Financial Analysts Journal

ISSN: 0015-198X (Print) 1938-3312 (Online) Journal homepage: https://www.tandfonline.com/loi/ufaj20

A New Framework for Analyzing Market Share Dynamics among Fund Families

Jan Jaap Hazenberg

To cite this article: Jan Jaap Hazenberg (2020): A New Framework for Analyzing Market Share Dynamics among Fund Families, Financial Analysts Journal, DOI: 10.1080/0015198X.2020.1744211

To link to this article: https://doi.org/10.1080/0015198X.2020.1744211

Published online: 08 Jun 2020.

Financial Analysts Journal | A Publication of **CFA Institute**
https://doi.org/10.1080/0015198X.2020.1744211

Research

A New Framework for Analyzing Market Share Dynamics among Fund Families

Jan Jaap Hazenberg

Jan Jaap Hazenberg is head of product strategy at NN Investment Partners and lecturer at the Rotterdam School of Management, Erasmus University, The Netherlands.

A simple framework decomposes changes in a fund family's market share into four components. The components are highly relevant for understanding mutual fund market dynamics and evaluating the business performance of fund families. Two components are performance driven, and two are flow driven. Analysis of US market data shows that the "Excess Flows" component, which measures whether fund family flows exceed or lag those of competitors that operate in the same fund categories, has the biggest impact on fund-family market share changes. Major cross-sectional differences characterize how individual families score on each of the components. Fund families can use this framework to provide input for strategic decision making.

In marketing literature, market share is a widely used measure for tracking one company's performance compared with that of its competitors. Improved company sales could be the result of favorable economic conditions for all market participants, but increased market share indicates that a company is gaining relative to its competition (Kotler 1983). Market share is calculated either as units sold by a company as a percentage of the total market's unit sales (unit market share) or as company revenue as a percentage of the total market's revenue (revenue market share). In the fund management industry, market reports tend to focus on assets under management (AUM) and fund flows, not market shares. Industry associations track and periodically report on the assets and net flows by region, country, and product type.[1] Investment research firms also analyze and report on funds at the fund-family and fund levels, but these firms have the same focus on assets and net flows.[2] The disadvantage of using assets and flows to assess fund management companies is similar to the disadvantage of using sales to evaluate business performance in other businesses: These measures are affected by economy-wide developments—in particular, market returns and market net flows. They do not reflect how fund families are performing relative to their competition. Market share, calculated as a fund family's AUM as a percentage of the total market's assets, and change in market share do not have this shortcoming.

My article focuses on fund management as a business and uses the important metric of market share change as a measure of business

Disclosure: The author reports no conflicts of interest.

PL Credits: 2.0

I would like to thank Executive Editor Stephen Brown, Managing Editor Heidi Raubenheimer, CFA, and Co-Editor Daniel Giamouridis. I am also grateful to Guido Baltussen, Peter Battiste, CFA, Stan Beckers, Ivo Frielink, Fabian Irek, Bart Renner, Noemi Rossini, Willem van der Scheer, CFA, and Marno Verbeek for valuable discussions and assistance.

performance. Khorana and Servaes (2012) studied competition and market share developments in the US fund industry and stated that market share is "the culmination of all the decisions made by fund families and the investors' response to those decisions" (p. 83). Because fund and fund-family market shares are calculated on the basis of AUM, changes in market share in a given period are not only the result of investors buying and selling mutual fund units but also of the investment performance made on the existing assets since the beginning of the period. I present a new framework for analyzing the development of fund-family market shares over time that disentangles these effects.

The new framework attributes the total change in market share in a period to four economically relevant components: Category Performance, Excess Performance, Category Flows, and Excess Flows. A fund family's score on each of the components reflects what is driving its market share change and indicates (1) whether or not a fund family outperformed and outsold funds in the same categories and (2) whether or not the fund benefited from its fund range being exposed to categories that experienced favorable market conditions—specifically, fund category performance and fund category flows.

I applied the framework to the US long-term mutual fund market for the period 2001 through 2018. In this period, excluding mergers and acquisitions, approximately 42% of market share changed hands among fund families, and in an average month, 0.6% of market share was redistributed. Of the four components, the Excess Flows component, which measures relative flows compared with peers in the same fund category, has had the largest impact on monthly changes in fund-family market shares. This finding is unrelated to market conditions, which contain distinctions based on the level of average fund returns, total net fund flows, market volatility, and investor sentiment. The longer the time period over which market change was analyzed, the more the two flow-driven components dominated the performance-driven components, which can be explained by the fact that flows are more persistent than performance. This finding does not imply that investment outperformance is unimportant for the market share growth of a fund family. Past fund performance and past category performance are both significant drivers of change in market shares.

The framework reveals, for the cross-section of fund families, that individual families score very differently on each of the four components, depending on their business performance. In the top three fund families, for example, Vanguard has considerably strengthened its leading market share position in the 2014–18 period as a result of a positive contribution from each of the four components. Fidelity, the number two fund family, lost market share in the same period because of a combination of underexposure to the better-selling fund categories (the Category Flows component) and lower flows relative to competitors in the categories in which it is active (the Excess Flows component). Capital Group, the number three fund family, also had a negative contribution from the Category Flows component, but that was offset by the Excess Flows component, resulting in an overall market share improvement for Capital Group.

The output from this framework for market share analysis is relevant for anyone involved in strategic decision making for fund families—for example, firm CEOs, chief investment officers, and chief business development officers. Because the framework is fed public data from industry data providers and does not require any proprietary data, it can be used by fund-family staff (e.g., market intelligence analysts, business strategy analysts, and sales or product managers) and also by external stakeholders in the fund management industry (e.g., regulatory authorities, consultancy firms, sell-side or buy-side research firms, and academic institutions).

Four-Component Framework

The framework is built on an analysis of fund flows and fund performance—both in relation to a fund family's market share and the change in its market share.

Fund Flows and Market Share Change.

Because of an absence of actual fund flow data, empirical mutual fund flow studies have estimated fund flows as the increase in a fund's assets that is not the result of dividends and capital gains (e.g., Gruber 1996; Sirri and Tufano 1998; Jain and Wu 2000). Flows can be analyzed either as the absolute amount of flows (dollar flow) or as flows relative to the assets at the start of the period (relative flow). Assuming that flows occur at the end of the period, these fund flow measures are calculated as follows:

$$\text{Dollar flow}_{i,t+1} = TNA_{i,t+1} - \left(1 + R_{i,t+1}\right)TNA_{i,t} \text{ and} \quad (1)$$

$$\text{Relative flow}_{i,t+1} = \frac{TNA_{i,t+1} - \left(1 + R_{i,t+1}\right)TNA_{i,t}}{TNA_{i,t}}, \quad (2)$$

where

$TNA_{i,t}$, $TNA_{i,t+1}$ = Fund i's total net assets at, respectively, time t and time $t + 1$

$R_{i,t+1}$ = Fund i's return over period $t + 1$

Spiegel and Zhang (2013) argued that empirical studies that model the relationship between relative flow and performance are misspecified because these studies implicitly assume that aggregate fund flows depend on the return difference between large and small funds. When large funds have performed well, relative fund flow models suggest larger aggregate flows than when small funds have performed well. Not only is this implication counterintuitive (because one would expect aggregate flows to be driven by economy-wide events), but it is also not supported by the empirical results. Spiegel and Zhang proposed market share change as an alternative flow measure. Market share is the ratio of a fund's AUM to the market's AUM at the same time. Because market share changes, by definition, add up to zero, models of market share change do not embody the same incorrect implicit assumption as relative flow models. Change in market share, ΔMS, is defined as the difference in market share at two moments in time:[3]

$$\Delta MS_{i,t+1} = MS_{i,t+1} - MS_{i,t} = \frac{TNA_{i,t+1}}{TNA_{m,t+1}} - \frac{TNA_{i,t}}{TNA_{m,t}}, \quad (3)$$

where $TNA_{m,t}$ and $TNA_{m,t+1}$ are the market's total net assets at, respectively, time t and time $t + 1$.

Fund-family market share is defined as the sum of the market shares of all funds that belong to that fund family.

Performance-Driven and Flow-Driven Market Share Change.

As shown in Appendix A, change in market share can be broken down into two components. The first one is driven by *contemporaneous performance*; the second one, by *fund flows*:

$$\Delta MS_{i,t+1} = \frac{TNA_{i,t}\left(R_{i,t+1} - R_{m,t+1}\right)}{TNA_{m,t+1}} + \frac{\text{Dollar flow}_{i,t+1} - MS_{i,t}\text{Dollar flow}_{m,t+1}}{TNA_{m,t+1}}, \quad (4)$$

where $R_{m,t+1}$ is the TNA-weighted average return of all funds in the market in period $t + 1$ and Dollar $\text{flow}_{m,t+1}$ is the sum of all fund flows in the market in period $t + 1$.

As long as Fund i has not just been launched,[4] ΔMS can be expressed in terms of previous market share, fund and market return, fund and market relative flows, and the market growth rate, as follows:

$$\Delta MS_{i,t+1} = MS_{i,t} \times \frac{R_{i,t+1} - R_{m,t+1} + \text{Relative flow}_{i,t+1} - \text{Relative flow}_{m,t+1}}{g_{m,t+1}}, \quad (5)$$

