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Chapter 8

ENTRY DECISIONS BY MUTUAL FUND FAMILIES

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ABSTRACT

Due to the multiple-share-class structure of mutual funds, the entry decisions by fund families include two separate decisions: the introduction of new (single-share-class or multiple-share-class) portfolios and the introduction of new share classes for existing portfolios. The two decisions are based on very different considerations and lead to very different share class compositions. New share classes in existing portfolios are primarily the results of the expansion of traditional front-end load funds and institutional funds, and are mostly introduced in star portfolios. No-load funds rarely introduce new load share classes and no-load share classes are never observed to be added to load funds. In addition, fund families starting new multiple-share-class portfolios appear to follow a very risky introduction strategy.

Keywords: Mutual funds; Entry decisions; Multiple-share-class structure; Fund families.

INTRODUCTION

The rapid growth of the mutual fund industry is characterized not only by the dramatic increase of assets in existing funds, but also by the large number of new funds started by fund families each year. The purpose of this chapter is to study what constitutes and what determines the entry decisions—the decisions to introduce new funds—by fund families. This research aids in understanding the industrial organization of the mutual fund industry and explaining the reasons for the rapid growth of the industry, one of the most dramatic developments of financial institutions in history.

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Despite the importance of the entry decisions, Khorana and Servaes (1999) is the only published study dedicated to this topic. They use annual data over the period 1979-1992, and find that fund initiations are positively related to the level of assets invested in and the capital gains embedded in other funds with the same objective, the fund family's prior performance, the fraction of funds in the family in the low range of fees, and the decision by large families to open similar funds in the prior year. They also find that large families and families that have more experience in opening funds in the past are more likely to open new funds.

This chapter extends the study of Khorana and Servaes (1999) by distinguishing between the two separate decisions included in the entry decisions: the introduction of new portfolios vs. the introduction of new share classes for existing portfolios, a distinction not made in the existing literature on the evolution of the mutual fund industry. The decision to introduce new portfolios can be further separated into the decisions to introduce new single-share-class portfolios or multiple-share-class portfolios. These distinctions have significant effects on how we analyze fund families' entry decisions.

Although many funds are listed as separate funds, they are components of the same *portfolio* in a fund family. The structure of a representative mutual fund family is given in Figure 1. For example, in the Dreyfus Fund Family, the following four funds — Dreyfus Premier Aggressive Growth Fund A, Dreyfus Premier Aggressive Growth Fund B, Dreyfus Premier Aggressive Growth Fund C, and Dreyfus Premier Aggressive Growth Fund R — share the same portfolio, that of Dreyfus Premier Aggressive Growth Fund. These four funds are called *share classes* of the same portfolio.[1] Although they are listed as four separate funds, they have the same portfolio manager, the same pool of securities, and the same returns before expenses and loads. The major difference among the four funds is that they have different loads.[2] The varying load structures make them attractive to different investors, and the fund family can offer them through different brokers to reach as many investors as possible. Nanda, Narayanan, and Warther (2000) show that the existence of investor clienteles with differing liquidity and marketing needs gives rise to a variety of open-end fund structures.

The multiple-share-class structure of mutual funds complicates the study of the entry decisions by fund families, because a new fund can be either the initial share class (or one of the initial share classes) of a new portfolio (a real new fund) or just a new share class of an existing portfolio. In the above example, Fund A, the first share class of the portfolio, was started in June 1969, while the other three share classes were started in January 1996. As a result, the entry decisions by fund families include two separate decisions: the introduction of new portfolios and the introduction of new share classes for existing portfolios. The decision by a fund family to introduce new portfolios may be very different from the decision to introduce new share classes for an existing portfolio. By introducing new portfolios, the fund family adds new products to its product line of funds; while by introducing new share classes for an existing portfolio, the fund family promotes more varieties of an existing product with minimal modifications, new distribution channels, and alternative pricing structures. In this chapter, I study the introduction of new portfolios and the introduction of new share classes for existing portfolios separately and contrast the results.

[1] See Pozen (1998) for a detailed discussion of share classes.

