0.00)
Turnover $_{t-1}$	-0.02 (0.08)	-0.03 (0.03)
Number of funds in family $_{t-1}$	0.03 (0.00)	0.03 (0.00)
Family experience $_{t-1}$	0.97 (0.00)	0.96 (0.00)
Number of observations	7513	7513
AR(2) in first differences, p-value	0.86	0.41
Hansen test of overid. restric., p-value	0.92	0.89

Table VIII. The effect of expenses for high- and low-cost families

This table reports a system GMM regression of family market share, allowing the effect of expenses on market share to depend on whether total expenses are above the median or not. The natural logarithm of the market share of a fund family in a given year is the dependent variable. Total expenses are weighted average objective-adjusted expenses computed across all funds in the family. Total expenses include one seventh of the front-end and back-end loads (starting in 1991). Performance is measured as objective-adjusted family abnormal return. Top 5% performance is an indicator variable that equals one if a family has at least one fund that is performing in the top 5% of all funds in a particular investment objective. Herfindahl index across objectives is the sum of the squared fractions of each investment objective's share in total family assets, i.e., individual fund shares are aggregated within an objective before computing the Herfindahl index. Number of funds started is the number of funds started by a family in a given year. Turnover is the average objective-adjusted turnover computed across all funds in the family. Family experience is the natural logarithm of the number of years a family has been in existence. The model includes year dummies. *P-values* are reported in parentheses. The AR(2) *p-value* is the *p-value* of a test of second order serial correlation in the error term. The *p-value* of the Hansen test of overidentifying restrictions is the *p-value* of a test to determine whether the instruments employed in the system GMM are exogenous.

Lagged market share	0.37 (0.00)
High expense dummy $_{t-1}$	-0.35 (0.00)
Total expenses $_{t-1}$ (including loads) * Low expense dummy$_{t-1}$	-5.22 (0.46)
Total expenses $_{t-1}$ (including loads) * High expense dummy $_{t-1}$	-24.10 (0.00)
Performance $_{t-1}$	0.64 (0.00)
Top 5% performance $_{t-1}$	0.36 (0.00)
Herfindahl index across objectives $_{t-1}$	-0.17 (0.33)
Number of funds started $_{t-1}$	0.08 (0.00)
(Number of funds started $_{t-1}$)^2	-0.001 (0.00)
Turnover $_{t-1}$	-0.02 (0.08)
Number of funds in family $_{t-1}$	0.01 (0.00)
Family experience $_{t-1}$	0.53 (0.00)
Number of observations	12635
AR(2) in first differences, p-value	0.24
Hansen test of overid. restric., p-value	0.99

Table IX. Market share of expenses

This table reports a system GMM regression of family market share of expenses. The dependent variable is the logarithm of the market share of expenses of the family, computed as total expenses charged by the family during the year (including one seventh of the load) divided by the sum of all expenses charged by all families during the year. Total expenses are weighted average objective-adjusted expenses computed across all funds in the family. Total expenses include one seventh of the front-end and back-end loads (starting in 1991). Performance is measured as objective-adjusted family abnormal return. Top 5% performance is an indicator variable that equals one if a family has at least one fund that is performing in the top 5% of all funds in a particular investment objective. Herfindahl index across objectives is the sum of the squared fractions of each investment objective's share in total family assets, i.e., individual fund shares are aggregated within an objective before computing the Herfindahl index. Number of funds started is the number of funds started by a family in a given year. Turnover is the average objective-adjusted turnover computed across all funds in the family. Family experience is the natural logarithm of the number of years a family has been in existence. The model includes year dummies. *P-values* are reported in parentheses. The AR(2) *p-value* is the *p-value* of a test of second order serial correlation in the error term. The *p-value* of the Hansen test of overidentifying restrictions is the *p-value* of a test to determine whether the instruments employed in the system GMM are exogenous.

Market share of expenses $_{t-1}$	0.27 (0.00)
Total expenses (including loads) $_{t-1}$	-23.11 (0.00)
Performance $_{t-1}$	0.56 (0.00)
Top 5% performance $_{t-1}$	0.37 (0.00)
Herfindahl index across objectives $_{t-1}$	-0.52 (0.01)
Number of funds started $_{t-1}$	0.08 (0.00)
(Number of funds started $_{t-1}$)^2	-0.001 (0.00)
Turnover $_{t-1}$	-0.01 (0.16)
Number of funds in family $_{t-1}$	0.02 (0.00)
Family experience $_{t-1}$	0.59 (0.00)
Number of observations	12635
AR(2) in first differences, p-value	0.17
Hansen test of overid. restric., p-value	0.78