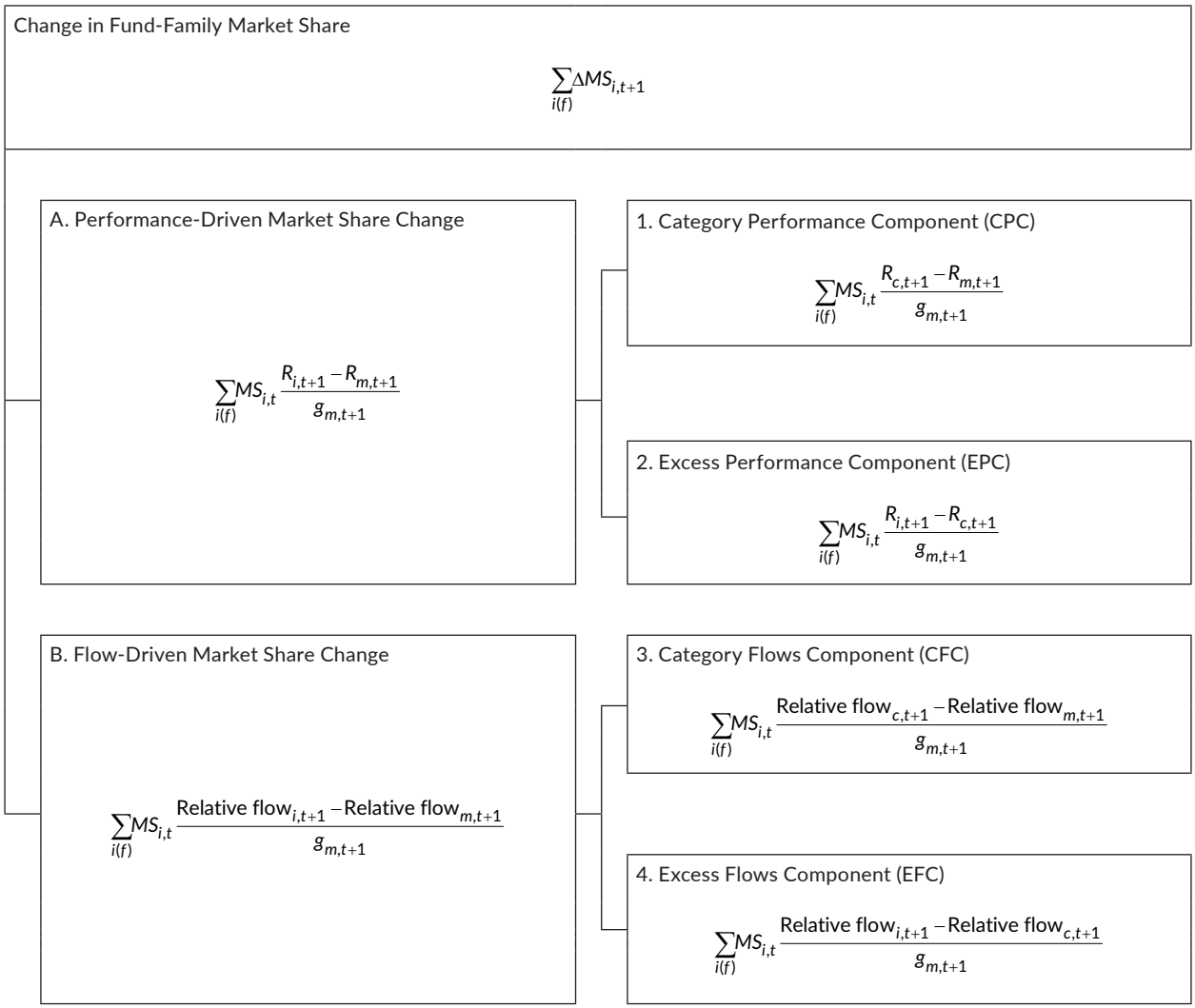
where Relative $\text{flow}_{m,t+1}$ is the total market dollar flow in period $t + 1$ relative to $TNA_{m,t}$ and $g_{m,t+1}$ is the market growth rate in period $t + 1$, calculated as $TNA_{m,t+1}/TNA_{m,t}$.

Equation 4 shows the two channels for fund market share gains: investment returns superior to the market average return $\left(R_{i,t+1} > R_{m,t+1}\right)$ and flows greater than would be expected on the basis of the fund's previous market share $\left(\text{Dollar flow}_{i,t+1} > MS_{i,t}\text{Dollar flow}_{m,t+1}\right)$. A fund's dollar flow being greater than that based on its own previous MS times the market's dollar flow is equivalent to the fund's relative flows being greater than the market's relative flows $\left(\text{Relative flow}_{i,t+1} > \text{Relative flow}_{m,t+1}\right)$. A fund gains market share when the sum of the fund's return and relative flows is greater than the sum of the market's return and relative flows (Equation 5). As shown on the left-hand side of **Figure 1**, the breakdown into two components can be rewritten to apply at the fund-family level.

Four Components of Market Share Change.

The decomposition into only two components does not provide enough information for understanding what drives changes in fund-family market shares. The reason is that the difference between a fund's return and the market average return can be explained, in large part, by the return of the investment objective or category to which the fund belongs.[5] The market-adjusted return of a small-capitalization growth fund, for example, can be broken down into (1) the difference between the fund's return and the average return of all funds in the small-cap growth category and (2) the difference between the average return of that category and the average return of the market as a whole. Similarly, the flows

Figure 1. Change in Market Share at the Fund-Family Level



Note: The term $i(f)$ refers to all funds in fund family f; Relative flow$_{c,t+1}$ is the total flow of fund category c in period $t + 1$ relative to category c *TNA* at time t; and $R_{c,t+1}$ is the weighted average return of funds in category c in period $t + 1$.

into funds belonging to the same category have statistically significant explanatory power for the flows into individual funds (Sirri and Tufano 1998). The amount of flows into a particular small-cap growth fund will depend on the extent to which investors direct their flows to the small-cap growth category and how much that particular fund is favored by investors compared with its category peers. By distinguishing the various fund categories, c, the category- and fund-specific effects can be separated out. The right-hand side of Figure 1 shows how the total change in market share can be decomposed into the four components. The derivation of this decomposition is provided in Appendix B.

Each component measures a different aspect of a fund family's business performance. The economic interpretation of these four components is as follows:

- The *Category Performance* component (CPC) is driven by how well a fund family's range of funds is positioned to benefit from differences in category investment performance. Fund families with a business mix that exposes them to categories that outperform the market average receive a positive contribution to their overall market share from this component.

- The *Excess Performance* component (EPC) measures the change in market share resulting from a fund family performing better (or worse) on the assets it manages than its peers in the same categories. This comparison is consistent with "category-adjusted fund returns," a performance measure often used in academic studies (e.g., Sirri and Tufano 1998; Jain and Wu 2000; Spiegel and Zhang 2013). This component reflects the direct contribution to the growth in market share made by the fund family's investment management division. Because, in practice, investors compare the results achieved by one fund with those achieved by available alternatives, benchmarking fund performance against competitors is relevant for fund investors as well as for fund families.
- The *Category Flows* component (CFC) reflects the positioning of the fund family's range and how that positioning interacts with differences in category flows. For fund families with a large existing market share in categories that investors favor when allocating net flows, this component provides a positive contribution to market share growth.
- The *Excess Flows* component (EFC) measures whether a fund family is outselling its category peers. This component benchmarks the relative flows of the family's funds against the relative flows of their respective categories. Achieving relative flows greater than the category average is mathematically equivalent to receiving a larger share of the category's net flows than the previous market share in the category assets. Abstracting from past performance as a driver for how investors direct their flows, this fourth component of market share change can be seen as the contribution of the fund family's sales and marketing division to the family's market share growth.

By definition, market share changes in a period add up to zero. That is also the case for each of the four components of market share change: for the cross-section of fund families or funds, the sum of the components is zero. That is, if the market share changes of each fund or fund family are added up, the result is, by definition, zero. The same is true for each of the components separately. Furthermore, investment or commercial outperformance has a greater impact on changes in market share for larger funds—those with a bigger market share to begin with—than for smaller funds. The formulas reflect this impact by changes in market share being a function of market share in the previous period. Scaling by the market growth rate ensures that the four components add up to the total change in market share. Newly launched funds get the full end-of-month market share allocated to the Excess Flows component in their month of inception. Hence, the Category Performance, Excess Performance, and Category Flows components for those new funds are zero.[6]

Fund-Family Strategies

The fund industry is dominated by fund families—that is, fund sponsors that offer a range of funds managed according to various investment styles. Gavazza (2011) provided demand-side and supply-side explanations for why fund families offer a large number of funds. The demand-side explanation is that investors value product variety and benefit from lower search and switching costs when transacting within a family as opposed to across families. On the supply side, the industry is characterized by high fixed and low variable costs, which encourages fund families to offer more products and forms a barrier to new entrants.

In a fund family, individual funds and their portfolio managers benefit from shared resources, not only for activities directly related to the investment process, such as research and trading, but also for other aspects of the business, such as sales and marketing, product development, operations, and human resources. Market share is of critical importance to a fund family. Because the majority of funds charge a fixed percentage fee on their AUM, there is a direct relationship between a fund family's market share and its revenues. Because of economies of scale and scope in the fund management business (Khorana and Servaes 1999; Banko, Beyer, and Dowen 2010; Gavazza 2011), increased fund-family size and market share should have a positive impact on profitability.

By evaluating business performance versus the competition, the framework for market share analysis helps identify a fund family's strengths and weaknesses. Fund-family executives can use this information in their strategic decision making. The existing academic literature on mutual funds provides numerous points of reference regarding strategic measures that fund families might effectively implement in response to the framework output.

Fund families that lose market share driven by negative results for the Excess Performance component, could implement a strategy aimed at strengthening their investment organizations. Measures could

include hiring/firing fund managers or reassigning managers within the family. Fang, Kempf, and Trapp (2014) showed that manager skill is rewarded only in inefficient markets and that fund families allocate skilled managers to categories where they can make a difference. Berk, van Binsbergen, and Liu (2017) found that fund families add value by using the private information about their fund managers' skill, to which they have access within the family, to efficiently reallocate managers among the family's funds. Luo, Manconi, and Schumacher (2019) studied fund-family mergers. Their results indicate that when tasks are reallocated after merger completion, fund managers are assigned to fewer investment objectives, which leads to specialization and improved fund performance.

Fund families do not compete on investment performance alone. Fund families with a negative score on the Excess Flows component need to focus on their commercial strategy to build market share. Jain and Wu (2000) provided evidence that advertising can have a positive effect on a mutual fund's new asset flows. Hazenberg, Irek, van der Scheer, and Stefanova (2015) examined fund-family branding and showed that fund families with a superior brand image see larger market share gains following periods of investment outperformance and smaller market share losses after underperformance.

Fees also matter. Massa (2003) argued that for fund families that cannot compete on investment performance, reducing fees can be an effective business strategy. Khorana and Servaes (2012) found that fee reductions lead to increased market share for fund families that charge above-average fees.

Fund families with negative scores on the Category Performance component or Category Flows component could consider making changes to their product lineup—for example, by launching funds in categories that they do not yet cover. According to Massa (2003), fund proliferation (increasing the number of funds a family offers) and category proliferation (increasing the number of categories a family operates in) allow a family to compete less on performance and more on non-performance-related characteristics. The findings of Nanda, Wang, and Zheng (2004) imply that fund families can pursue a "star-creating" strategy, in which a high number of funds with a large variation in investment strategies are offered in order to increase the likelihood of producing a star performer. In a fund family with a star performer, the other funds also receive higher inflows. Khorana and Servaes (2012) found evidence that innovation can lead to increased market share, particularly when a new fund is launched in an uncrowded market segment or its portfolio characteristics differ from those of the competition. Alternatively, small, underperforming funds could be liquidated or merged into more successful funds (Zhao 2005; Khorana, Tufano, and Wedge 2007).

Sample and Data

In an article on market boundaries, Brooks (1995) argued that firms compete in the same market only when they have similar products and target the same customers. He stated that studies of competition require a market definition. I applied the framework for market share analysis to the US long-term mutual fund market, which consists of open-end mutual funds and exchange-traded funds (ETFs). Long-term mutual funds include equity, bond, and mixed funds but exclude money market funds. According to the Investment Company Institute, the primary investors in these funds are US retail investors, who tend to use them for meeting their long-term personal financial objectives. An example would be building wealth for retirement or education. Money market funds, in contrast, are used by households, businesses, and institutional investors as a cash management tool (ICI 2019).