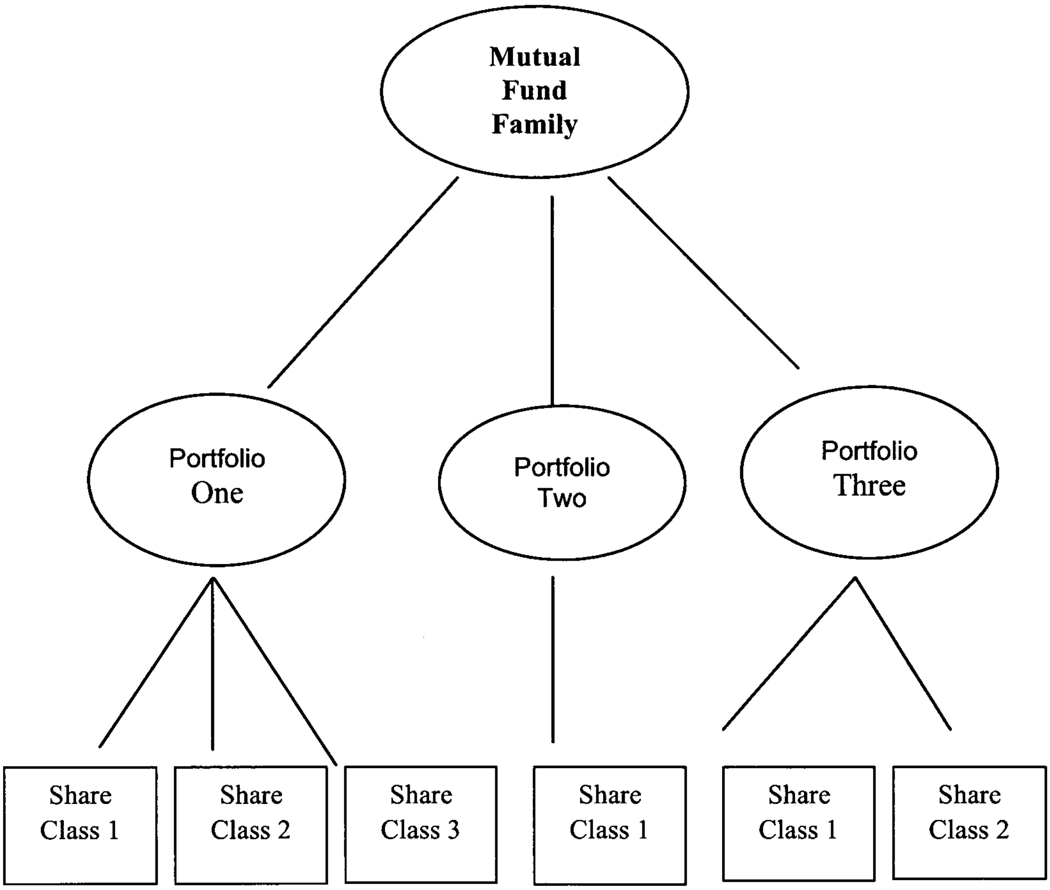

Figure 1. Structure of a representative mutual fund family. Many mutual funds are *share classes* of the same *portfolio* in a fund family. Although they are listed as separate funds, they have the same portfolio manager, the same pool of securities, and the same returns before expenses and loads. The major difference among the share classes is that they have different loads. The varying load structures make them attractive to different investors, and the fund family can offer them through different brokers to reach as many investors as possible.

I first find that the distributions across different share classes are very different for the initial share classes of new portfolios and new share classes in existing portfolios, except for the institutional share class. Besides institutional share classes, new portfolios are primarily made up of no-load share classes and front-end load share classes, while back-end load and level-load share classes account for about 50% of new share classes in existing portfolios.