Data for the analysis were obtained from two industry databases—Broadridge FundFile and Morningstar Direct, both of which are free of survivorship bias. I used FundFile to construct the sample of all long-term US mutual funds and ETFs in the research period (2001 through 2018) and to connect each fund to a fund family, the Broadridge "Master Group"—that is, the fund company's ultimate parent company. Because the Broadridge US database was launched in 2010, I used the CRSP Survivor-Bias-Free US Mutual Fund Database to fill in and, where necessary, correct the pre-2011 fund-family data. I used Morningstar Direct for return, TNA, and expense data and to determine the fund category and whether a fund was an index fund. Monthly fund returns and monthly fund expenses were calculated as the TNA-weighted average of fund share class returns and expenses. Fund-level TNA was used to calculate fund market share and, in combination with fund return, to calculate fund flows.

The category definition is important in the analysis framework. The categorization of funds in my study determined which funds were direct competitors for comparisons involving the Excess Performance and

Excess Flows components. I used the Morningstar Categories, which are based on the actual investment style of a fund and are widely used in the fund industry.

After funds without any returns or TNA observations in the research period were excluded, the final sample consisted of 15,242 funds belonging to 1,428 fund families, including 6,000 nonsurviving funds. The sample funds were in six Morningstar Global Broad Category Groups—(from large to small) equity, fixed income, allocation (an allocation fund provides investors with a diversified portfolio of investments across various asset classes), alternative assets, convertibles, and commodities. The funds landed in 122 Morningstar Categories, ranging from "equity large-cap blend" (the largest category at the end of the research period) to "commodities—industrial metals" (the smallest category at that time).

For each month in the research period, I first calculated the total change in market share and the four components for each fund in the sample; then, I aggregated these fund-level variables to the fund-family level.

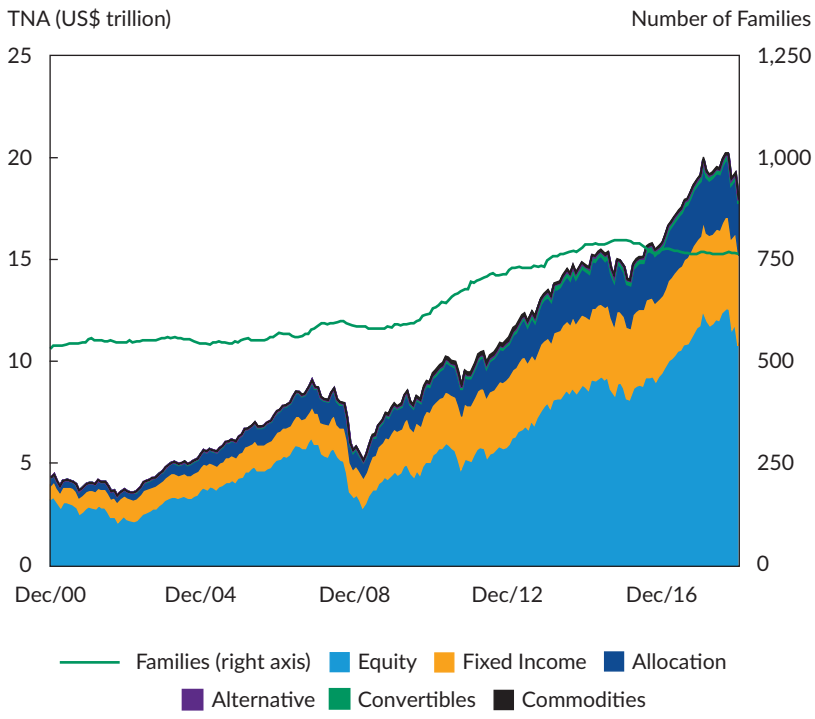
The funds in the sample had US$4,347 billion in AUM at the start of the research period and US$18,126 billion at the end of the period. Total net flows in this 18-year period amounted to US$5,284 billion. **Figure 2** shows the TNA development of the sample funds by Morningstar Global Broad Category Group. Summary statistics for the sample are provided in **Table 1**.

The number of fund families in the sample increased from 532 at the end of 2000 to 762 at the end of 2018. The number of funds increased from 5,121 to 9,242 in the same period. Whereas the average family size almost tripled in the research period, the average market share by family dropped from 18.8 basis points (bps) to 13.1 bps. The median market share is considerably smaller (dropping from 0.6 bp to 0.1 bp), indicating that the sample contained a large number of small fund families.

Unraveling Market Share Changes

To compare the business performance of individual fund families, I used the four-component framework to analyze the top 25 families in the 2014–18 period. Results are displayed in **Table 2**. Panel A shows the traditional metrics, AUM, AUM change and flows; Panel B shows the fund-family market shares, market share changes, and the corresponding

Figure 2. AUM and Number of Fund Families, 2000–2018



Notes: The research period runs from December to December. Shown are (1) the development in total assets under management of the sample funds by Morningstar Global Broad Category Group on the left y-axis and (2) the number of fund families on the right y-axis.

Table 1. Summary Statistics, 2000–2018

Year	Market TNA (US$ billion)	Market Flow (US$ billion)	Number of Families (n)	TNA/n (US$ billion)	Flow/ $\bar{n}$ (US$ billion)	Market Share Mean (bps)	Market Share Median (bps)
2000	4,347	—	532	8.2	—	18.8	0.6
2003	4,854	638	556	8.7	1.2	18.0	0.6
2006	7,739	983	570	13.6	1.7	17.5	0.4
2009	8,038	900	591	13.6	1.6	16.9	0.3
2012	11,263	1,076	725	15.5	1.6	13.8	0.1
2015	14,783	997	798	18.5	1.3	12.5	0.1
2018	18,126	690	762	23.8	0.9	13.1	0.1

Notes: Total net assets and number of families were measured at year-end. Flows are for the three-year period up to the end of the year indicated.

four components. If a merger or acquisition (M&A) occurred in the time span, Panels A and B show AUM and market share change with and without those acquired or divested assets. In Panel B, pre-acquisition market share changes were allocated to the acquired fund family. Post-acquisition market share changes were allocated to the acquiring family. As a consequence, the results for a fund family's market share change without M&A (ΔMS excl. M&A) and for the corresponding four components apply to the organic market share change of each family in the period analyzed, including the organic market share change of any acquired funds after the acquisition.

In the five-year period covered by Table 2, the top 25 fund families at the beginning of the period increased their AUM by US$4.0 trillion (+38%) and increased their total market share by 2.9 percentage points (+3.8%). Because these families divested a net 0.2 percentage point of market share through M&A activity, the organic market share gain amounted to 3.1 percentage points. Excess Flows (+1.3 percentage points) and Category Performance (+0.8 percentage point) contributed the most, although Excess Performance (+0.5 percentage point) and Category Flows (+0.5 percentage point) also contributed positively.

The leading fund family, Vanguard, strengthened its position by almost doubling its AUM (+88%) in the period. All four components contributed positively to its market share growth, resulting in a total market share gain of 7.5 percentage points (+41%). Vanguard's Excess Flows component contributed 4.1 percentage points, indicating that within the categories in which the family was active, the family outsold its competitors; Category Flows added another 2.4 percentage points to the family's market share. Vanguard's performance components also made a positive contribution. Despite Vanguard being largely an index management house, it gained 0.5 percentage point of market share through the Excess Performance component, which implies that Vanguard performed better than the average fund in the categories in which it was active. The other large index managers, BlackRock and State Street, also increased their market shares. The market share development of active and passive funds is discussed further in the next section.

Dodge & Cox, which has a relatively narrow fund range of six funds in six categories, is an example of a fund family that lost market share despite positive net flows and an increase in AUM. This result shows that market share is the relevant metric to monitor if one wants to determine whether a fund family can keep up with the competition. The market share framework can be used to unravel the drivers behind a market share change. Dodge & Cox's positive results for the Excess Performance and Excess Flows components show that the family outperformed and outsold the competition in the categories in which it was active, improving its market shares within the categories. The net market share loss was driven by the negative contributions from the Category Performance and Category Flows components, which indicate that the fund family did not have high exposure to the better-performing or the better-selling fund categories. For Dodge & Cox, with its narrow product lineup, these results raise the question of whether it should launch new funds in categories in which it currently does not compete.

Fund families that provide an interesting comparison are Fidelity, ranked second, and Capital Group, ranked third at the beginning of the five-year period. Although both these fund families increased their AUM considerably, only Capital Group showed an increased market share. Capital Group increased market share by +0.5 percentage point versus −0.6 percentage point for Fidelity. **Figure 3** highlights the annual dynamics of the components of market share change for these specific fund families. The Excess Performance component was small in each year for both fund families, which indicates that these families delivered a fund performance that, on average, was in line with that of their category peers. Capital Group, which is primarily an equity house, had a positive contribution from the Category Performance component, particularly in 2017, when it benefited from the tailwind of strong equity market performance.

The Excess Flows component, shown in Panels G and H of Figure 3, reveals the largest difference in business performance between these two fund families. Capital Group outsold its competitors in the same categories in four out of five years,

Table 2. Development of Top 25 Fund Families, 2014–2018

Fund Family	TNA_0	$Rank_0$	TNA_1	$Rank_1$	ΔTNA	M&A ΔTNA	ΔTNA excl. M&A	Flow
A. Assets under management (dollars in billions)								
Vanguard Group	US$2,482	1	US$4,666	1	US$2,184	0	US$2,184	US$1,310
Fidelity	1,363	2	1,706	2	343	0	343	−51
Capital Group	1,134	3	1,595	4	460	0	460	120
BlackRock	859	4	1,608	3	749	1	748	547
PIMCO	595	5	370	8	−225	0	−225	−271
T. Rowe Price	536	6	706	5	170	0	170	−23
Franklin Templeton Group	445	7	339	10	−106	0	−106	−162
State Street	395	8	597	6	202	17	185	47
JPMorgan Asset Management	252	9	351	9	100	0	100	36
Invesco	241	10	309	11	68	38	29	−32
Dimensional	236	11	397	7	161	0	161	115
MassMutual Financial Group	225	12	217	14	−8	1	−9	−37
Ameriprise Financial	174	13	142	19	−32	1	−33	−70
Sun Life/MFS	172	14	235	13	64	0	64	16
Manulife Financial Corp.	159	15	169	17	9	0	9	−24
Dodge & Cox	151	16	188	16	37	0	37	8
Natixis Group	144	17	127	21	−17	0	−17	−30
Principal Financial Group	139	18	151	18	13	0	13	−22
American Century Investments	111	19	117	22	6	0	6	−26
Lord, Abbett & Co.	110	20	134	20	25	0	25	8
Legg Mason	106	21	111	24	4	0	5	−14
Wells Fargo & Co.	104	22	76	32	−28	0	−28	−41
GMO	103	23	54	42	−48	0	−48	−58
Waddell & Reed	98	24	54	43	−44	0	−44	−50
Janus Capital Group	96	25	0	NA	−96	−88	−8	−28
Total for top 25	US$10,428		US$14,418		US$3,990	−31	US$4,020	US$1,268
Grand total[a]	US$13,611		US$18,126		US$4,514	0	US$4,514	US$1,230

(continued)

Table 2. Development of Top 25 Fund Families, 2014–2018 (continued)

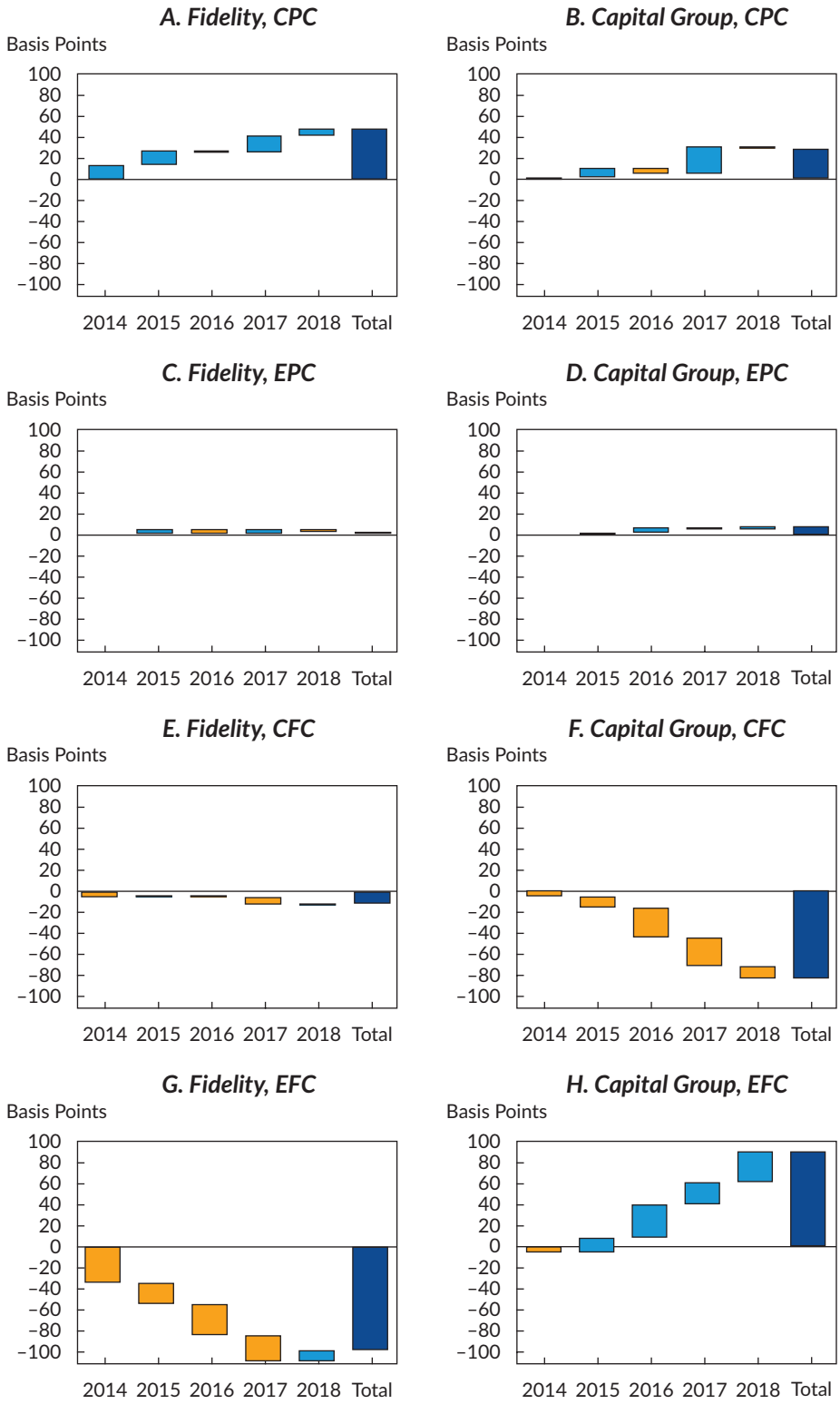
Fund Family	MS_0	$Rank_0$	MS_1	$Rank_1$	ΔMS	M&A ΔMS	ΔMS excl. M&A	CPC	EPC	CFC	EFC
B. Market share (market share variables in bps)											
Vanguard Group	1,823	1	2,574	1	751	0	751	54	46	242	409
Fidelity	1,001	2	941	2	−60	0	−60	49	2	−15	−97
Capital Group	833	3	880	4	47	0	47	30	9	−84	91
BlackRock	631	4	887	3	256	0	256	−26	7	30	244
PIMCO	437	5	204	8	−233	0	−233	−29	5	−13	−196
T. Rowe Price	394	6	389	5	−4	0	−4	18	14	−10	−26
Franklin Templeton Group	327	7	187	10	−140	0	−140	−10	−10	−50	−69
State Street	290	8	329	6	39	11	28	13	10	0	5
JPMorgan Asset Management	185	9	194	9	9	0	9	0	−1	10	0
Invesco	177	10	171	11	−7	20	−27	6	−1	−18	−13
Dimensional	173	11	219	7	46	0	46	−10	−1	27	29
MassMutual Financial Group	165	12	120	14	−46	1	−47	−9	−3	−5	−29
Ameriprise Financial	128	13	78	19	−50	1	−50	3	−2	−10	−42
Sun Life/MFS	126	14	130	13	4	0	4	0	2	−8	9
Manulife Financial Corp.	117	15	93	17	−24	0	−24	−1	−2	−8	−12
Dodge & Cox	111	16	104	16	−7	0	−7	−8	3	−9	7
Natixis Group	106	17	70	21	−36	0	−36	−4	−7	10	−35
Principal Financial Group	102	18	84	18	−18	0	−18	0	0	−2	−16
American Century Investments	81	19	64	22	−17	0	−17	3	0	−2	−18
Lord, Abbett & Co.	80	20	74	20	−7	0	−7	−4	−1	0	−3
Legg Mason	78	21	61	24	−17	0	−17	2	−4	−6	−9
Wells Fargo & Co.	76	22	42	32	−35	0	−35	−1	−4	−4	−26
GMO	75	23	30	42	−45	0	−45	−6	−2	−8	−30
Waddell & Reed	72	24	30	43	−42	0	−42	1	−8	−7	−28
Janus Capital Group	70	25	0	NA	−70	−51	−19	3	−1	−8	−14
Total for top 25	7,662		7,954		293	−19	312	76	53	51	132
Grand total[a]	10,000		10,000		0	0	0	0	0	0	0

NA = not applicable.

[a]Grand total includes fund families not in the top 25.

Notes: Panel A distinguishes between the beginning and the end of the period for total net assets (TNA) and rank. Ranking is according to TNA at the beginning of the period. The sixth, seventh, and eighth columns show change in TNA over the five-year period—total change; the part resulting from mergers and acquisitions (M&A), which is measured at the beginning of the month of the M&A; and the part excluding M&A. The final column shows the dollar flow. Panel B distinguishes between the beginning and the end of the period for market share and rank. Ranking is according to market share at the beginning of the period. The sixth, seventh, and eighth columns show change in market share over the five-year period—total change; the part resulting from M&A; and the part excluding M&A. The final columns show the four components to which total change excluding M&A can be attributed: Category Performance component (CPC), Excess Performance component (EPC), Category Flows component (CFC) and Excess Flows component (EFC). ΔMS excl. M&A and the four components thereof apply to the organic market share change of each firm in the period analyzed, including the organic market share change of any acquired funds as of the month of acquisition. In the merger between Janus Capital Group and Henderson Global Investors in May 2017, Henderson was treated as the surviving family. In this case, the absolute values for M&A ΔTNA and M&A ΔMS are Janus's TNA and market share contribution to the combined family. In this case, ΔMS excluding M&A and the four components apply to the family's market share change in the period January 2014 through April 2017.

Figure 3. Components of Market Share Change for Fidelity and Capital Group, 2014–2018



Note: Light blue bars represent annual increase; orange bars represent annual decrease; dark blue bars represent the total changes.

providing a 0.9 percentage point market share gain. For Fidelity, this component was negative in four out of five years, resulting in a market share loss of 1.0 percentage point.

As shown in Panels E and F of Figure 3, both fund families had a negative Category Flows component, which measures whether the fund family's range of funds is exposed to the better-selling categories. The contribution of this component for Fidelity was small in each year, which can be explained by the fact that Fidelity's fund range is highly diversified among fund categories. Capital Group's market share loss in 2016 and 2017 resulting from the Category Flows component can be explained by the fact that the fixed-income fund categories received higher relative flows than did the equity categories in that period.

The results in Table 2 reveal important differences in how individual fund families score on each component. This fact implies that the four-component framework is a powerful tool for analyzing and explaining the changes in market share for fund families and the differences in market share development between families.

Active and Passive Funds

Table 3 shows total market share development for actively managed and passively managed funds by Global Broad Category Group in the 2001–18 period. Passively managed funds increased their market share in this period by 26.3 percentage points—from 9.4% to 35.7%. The actively managed equity funds were the ones that lost market share, –35.4 percentage points. In the fixed-income group, active and passive funds both increased their market shares, but passive funds did so by a more significant degree (+2.0 percentage points and +6.1 percentage points, respectively). Despite the increased popularity of indexing, both in equity and in fixed income, the market share of active funds was still larger than that of passive funds. Only in the commodities category was the market share of passive funds larger than that of active funds, but the overall market share of commodities was modest—less than 1%.