When fund families introduce new portfolios, they may introduce single-share-class portfolios or multiple-share-class portfolios. Share class compositions are also quite different for new single-share-class portfolios and new multiple-share-class portfolios. Although some

[2] Fund A has a 5.75% front-end load, Fund B has a 4.00% back-end load and a 0.75% 12b-1 fee but no front-end load, Fund C also has no front-end load and a 0.75% 12b-1 fee but a low 1.00% back-end load, while Fund R has no load whatsoever.

determinants are shared in the decisions to introduce new single-share-class and multiple-share-class portfolios, such as economies of scale effect, tax effect, and objective introduction record, significant differences also exist. Fund families starting multiple-share-class portfolios appear to follow a very risky introduction strategy. They chase recent inflows, bet against market trend, and tend to add more portfolios in the same investment objective in consecutive quarters. Fund families tend to introduce both new multiple-share-class portfolios and new share classes in existing portfolios in investment objectives with poor returns, resorting to the assistance of brokers and financial advisors to attract new investments in a down market.

The two decisions to introduce new portfolios and new share classes in existing portfolios are also largely based on different considerations. Fund families with both good performance and poor performance introduce new portfolios, while new share classes are mostly introduced by fund families with unsatisfactory performance. High inflows lead families to introduce new portfolios, while low inflows entice families to introduce more share classes in existing portfolios. Although fund families are more likely to introduce new portfolios in objectives with high capital gains overhang to attract tax-sensitive investors, tax concerns do not affect fund families' decision to introduce new share classes, because new share classes are not a solution to the unrealized capital gains problem. In addition, I find that new share classes are mostly introduced in star portfolios with good performance, more assets, high expense ratio, longer history, and smaller number of share classes.

Share classes are a major innovation in the development of mutual funds, and the best-known fund families played leading roles in this process. New share classes in existing portfolios are primarily the results of the expansion of traditional front-end load funds and institutional funds. The front-end load funds expand by adding other load retail share classes and institutional share classes. Institutional funds overwhelmingly choose the load path over the no-load path to expand to the retail market. No-load funds rarely introduce new load share classes and no-load share classes are never observed to be added to load funds, both due to the reluctance of brokers and financial planners to sell any load share classes of a fund when it is also available to investors at no cost.

A comparison of my results for introduction of new portfolios and Khorana and Servaes' (1999) results shows some similarity: we both predict fund families are more likely to introduce new portfolios (funds) in objectives with high capital gains overhang and a strong introduction record. On the other hand, in terms of family returns and inflows, or objective size and returns, the results are quite different. My results for introduction of new share classes in existing portfolios, except for a strong introduction record in the family and in the investment objective, differ substantially from those of Khorana and Servaes (1999). The contradictory results underscore the importance of distinguishing between the decisions to introduce new portfolios vs. new share classes.[3]

The remainder of the Chapter is organized as follows. Section 2 describes the data and variable construction. Section 3 examines the introduction of new portfolios. Section 4 studies the initiation of new share classes for existing portfolios. Section 5 concludes.

[3] The data used in Khorana and Servaes (1999) end in 1992, and should include introduction of both new portfolios and new share classes in existing portfolios, considering that 95 new share classes had already been introduced in existing portfolios by the end of 1992 in my data set.

DATA AND VARIABLE CONSTRUCTION

Data

A panel data set of quarterly data from the first quarter of 1987 to the fourth quarter of 1996 of 3,047 open-end domestic equity mutual funds is created from raw data obtained from Morningstar Inc., with some of the returns supplemented with data from Lipper and the CRSP Survivor-Bias Free US Mutual Fund Database. The data set covers all of the five Morningstar domestic equity investment objectives: Aggressive Growth, Growth, Growth and Income, Equity-Income, and Small Company.[4] The data include: fund name, fund family, portfolio name, fund share class, inception date, fund age (months), quarterly return, NAV (net asset value), expense ratio, fund loads (front-end load, back-end load, and 12b-1 fee), and total assets. For funds that exited during the sample period, a complete history of these funds until their exits is available. Therefore, the data set is free from survivorship bias.