The five columns on the right-hand side of Table 3 reflect how the market share framework can be used to analyze the drivers of the market share increase for passive management. The Excess Flows

Table 3. Market Share Change of Active and Passive Funds, 2001–2018

Category	TNA_0 (US$ billions)	TNA_1 (US$ billions)	Flow (US$ billions)	MS_0 (bps)	MS_1 (bps)	ΔMS (bps)	CPC (bps)	EPC (bps)	CFC (bps)	EFC (bps)
Equity active	2,909	5,717	–1,024	6,693	3,154	–3,539	112	–53	–1,892	–1,706
Equity passive	377	5,114	2,757	866	2,821	1,955	200	53	–3	1,706
Fixed-income active	694	3,257	1,274	1,596	1,797	201	–152	0	790	–438
Fixed-income passive	24	1,201	993	54	663	608	–93	0	264	438
Allocation active	318	2,495	957	733	1,377	644	116	0	546	–19
Allocation passive	6	50	23	14	27	13	3	0	–8	19
Alternative active	9	148	133	21	82	61	–58	1	119	–1
Alternative passive	2	41	77	5	22	18	–67	–1	84	1
Convertibles active	8	13	–6	18	7	–11	2	0	–10	–3
Convertibles passive	0	4	3	0	2	2	0	0	–1	3
Commodities active	0	27	43	0	15	15	–33	1	50	–3
Commodities passive	0	60	55	0	33	33	–30	–1	61	3
Total active	3,938	11,657	1,376	9,060	6,431	–2,629	–12	–51	–397	–2,169
Total passive	408	6,469	3,908	940	3,569	2,629	12	51	397	2,169
Grand total	4,347	18,126	5,284	10,000	10,000	0	0	0	0	0

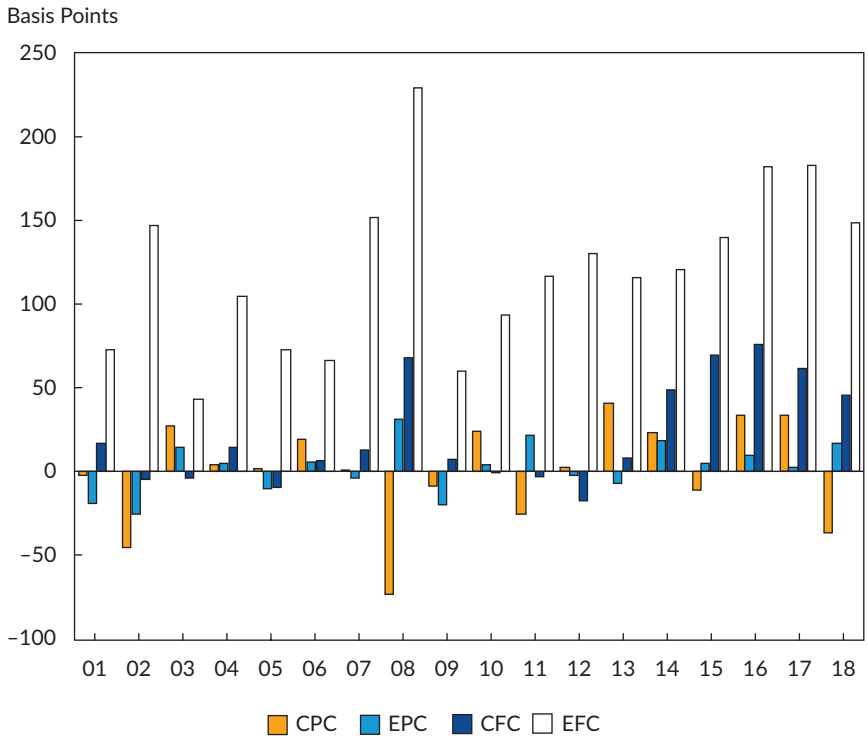
Note: The distinction between active and passive funds is based on the Morningstar Direct index fund data point.

component had the biggest impact, which means that in the categories in which both active and passive funds competed, passive funds experienced larger relative flows than active funds. The Category Flows component reveals that the active equity funds' market share also suffered from investors allocating to other broad categories—specifically, to fixed income and allocation. The results for the Category Performance component indicate that the market share of both active and passive equity funds, as well as that of allocation funds (in contrast to the fixed-income categories), was affected positively by favorable equity market performance. Although the values are relatively small in comparison with those for the other components, the results for the Excess Performance component are interesting—positive for passive equity funds and negative for active equity funds. This finding implies that in equity categories where both active and passive funds compete, the average passive fund outperformed the average active fund after costs. That outcome was not the case for fixed income, where the results for active and passive funds were equivalent.

Figure 4 shows the annual components of market share change for passive funds in the 2001–18 period. The Excess Flows component was positive in each year. The Category Performance and Category Flows components showed greater fluctuations; in some years, passive funds were strongly represented in categories with strong investment returns or strong flows, but in other years, not so. For example, in 2018, passive funds, which had the greatest market share in equity, suffered from the equity market downturn but benefited from investors shifting their net flows to equity and fixed-income categories where passive funds had a large existing market share. The fluctuation of the Excess Performance component shows that passive funds did not outperform the average active fund in the same category every year.

In the model setting used in this study, active and passive funds were included in the same categories. An alternative approach would be to analyze the market for active and passive funds separately or to define the categories in such a way that active funds and passive funds would fall into different categories—for example, separating the "equity large-cap blend active" group from the "equity large-cap blend passive" group. In this approach, the majority of the passive market share gain would be allocated to the Category Flows component as a result of investors increasingly allocating to the passive categories. The current approach implies that active and passive funds are treated as direct competitors in each of the categories, both for generating investment performance and for capturing fund flows.

Figure 4. Components of Market Share Change for Passive Funds, 2001–2018



Properties of the Market Share Change Components

In this section, I discuss the impact of the four components on market share change, whether winning market share in one period continues in the next period, the impact of market circumstances on changes in market share, and the relationship between past performance and market share changes.

Component Impact. I estimated the relative importance of the four components in terms of total market share changes of fund *families*. (I also performed all these analyses at the *fund* level, but to save space, these results are not presented here.) I used two approaches: In the first approach, I analyzed (1) how much market share shifted between fund families and (2) which components drove the shifts. In the second approach, I analyzed the weight of each of the components compared with the total change in market share.

Given that any gain in market share by one family occurs at the expense of the other families' market share, the sum of the changes in market share is zero. Therefore, the total market share transfer (MST) in a period can be calculated as the sum of the absolute value of all market share changes divided by two (this divisor prevents the double counting of market share gains and losses). In a similar fashion, the absolute values of each of the components can be summed and then divided by two. The average MST for each of the components compared with the MST for the other components gives an indication of each component's impact.

In interpreting the results, note that the sum of the MST results for the four components does *not* equal the total MST. The reason is that for individual observations, the four components add up to the total change in market share, but they do not necessarily have the same sign. So, the sum of the four absolute values of the components is often greater than the total amount of market share transfer. Therefore, I also calculated each component's relative weight (RW) for each family-period observation, where a negative sign was given to a component that pointed in the direction opposite to the total change in market share. For the RW measure, there were outliers in excess of 1,000%, when a family's total market share change in a period was small but the contribution by one of the components was large in comparison. Because these outliers distort the means, I calculated medians as the central tendency measure.

As shown in **Table 4**, 57 bps of market share was transferred, on average, per month at the fund-family level. The Excess Flows component had the biggest impact—approximately 1.4 times that of the Category Performance component and more than 2.5 times the impact of the Category Flows and the Excess Performance components. Analysis at the fund level revealed that more market share transferred between funds: 1.5 percentage points per month (not shown in Table 4). The ranking of the components at the fund level is similar to that at the fund-family level: Excess Flows had the largest impact, followed by Category Performance; Category Flows and Excess Performance were a close third and fourth.

The analysis of relative weights confirmed that Excess Flows is the leading driver of market share changes. Using monthly data, I found, as shown in Table 4, that this component had a median weight of 57%, followed by Category Performance, with 14%. Excess Performance and Category Flows had smaller impacts, but all medians were statistically significantly greater than zero. For robustness, I also separately analyzed each subsequent three-year period's monthly results and results for the three largest Global Broad Category Groups—namely, equity, fixed income, and allocation. These untabulated results show that in each period and in each of these broad categories, the Excess Flows component had the greatest impact.

When I extended the horizon to 1, 3, and 18 years, the relative importance of the Category Flows and Excess Flows components increased vis-à-vis the performance components. Over the three-year horizon shown in Table 4, for example, approximately seven times as much market share was transferred between fund families through Excess Flows as through Excess Performance. Comparing the two flow components, I found that MST resulting from the Excess Flows component was approximately two and a half times that resulting from the Category Flows component—irrespective of the period analyzed.

The results in Table 4 for relative weights are more pronounced. Over the one-year and three-year horizons, the RW median of the two performance components decreased while that of Category Flows remained more or less stable and that of Excess Flows increased. Over the 18-year horizon, the Excess Flows component dominated the results, with an RW median greater than 100%; some of the other results are even below 0%. An RW median below zero indicates that the sign of that component

Table 4. Component Impact

			Components			
Period	Measure	ΔMS	CPC	EPC	CFC	EFC
1 month	MST mean	57.5	27.0	14.5	14.0	36.7
	RW median		14.3%**	9.6%**	3.8%**	57.2%**
	n	139,983	139,983	139,983	139,983	139,983
1 year	MST mean	428.9	119.9	65.9	120.4	317.3
	RW median		2.9%**	3.7%**	4.4%**	83.3%**
	n	12,431	12,431	12,431	12,431	12,431
3 years	MST mean	1,109.4	201.8	127.3	312.5	837.9
	RW median		0.4%**	2.3%**	2.9%**	92.5%**
	n	4,679	4,679	4,679	4,679	4,679
18 years	MST mean	4,233.3	553.1	547.0	1,378.8	3,506.0
	RW median		0.4%	−0.1%	−0.1%	100.2%**
	n	1,428	1,428	1,428	1,428	1,428

Notes: MST in a period is the sum of the absolute value of changes in fund-family market share in bps divided by two, which is calculated for the total market share change and each of the components. RW is calculated as the value of each component (CPC, EPC, CFC, and EFC) divided by the total market share change (ΔMS). A two-sided binomial sign test was used to test whether the RW medians are statistically significantly different from zero.

**Significant at the 1% level.

tended to be opposite to the sign of market share change as a whole.

The MST and RW results confirm that all four components contribute significantly to changes in market share, although the magnitude is subject to the length of the period analyzed. Over longer horizons in this study, the combined contribution of the flow components increased at the expense of the performance components. This finding is consistent with earlier research showing that fund flows have a significant degree of persistence (Gruber 1996; Hazenberg et al. 2015); fund performance persistence is hardly economically significant and tends to be short-lived (Carhart 1997). I discuss persistence in detail in the next section.

Persistence. The question that I address in this section is whether fund families that win market share in one period tend to continue doing so in the following period. If market share gains are not random but persist, fund families have all the more reason to pay attention to what the framework for market share analysis tells them about their market positioning. To analyze the persistence of changes in market share and the four components, I used the "odds ratio" (Christensen 1997). In a specific period, a fund family is labeled a winner (W) when it gains market share and a loser (L) when it loses market share. By repeating this labeling in the next period of the same length, families are scored as either WW, WL, LW, or LL. The odds ratio is calculated as the quotient of the number of repeat winners times repeat losers and the number of winner/losers times loser/winners. An odds ratio of 1.0 indicates that a fund family's market share change in one period was unrelated to the change in the next period. A result greater than 1.0 is indicative of persistence, whereas a result below 1.0 indicates that winners tend to turn into losers and vice versa. I followed the same process for each of the components and not only for subsequent months but also for subsequent one-, three-, and nine-year periods. The results are presented in **Table 5**.

Over subsequent months, calendar years, and three-year periods, Table 5 shows a statistically significant degree of persistence for total change in market share as well as for each of the components. In subsequent years, the odds ratio for ΔMS is 5.68 at the fund-family level and 4.46 (not shown in Table 5) at the fund level. Fund families that won market share in

Table 5. Persistence

Evaluation Period	Measure	ΔMS	CPC	EPC	CFC	EFC
One month	WW	42,344	36,711	31,525	39,705	47,849
	LL	47,632	35,674	39,904	64,569	51,932
	WL	24,672	32,649	33,144	16,784	19,694
	LW	23,875	32,650	33,058	16,629	18,995
	n	138,523	138,523	138,523	138,523	138,523
	OR	3.42**	1.23**	1.15**	9.19**	6.64**
One year	WW	3,573	2,856	1,957	2,722	3,914
	LL	4,108	2,869	3,885	5,187	4,006
	WL	2,030	2,588	2,582	1,608	1,848
	LW	1,272	2,503	2,390	1,300	1,209
	n	10,983	10,983	10,983	10,983	10,983
	OR	5.68**	1.26**	1.23**	6.75**	7.02**
Three years	WW	951	984	450	738	1,063
	LL	1,043	919	1,362	1,497	971
	WL	938	663	777	584	868
	LW	305	630	605	377	335
	n	3,240	3,240	3,240	3,240	3,240
	OR	3.47**	2.16**	1.30**	5.02**	3.55**
Nine years	WW	136	137	54	133	172
	LL	139	102	274	293	129
	WL	278	143	193	102	239
	LW	44	208	69	62	60
	n	601	601	601	601	601
	OR	1.55*	0.47**	1.11	6.16**	1.55*

Notes: The odds ratio (OR) is calculated as (WW × LL)/(WL × LW). Only when fund families had data in both periods were they included in the calculation. The statistical significance of the odds ratio was determined by using the *z*-value of the natural logarithm of the odds ratio, which is calculated as $\ln[OR]/\sqrt{1/WW + 1/LL + 1/WL + 1/LW}$ and is normally distributed for large samples (Christensen 1997).

*Significant at the 5% level.

**Significant at the 1% level.

one year had odds of approximately 6 to 4 of winning again in the subsequent year. Losers in one year had odds of about 8 to 2 of losing market share again. The persistence of the flow components (CFC and EFC) was higher than that of the performance components (CPC and EPC) for all evaluation periods. In the case of Excess Performance, it is primarily the losers that repeated, not the winners, which is consistent with the findings of Carhart (1997).

For the subsequent nine-year periods analyzed, the odds ratio for the total change in market share continued to be statistically significantly greater than 1.0, but not so for the Category Performance component. The longer the evaluation period, the more the persistence was driven by the losers rather than the winners. Over the nine-year periods, losers had odds of approximately 8 to 2 of losing again, while the odds for winners of winning again were only 3 to 7.

Over the three-year evaluation periods, winning fund families also lost slightly more often than they won in the subsequent period.

The finding that the flow components of market share change are more persistent than the performance components is consistent with the finding in the previous section—namely, that over a long horizon, the flow components have an even greater impact on the total change in market share than they do over short horizons.

Market Circumstances. This section focuses on whether market circumstances matter for the transfer of market share and the impact of the four components. I make distinctions here as to the level of monthly (1) weighted average fund return, (2) market-wide relative flow, (3) volatility, and (4) investor sentiment. The first two measures were determined from the sample funds. Volatility was measured as the average daily closing price of the VIX—the implied standard deviation of the S&P 500 Index.[7] The investor sentiment proxy is the "net exchanges" indicator of Ben-Rephael, Kandel, and Wohl (2012), which measures the degree to which investors in the United States switch between equity and bond funds.[8] For each measure, "high" is a score above the median and "low" is a score below the median, so the total of 216 months is split into two equal groups in each case. The results are displayed in **Table 6**.

Although Table 6 shows no statistically significant difference between the market share transferring in months of high and low fund flows, it does show statistically significantly more market share transferring in months with low fund returns, high volatility, and low sentiment. The largest difference for average market share transfer was recorded between high-volatility and low-volatility months: 69 bps versus 46 bps. This finding indicates that fund families have more to win and lose in terms of their market share at times when the market is volatile. Although the Excess Flows component continued to have the largest impact regardless of market volatility, it is the Category Performance component that particularly gained strength in volatile markets. This result indicates that for purposes of gaining market share, being positioned in the categories that perform well is more important in the more volatile months than it is in the less volatile months.

Table 6. Market Share Transfer in Various Market Circumstances, 2001–2018 (bps)

Months	ΔMS	CPC	EPC	CFC	EFC
High fund return: MST mean	52.5	25.3	13.0	13.2	35.1
Low fund return: MST mean	62.5	28.6	16.0	14.9	38.3
Difference	−10.1**	−3.3	−3.0*	−1.7*	−3.2*
High fund flow: MST mean	56.1	25.4	14.1	14.0	38.0
Low fund flow: MST mean	58.9	28.5	14.9	14.0	35.3
Difference	−2.8	−3.1	−0.7	0.0	2.7
High volatility: MST mean	68.9	35.3	18.7	16.1	40.8
Low volatility: MST mean	46.1	18.6	10.3	12.0	32.5
Difference	22.8**	16.7**	8.4**	4.1**	8.3**
High sentiment: MST mean	53.3	24.2	12.8	13.0	35.4
Low sentiment: MST mean	61.7	29.8	16.2	15.1	38.0
Difference	−8.4**	−5.6*	−3.5**	−2.1**	−2.6

Notes: Market share transfer (MST) in a period is the sum of the absolute value of fund-family market share changes divided by two, which is calculated for the total market share change and each of the components. The statistical significance of the differences in average MST was determined by using a two-sample *t*-test under the assumption of unequal variances.

*Significant at the 5% level.

**Significant at the 1% level.

Table 7. Relationship between Fund-Family Market Share Change and Past Performance, 2002–2018

Measure	ΔMS	CPC	EPC	CFC	EFC
Intercept	0.146	0.028	0.022*	−0.010	0.106
Fund rank	0.107**	0.001	0.006**	0.011*	0.090**
Cat rank	0.097**	0.020**	0.002	0.048**	0.027**
Risk	−0.001	0.000	0.000	−0.001	0.001
Size	−0.021	−0.006**	−0.005**	0.003	−0.013
Age	−0.064	−0.003	0.002	−0.014	−0.048
Costs	−0.107	−0.008	−0.013	−0.005	−0.080
R^2	0.12	0.00	0.02	0.14	0.17

Notes: For each model, fixed effects are for year and family; n = 120,535 and the standard errors were clustered by fund family. Monthly ΔMS and the four components of it (CPC, EPC, CFC, EFC) are in bps. Risk is the TNA-weighted standard deviation of monthly fund returns over a 12-month period. Size is the natural logarithm of the sum of fund TNA (in millions). Age is the natural logarithm of the TNA-weighted fund age in years plus one. Costs are the TNA-weighted monthly ongoing expenses (in percentages). All independent variables were lagged by one month.

*Significant at the 5% level.

**Significant at the 1% level.

Relationship between Market Share Change and Past Performance. A well-documented finding is that fund investors react to good and poor performance by directing assets towards past winners and by withdrawing assets from past losers (see, e.g., Gruber 1996; Sirri and Tufano 1998; Spiegel and Zhang 2013). Therefore, the flow-driven parts of market share change can be expected to be affected by past performance. Following previous flow-performance studies, I looked at the relationship between market share change and past performance. To estimate the performance sensitivity of change in market share (ΔMS) and the four components, I used the following multivariate regression:

$$\Delta MS_{i,t} = a_i + b_{1,i} \cdot \text{Fund rank}_{i,t} + b_{2,i} \cdot \text{Cat rank}_{i,t} + \text{CONTROLS}_{i,t} + \varepsilon_{i,t}. \quad (6)$$

"Fund rank" is a proxy for a fund family's past performance versus category peers and is based on rolling 12-month category-adjusted fund returns—that is, fund return relative to the weighted average return of funds in the same category ($R_i - R_c$). "Cat rank" measures whether the family was positioned in categories that performed well and is based on rolling 12-month market-adjusted category returns—that is, category return relative to the weighted average return of all funds in the market ($R_c - R_m$). To arrive at fund-family Fund rank and Cat rank, I first TNA-weighted the fund-level variables and then converted those results to ranks [from 0 (worst performance) to 1 (best performance)]. I controlled for family-level risk, age, costs, and size and included fund-family and year fixed effects. The independent variables are lagged by one month. Because I used 12-month past returns, I lost the first year of data for market share change. Hence, the analysis applies to the 2002–18 period. The results are presented in **Table 7**.

The model with total change in market share (ΔMS) as the dependent variable shows that both past fund performance (Fund rank) and past category performance (Cat rank) produced positive and statistically significant coefficients. This outcome confirms the positive relationship between market share change and past performance. None of the control variables are statistically significant in the ΔMS model.

The models in the subsequent columns of Table 7, which show the results for the components of market share change separately, reveal through which channel past performance drives a fund family's market share change. First, Fund rank is positively related to the Excess Flows component, which shows that strong past fund performance helps fund

families outsell category peers. Second, Cat rank is positively related to the Category Flows component (although to a lesser extent than Fund rank and Excess Flows), which indicates that fund families win market share when they are well represented in categories that had favorable returns in the preceding 12 months. Finally, the positive coefficients for Cat rank in the Category Performance model and Fund rank in the Excess Performance model are consistent with findings for persistence in both fund and category returns.

The positive relationship between market share change and past performance implies that, in addition to the direct impact of performance on changes in fund-family market shares, an indirect impact should be considered. The direct impact is that of contemporaneous performance affecting AUM and the performance-driven components of market share change; the indirect impact is that of past performance affecting the flow-driven components. The economic significance of the indirect impact turns out to be larger than that of the direct impact. In the 2002–18 period, the average fund family had 15.4 bps of market share. Fund families that ranked in the first quartile (based on their weighted average category-adjusted fund performance in a calendar year[9]) received an average direct contribution of 0.27 bp to their market share that year through the Excess Performance component. The indirect benefit of outperforming category peers was reaped in the subsequent period through the Excess Flows component. Based on the regression analysis, the indirect contribution of having a 12-month period of first-quartile family performance, as compared with median performance, is estimated to be 0.40 bp a year,[10] which is approximately one and a half times the direct effect.

For fund families interpreting the output of the market share framework as part of a business performance evaluation, the economic significance of the relationship between past performance and market share change implies that this indirect effect should not be disregarded. A negative score on the Excess Flows component may be caused—at least in part—by past investment underperformance. An important implication is that the sales and marketing division cannot be held solely responsible for the development of the Excess Flows component. The impact of the investment management division on this component is indirect through the market share change–past performance relationship. Outperforming category peers helps a fund family to outsell the competition in the subsequent period and gain market share through the Excess Flows component.