Table 1. Fund Share Classes

Share classes	Number	Description
A	843	With a front-end load and a 12b-1 fee, no back-end load
B	470	With a back-end load and a 12b-1 fee, no front-end load
C	263	With a back-end load (much smaller than B's) and a 12b-1 fee (generally greater than B's), no front-end load; often called level-load
D	15	With a front-end load, a back-end load, and a 12b-1 fee
No-Load	681	No front-end load or back-end load, no 12b-1 fee or with a 12b-1 fee ≤ 0.25%
12b-1 Only	72	With a 12b-1 fee, but no front-end load or back-end load
Institutional	678	No load, generally with a large minimum initial purchase, for institutional investors
Advisory	21	No load in name, only available through advisors who may charge commissions or fees
Other	4	Other
Total	*3,047*	

Note: Many mutual funds are different share classes of the same portfolio. These share classes have different loads or minimum investment requirements and may be offered through different brokers. The varying load structures and minimum investment requirements make them attractive to different investors. The 3,047 funds studied in this chapter can be categorized into nine types of share classes: A, B, C, D, No-Load, 12b-1 Only, Institutional, Advisory, and Other. A (front-end load) is the largest share class in terms of number of funds, followed by No-Load, Institutional, and B (back-end load).

[4] According to Morningstar Mutual Funds User's Guide, *Aggressive Growth* funds seek rapid growth of capital. They often invest in small companies without specifying a market capitalization range and are more likely than other funds to invest in IPOs and in companies with high price/earnings and price/book ratios. *Growth* funds pursue capital appreciation by investing primarily in equity securities. Current income, if considered at all, is a secondary concern. For *Growth and Income* funds, growth of capital and current income are near-equal objectives. Investments are typically selected for both appreciation potential and dividend-paying ability. *Equity-Income* funds are expected to pursue current income by investing at least 65% of their assets in dividend-paying equity securities. *Small Company* funds seek capital appreciation by investing primarily in stocks of companies with market capitalization of less than $1 billion.

As shown in Table 1, the 3,047 funds studied in this chapter can be categorized into nine types of share classes: A, B, C, D, No-Load, 12b-1 Only, Institutional, Advisory, and Other. The description of these share classes is given in Table 1. From Table 1, we can see A (front-end load) is the largest share class in terms of number of funds, followed by No-Load, Institutional, and B (back-end load). Many funds are different share classes of the same portfolio. These share classes have different loads or minimum investment requirements and may be offered through different brokers. The 3,047 funds belong to 1,790 portfolios, as depicted in Panel A of Table 2. While the majority of portfolios, 1,111 of them, have only one share class, 679 of them are made up of at least two share classes. These 1,790 portfolios belong to 591 families, tabulated in Panel B of Table 2. While 254 families have just one portfolio, the remaining 337 families have at least two portfolios.

At the beginning of 1987, as shown in Figure 2, the composition of mutual funds was dominated by A funds and No-Load funds, each accounting for roughly 40% of all funds, while all other share classes had a combined share of about 20%. But this situation has changed dramatically after ten years. At the end of 1996, although A was still the largest share class, its share dropped to about 25%. No-Load funds and Institutional funds tied for the second place, each with a share of about 20%. Besides Institutional funds, B (back-end load) and C (level-load) funds also had dramatic growth in the ten years.

Table 2. Share Classes, Portfolios, and Fund Families

Number of Share Classes	*Number of Portfolios*
Panel A: Number of share classes in portfolios	
1	1,111
2	295
3	223
4	132
5	28
6	0
7	1
Total	1,790
Number of Portfolios	*Number of Fund Families*
Panel B: Number of portfolios in fund families	
1	254
2	121
3-5	143
6-10	48
11-20	22
21-30	2
31	1
Total	591

Note: A portfolio may have more than one share class. Many mutual funds are different share classes of the same portfolio. The 3,047 funds belong to 1,790 portfolios. While the majority of portfolios, 1,111 of them, have only one share class, 679 of them are made up of at least two share classes. The maximum number of share classes a portfolio has is seven. A fund family may have more than one portfolio. The 1,790 portfolios belong to 591 families. While 254 families have just one portfolio, the remaining 337 families have at least two portfolios.