Conclusion

At the end of 2018, the US market for long-term mutual funds had more than US$18 trillion in AUM. Not only is the fund management industry a highly relevant sector for investors that use these funds for building wealth; it is also a significant business for the more than 750 fund families operating in the industry.[11] For fund-family executives, market share change is a key indicator of whether the family is winning or losing compared with the competition. To analyze the drivers of changes in fund-family market share, I developed and applied a framework that attributes changes in market share to four relevant business performance components. The framework output allows fund families to identify the drivers on which they outperformed, leading to market share gain, and the drivers on which they lagged the competition, leading to market share loss. Fund-family executives can use the framework to evaluate their business performance and to provide input for strategic decision making.

I applied the framework to a sample of US long-term mutual funds in the 2001–18 period. This analysis showed that of the four components, the Excess Flows component had the highest impact on the total change in fund-family market share. This component measures whether or not the fund family has generated more flows into its funds than would be expected given these funds' previous market shares in their various categories. When time periods longer than one month were analyzed, I found that the combined importance of the flow-driven components increased at the expense of the performance-driven components. This finding can be explained by the fact that flows are more persistent than investment performance.

The smaller impact of the performance components compared with the flow components does not imply that fund families can neglect fund performance and focus only on marketing and sales. The framework for market share analysis decomposes the total market share change in a given period on the basis of *contemporaneous* performance and flows. Past performance has an impact on which funds investors allocate their flows to and, therefore, affects market share changes indirectly. Past fund performance was

a significant driver for the framework's Excess Flows component, and past category performance was a significant driver for the Category Flows component. Consequently, investment performance matters for a fund family seeking market share growth, both directly through the performance components and indirectly through the flow components.

The framework reveals which components drive the total change in market share in a period and to what degree. The significant persistence of each of the components amplifies the importance of such an evaluation from a fund family's perspective: A fund family's business performance with regard to each of the components in one period is likely to continue into the next period. In particular, when a fund family scores negatively, action is warranted because the odds of a negative outcome in the next period are high.

The finance literature on mutual funds has investigated several fund-family strategies—in relation to their impact on performance and flows—that could be implemented effectively in response to the assessment of a fund family's business performance. Examples include the hiring, firing, and reassigning of fund managers; fund launches, mergers, and liquidations; and marketing, distribution, and pricing strategies. The question of how these strategies relate to each of the components of market share change is one that I leave for future research.

Another area for future research could be extending this framework based on market shares in terms of AUM into a framework for market shares in terms of fees. This approach would be similar to the distinction made between unit market share and revenue market share in the marketing literature. Although a direct link exists between fund AUM and fees, not every dollar under management is equally valuable from the perspective of fee generation because of fee differences among funds and fund share classes.

Appendix A. Decomposition into a Performance Component and a Flow Component

In line with Spiegel and Zhang (2013), change in market share from time t to time $t + 1$, $\Delta MS_{i,t+1}$, is calculated as

$$\begin{aligned}\Delta MS_{i,t+1} &= MS_{i,t+1} - MS_{i,t} \\ &= \frac{TNA_{i,t+1}}{TNA_{m,t+1}} - \frac{TNA_{i,t}}{TNA_{m,t}},\end{aligned} \tag{A1}$$

where $TNA_{i,t}$ and $TNA_{i,t+1}$ are the TNA of Fund i at, respectively, time t and time $t + 1$ and $TNA_{m,t}$ and $TNA_{m,t+1}$ are the total market TNA at, respectively, time t and time $t + 1$.

$TNA_{i,t+1}$ and $TNA_{m,t+1}$ can be expressed as a function of $TNA_{i,t}$ and $TNA_{m,t}$ as follows:

$$\begin{aligned}TNA_{i,t+1} &= TNA_{i,t} + TNA_{i,t}R_{i,t+1} + \text{Dollar flow}_{i,t+1} \\ &= \left(1 + R_{i,t+1}\right)TNA_{i,t} + \text{Dollar flow}_{i,t+1}\end{aligned} \tag{A2}$$

and

$$\begin{aligned}TNA_{m,t+1} &= \sum_i TNA_{i,t+1} \\ &= \sum_i TNA_{i,t} + \sum_i \left(TNA_{i,t}R_{i,t+1}\right) \\ &\quad + \sum_i \text{Dollar flow}_{i,t+1} \\ &= \left(1 + R_{m,t+1}\right)TNA_{m,t} + \text{Dollar flow}_{m,t+1},\end{aligned} \tag{A3}$$

where $R_{m,t+1}$ is the weighted average return of all funds in the market in period $t + 1$ and $\text{Dollar flow}_{m,t+1}$ is the sum of all fund flows in the market in period $t + 1$.

After substituting $TNA_{i,t+1}$, we can write the change in market share, $\Delta MS_{i,t+1}$, as

$$\begin{aligned}\Delta MS_{i,t+1} &= \frac{\left(1 + R_{i,t+1}\right)TNA_{i,t} + \text{Dollar flow}_{i,t+1}}{TNA_{m,t+1}} - \frac{TNA_{i,t}}{TNA_{m,t}} \\ &= \frac{\left(1 + R_{i,t+1}\right)TNA_{i,t}}{TNA_{m,t+1}} + \frac{\text{Dollar flow}_{i,t+1}}{TNA_{m,t+1}} - \frac{TNA_{i,t}}{TNA_{m,t}}.\end{aligned} \tag{A4}$$

The performance-driven term is split into one part that depends on the market average return and one part that depends on the fund's market-adjusted return. The flow-driven term is split into one part that is equal to the fund's previous market share times the aggregate flows (the fund's market share–equivalent part of these aggregate flows) and one part that is the fund's excess flow:

$$\Delta MS_{i,t+1} = \frac{TNA_{i,t}\left(1+R_{m,t+1}\right)+TNA_{i,t}\left(R_{i,t+1}-R_{m,t+1}\right)}{TNA_{m,t+1}} + \frac{MS_{i,t}\text{Dollar flow}_{m,t+1}+\left(\text{Dollar flow}_{i,t+1} - MS_{i,t}\text{Dollar flow}_{m,t+1}\right)}{TNA_{m,t+1}} - \frac{TNA_{i,t}}{TNA_{m,t}}. \quad \text{(A5)}$$

Equation A5 can be rewritten as

$$\begin{aligned}
&\Delta MS_{i,t+1} \\
&= \frac{TNA_{i,t}\left(R_{i,t+1}-R_{m,t+1}\right)}{TNA_{m,t+1}} \\
&\quad + \frac{\left(\text{Dollar flow}_{i,t+1} - MS_{i,t}\text{Dollar flow}_{m,t+1}\right)}{TNA_{m,t+1}} \\
&\quad + \frac{TNA_{i,t}\left(1+R_{m,t+1}\right)}{TNA_{m,t+1}} + \frac{MS_{i,t}\text{Dollar flow}_{m,t+1}}{TNA_{m,t+1}} - MS_{i,t} \\
&= \frac{TNA_{i,t}\left(R_{i,t+1}-R_{m,t+1}\right)}{TNA_{m,t+1}} \\
&\quad + \frac{\left(\text{Dollar flow}_{i,t+1} - MS_{i,t}\text{Dollar flow}_{m,t+1}\right)}{TNA_{m,t+1}} \\
&\quad + \frac{TNA_{i,t}\left(1+R_{m,t+1}\right)TNA_{m,t}}{TNA_{m,t}\,TNA_{m,t+1}} \\
&\quad + \frac{MS_{i,t}\text{Dollar flow}_{m,t+1}}{TNA_{m,t+1}} - MS_{i,t} \\
&= \frac{TNA_{i,t}\left(R_{i,t+1}-R_{m,t+1}\right)}{TNA_{m,t+1}} \\
&\quad + \frac{\left(\text{Dollar flow}_{i,t+1} - MS_{i,t}\text{Dollar flow}_{m,t+1}\right)}{TNA_{m,t+1}} \\
&\quad + MS_{i,t}\frac{\left(1+R_{m,t+1}\right)TNA_{m,t}+\text{Dollar flow}_{m,t+1}}{TNA_{m,t+1}} - MS_{i,t}.
\end{aligned} \quad \text{(A6)}$$

Because $TNA_{m,t+1} = (1 + R_{m,t+1})\, TNA_{m,t}$ + Dollar $\text{flow}_{m,t+1}$, it follows that

$$\Delta MS_{i,t+1} = \frac{TNA_{i,t}\left(R_{i,t+1}-R_{m,t+1}\right)}{TNA_{m,t+1}} + \frac{\text{Dollar flow}_{i,t+1} - MS_{i,t}\text{Dollar flow}_{m,t+1}}{TNA_{m,t+1}}. \quad \text{(A7)}$$

Alternatively, as long as $TNA_{i,t} \neq 0$ (i.e., the fund is not newly launched), the flow-driven change in market share can be expressed in terms of relative flows, as follows:

$$\begin{aligned}
&\Delta MS\,Flow_{i,t+1} \\
&= \frac{\left(\text{Dollar flow}_{i,t+1} - MS_{i,t}\text{Dollar flow}_{m,t+1}\right)}{TNA_{m,t+1}} \\
&= \frac{\left(\frac{\text{Dollar flow}_{i,t+1}TNA_{i,t}}{TNA_{i,t}} - \frac{TNA_{i,t}\,\text{Dollar flow}_{m,t+1}}{TNA_{m,t}}\right)}{TNA_{m,t+1}} \\
&= \frac{TNA_{i,t}\left(\text{Relative flow}_{i,t+1} - \text{Relative flow}_{m,t+1}\right)}{TNA_{m,t+1}}.
\end{aligned} \quad \text{(A8)}$$

Equation A8 implies that the total change in market share can be written as

$$\begin{aligned}
&\Delta MS_{i,t+1} \\
&= \frac{TNA_{i,t}\left(R_{i,t+1}-R_{m,t+1}\right)}{TNA_{m,t+1}} \\
&\quad + \frac{TNA_{i,t}\left(\text{Relative flow}_{i,t+1} - \text{Relative flow}_{m,t+1}\right)}{TNA_{m,t+1}},
\end{aligned} \quad \text{(A9)}$$

which can be rewritten as

$$\begin{aligned}
\Delta MS_{i,t+1} &= \frac{TNA_{i,t}}{TNA_{m,t+1}}\begin{pmatrix} R_{i,t+1}-R_{m,t+1}+\text{Relative flow}_{i,t+1} \\ -\text{Relative flow}_{m,t+1}\end{pmatrix} \\
&= MS_{i,t}\frac{R_{i,t+1}-R_{m,t+1}+\text{Relative flow}_{i,t+1} - \text{Relative flow}_{m,t+1}}{g_{m,t+1}},
\end{aligned} \quad \text{(A10)}$$

where $g_{m,t+1}$ is the market growth rate in period $t + 1$, calculated as $TNA_{m,t+1}/TNA_{m,t}$.