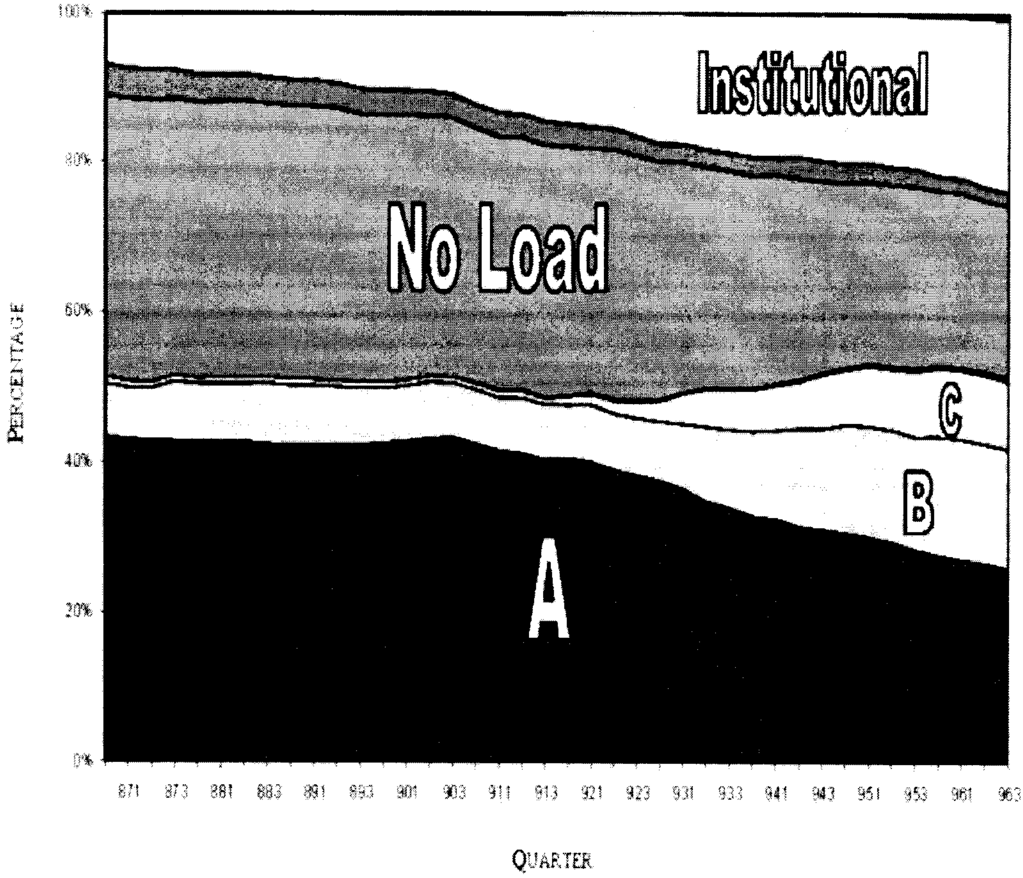

Figure 2. The evolution of fund share classes. At the beginning of 1987, the composition of mutual funds was dominated by A funds and No-Load funds, each accounting for roughly 40% of all funds, all other share classes had a combined share of about 20%. But this situation has changed dramatically after ten years. At the end of 1996, although A was still the largest share class, its share dropped to about 25%. No-Load funds and Institutional funds tied for the second place, each with a share of about 20%. Besides Institutional funds, B (back-end load) and C (level-load) funds also had dramatic growth in the ten years.

In Figure 3, at the beginning of 1987, almost all portfolios had only one share class. At the end of 1996, only about 60% of portfolios had only one share class, roughly 20%, 15%, and 4% of portfolios had two share classes, three share classes, and four share classes, respectively.