Appendix B. Decomposition of Market Share Change into Four Components

Considering the fund category, *c*, to which Fund *i* belongs, change in market share can be broken down into four components. First, market shares are distinguished at three levels:

1. $MS_{i,t}$, which is the market share of Fund *i* within the market as a whole at time *t*;
2. $MS_{i_c,t}$, which is the market share of Fund *i* within the fund category, *c*, at time *t*; and
3. $MS_{c,t}$, which is the market share of the fund category *c* within the market as a whole at time *t*.

The relationship is $MS_{i,t} = MS_{i_c,t}MS_{c,t}$.

Second, in line with the definitions of the weighted average market return and market flows, $R_{c,t+1}$ is the weighted average return of funds in the fund category *c* and Dollar $\text{flow}_{c,t+1}$ is the sum of all fund flows in the fund category *c* in period *t* + 1.

Considering the fund category *c* to which Fund *i* belongs, the performance-driven and flow-driven parts of the change in market share (see Equation A7) can each be broken down further into two parts:

1. The performance-driven component can be broken down into one part where the fund performance is compared with the category-weighted average and one part where the category average is compared with the market average return.
2. The flow-driven component can be broken down into one part that is the difference between the actual fund flow and the part of the category flows the fund would be expected to receive based on its previous market share in the category (the fund's previous market share in the category times the category flows) and one part that is the difference between the latter and fund's previous market share in the total market times the market flow:

$$\begin{aligned}\Delta MS_{i,t+1} &= \frac{TNA_{i,t}\left(R_{i,t+1}-R_{c,t+1}\right)}{TNA_{m,t+1}} + \frac{TNA_{i,t}\left(R_{c,t+1}-R_{m,t+1}\right)}{TNA_{m,t+1}} \\ &+ \frac{\left(\text{Dollar flow}_{i,t+1} - MS_{i_c,t}\text{Dollar flow}_{c,t+1}\right)}{TNA_{m,t+1}} \\ &+ \frac{\left(MS_{i_c,t}\text{Dollar flow}_{c,t+1} - MS_{i,t}\text{Dollar flow}_{m,t+1}\right)}{TNA_{m,t+1}}.\end{aligned} \tag{B1}$$

Equation B1 can be rewritten as

$$\begin{aligned}\Delta MS_{i,t+1} &= \frac{TNA_{i,t}\left(R_{i,t+1}-R_{c,t+1}\right)}{TNA_{m,t+1}} + \frac{TNA_{i,t}\left(R_{c,t+1}-R_{m,t+1}\right)}{TNA_{m,t+1}} \\ &+ \frac{\left(\text{Dollar flow}_{i,t+1} - MS_{i_c,t}\text{Dollar flow}_{c,t+1}\right)}{TNA_{m,t+1}} \\ &+ \frac{\left(MS_{i_c,t}\text{Dollar flow}_{c,t+1} - MS_{i_c,t}MS_{c,t}\text{Dollar flow}_{m,t+1}\right)}{TNA_{m,t+1}} \\ &= \frac{TNA_{i,t}\left(R_{i,t+1}-R_{c,t+1}\right)}{TNA_{m,t+1}} + \frac{TNA_{i,t}\left(R_{c,t+1}-R_{m,t+1}\right)}{TNA_{m,t+1}} \\ &+ \frac{\left(\text{Dollar flow}_{i,t+1} - MS_{i_c,t}\text{Dollar flow}_{c,t+1}\right)}{TNA_{m,t+1}} \\ &+ \frac{MS_{i_c,t}\left(\text{Dollar flow}_{c,t+1} - MS_{c,t}\,\text{Dollar flow}_{m,t+1}\right)}{TNA_{m,t+1}}.\end{aligned} \tag{B2}$$

Based on Equation B2, the four components are defined as follows.

- Category Performance component (CPC): $\frac{TNA_{i,t}\left(R_{c,t+1}-R_{m,t+1}\right)}{TNA_{m,t+1}} = MS_{i,t}\frac{R_{c,t+1}-R_{m,t+1}}{g_{m,t+1}}$.
- Excess Performance component (EPC): $\frac{TNA_{i,t}\left(R_{i,t+1}-R_{c,t+1}\right)}{TNA_{m,t+1}} = MS_{i,t}\frac{R_{i,t+1}-R_{c,t+1}}{g_{m,t+1}}$.
- Category Flows component (CFC): $$\begin{aligned}&\frac{MS_{i_c,t}\left(\text{Dollar flow}_{c,t+1} - MS_{c,t}\text{Dollar flow}_{m,t+1}\right)}{TNA_{m,t+1}} \\ &= MS_{i,t}\frac{\text{Relative flow}_{c,t+1} - \text{Relative flow}_{m,t+1}}{g_{m,t+1}}.\end{aligned}$$
- Excess Flows component (EFC): $\frac{\text{Dollar flow}_{i,t+1} - MS_{i_c,t}\text{Dollar flow}_{c,t+1}}{TNA_{m,t+1}}$.

When $TNA_{i,t} \neq 0$, the Excess Flows component (EFC) is $MS_{i,t}\frac{\text{Relative flow}_{i,t+1} - \text{Relative flow}_{c,t+1}}{g_{m,t+1}}$.

Editor's Note

This article was externally reviewed using our double-blind peer-review process. When the article was accepted for publication, the author thanked the reviewers in the acknowledgments for their comments and suggestions.

Jian ZHANG and one anonymous reviewer were the reviewers for this article.

Submitted 31 January 2019

Accepted 9 March 2020 by Stephen J. Brown

Notes

1. See, for example, the Investment Company Institute reports on "Worldwide Regulated Open-End Fund Assets and Flows" (found at https://www.ici.org/research/stats) and the European Fund and Asset Management Association's quarterly international statistical releases for assets and net flows by region, country, and asset class (https://www.efama.org/statistics/SitePages/International%20Quarterly%20Statistical%20Release.aspx).

2. See, for example, Morningstar's Fund Flows Commentary (https://www.morningstar.com/lp/fund-flows-direct) and Broadridge's Fund Radar (on the Broadridge Distribution Insight Platform at https://distributioninsight.broadridge.com/).

3. Spiegel and Zhang (2013) indicated that ΔMS can be calculated either by using only funds that were in existence at the start of the period or by using all funds that were in existence at any moment in the period. In this article, I use the second approach.

4. When a fund is launched in period $t + 1$, $TNA_{i,t} = 0$, which would result in dividing by zero.

5. In this article, the term "category" is used.

6. In a fund's first month of existence, the Excess Flows component cannot be expressed in terms of a relative flows differential. Instead, dollar flows versus the market share–equivalent part of the dollar flow of the category must be used (see Appendix B).

7. VIX data were obtained from Yahoo Finance.

8. Data for aggregate net exchanges were kindly provided by the Investment Company Institute.

9. First-quartile fund performance is defined as a fund-family Fund rank greater than 0.75.

10. This amount is the difference in rank of 0.375 between a top-quartile family (median rank of 0.875) and a median family (rank of 0.500) times the Fund rank coefficient in the EFC model (0.090) times 12 (to annualize), which gives the 0.40 bp of market share gain per year. Performing the regression on annual market share changes produced a similar result. In that case, the coefficient was 0.95, which gives an annual market change impact of 0.36 bp when multiplied by 0.375.

11. Market statistics are based on the sample funds.

References

Banko, J., S. Beyer, and R. Dowen. 2010. "Economies of Scope and Scale in the Mutual-Fund Industry." *Managerial Finance* 36 (4): 322–36.

Ben-Rephael, A., S. Kandel, and A. Wohl. 2012. "Measuring Investor Sentiment with Mutual Fund Flows." *Journal of Financial Economics* 104 (2): 363–82.

Berk, J.B., J.H. van Binsbergen, and B. Liu. 2017. "Matching Capital and Labor." *Journal of Finance* 72 (6): 2467–504.

Brooks, G.R. 1995. "Defining Market Boundaries." *Strategic Management Journal* 16 (7): 535–49.

Carhart, M. 1997. "On Persistence in Mutual Fund Performance." *Journal of Finance* 52 (1): 57–82.

Christensen, R. 1997. *Log-Linear Models and Logistic Regression*. 2nd ed. New York: Springer-Verlag.

Fang, J., A. Kempf, and M. Trapp. 2014. "Fund Manager Allocation." *Journal of Financial Economics* 111 (3): 661–74.

Gavazza, A. 2011. "Demand Spillovers and Market Outcomes in the Mutual Fund Industry." *Rand Journal of Economics* 42 (4): 776–804.

Gruber, M.J. 1996. "Another Puzzle: The Growth in Actively Managed Mutual Funds." *Journal of Finance* 51 (3): 783–810.

Hazenberg, J.J., F. Irek, W. van der Scheer, and M. Stefanova. 2015. "The Lure of the Brand: Evidence from the European Mutual Fund Industry." *European Financial Management* 21 (5): 867–904.

ICI. 2019. *Investment Company Fact Book: A Review of Trends and Activities in the Investment Company Industry*. Washington, DC: Investment Company Institute. https://static1.squarespace.com/static/56c237b2b09f95f2a778cab2/t/5cc8ebdbe2c483c67348299c/1556671482904/ICI.pdf.

Jain, P.C., and J.S. Wu. 2000. "Truth in Mutual Fund Advertising: Evidence on Future Performance and Fund Flows." *Journal of Finance* 55 (2): 937–58.

Khorana, A., and H. Servaes. 1999. "The Determinants of Mutual Fund Starts." *Review of Financial Studies* 12 (5): 1043–74.

——. 2012. "What Drives Market Share in the Mutual Fund Industry?" *Review of Finance* 16 (1): 81–113.

Khorana, A., P. Tufano, and L. Wedge. 2007. "Board Structure, Mergers, and Shareholder Wealth: A Study of the Mutual Fund Industry." *Journal of Financial Economics* 85 (2): 571–98.

Kotler, P. 1983. *Principles of Marketing*, 2nd ed. Upper Saddle River, NJ: Prentice-Hall.

Luo, M., A. Manconi, and D. Schumacher. 2019. "Returns to Scale from Labor Specialization: Evidence from Global Asset Management." Working paper, Rotterdam School of Management.

Massa, M. 2003. "How Do Family Strategies Affect Fund Performance? When Performance-Maximization Is Not the Only Game in Town." *Journal of Financial Economics* 67 (2): 249–304.

Nanda, V., Z.J. Wang, and L. Zheng. 2004. "Family Values and the Star Phenomenon: Strategies of Mutual Fund Complexes." *Review of Financial Studies* 17 (3): 667–98.

Sirri, E., and P. Tufano. 1998. "Costly Search and Mutual Fund Flows." *Journal of Finance* 53 (5): 1589–622.

Spiegel, M., and H. Zhang. 2013. "Mutual Fund Risk and Market Share-Adjusted Fund Flows." *Journal of Financial Economics* 108 (2): 506–28.

Zhao, X. 2005. "Exit Decisions in the U.S. Mutual Fund Industry." *Journal of Business* 78 (4): 1365–402.