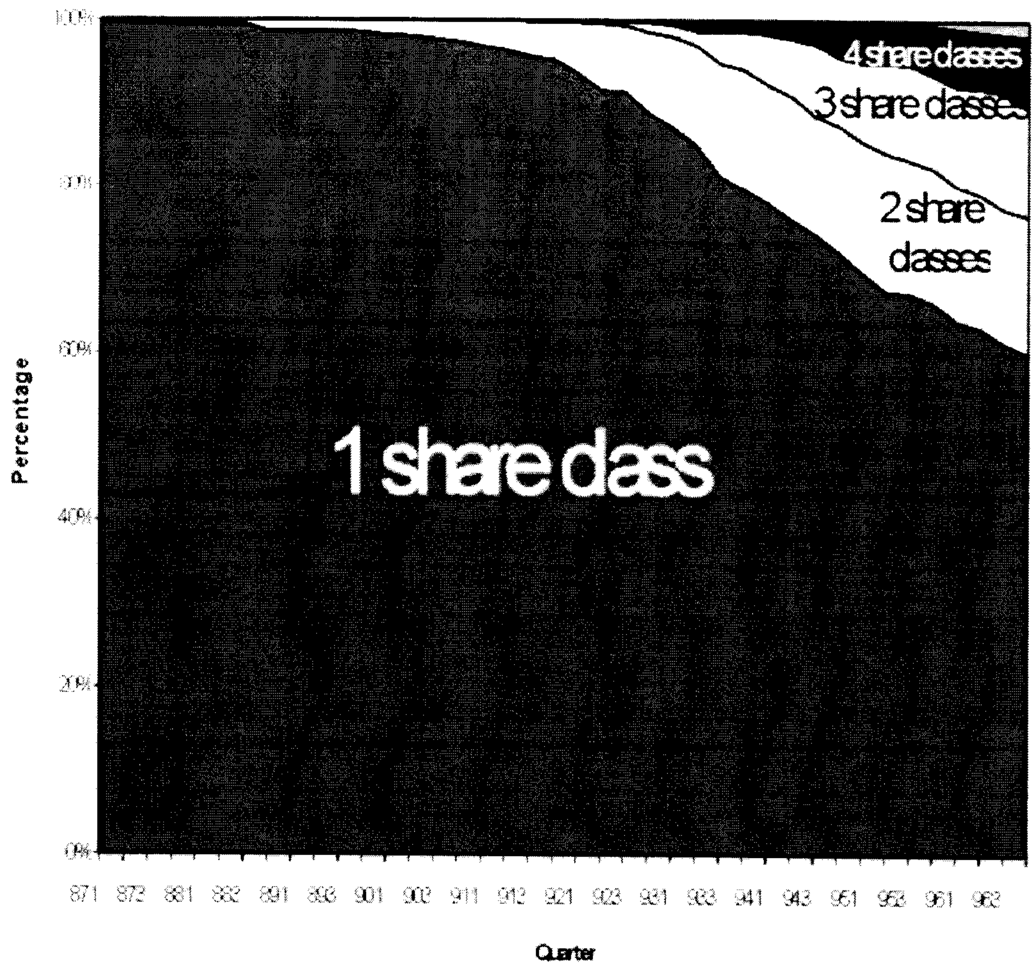

Figure 3. Number of share classes in portfolios. At the beginning of 1987, almost all portfolios had only one share class. At the end of 1996, only about 60% of portfolios had only one share class, roughly 20%, 15%, and 4% of portfolios had two share classes, three share classes, and four share classes, respectively.

As shown in Table 3, among the 3,047 funds, 2,529 funds were started in the ten-year period from 1987 to 1996. New Institutional funds and A funds were the two largest groups, each accounting for about 25% of all new funds, followed by No-Load funds, B funds, and C funds. Among these new funds, 1,576 funds were the initial share classes of new portfolios, while the remaining 953 funds were introduced as new share classes in existing portfolios.

Table 3. Distribution of Initial Share Classes in New Portfolios and New Share Classes in Existing Portfolios across Different Share Classes

	All New Funds		As Initial Share Classes in New Portfolios						As New Share Classes in Existing Portfolios					
			Single Share Class		Multiple Share Class		Sub Total		Single Share Class		Multiple Share Class		Sub Total	
Share Class	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%
A	620	24.52	282	25.99	165	33.60	447	28.36	122	18.54	51	17.29	173	18.15
B	434	17.16	36	3.22	106	21.59	142	9.01	185	28.12	107	36.27	292	30.64
C	258	10.20	14	1.29	69	14.05	83	5.27	109	16.57	66	22.37	175	18.36
D	15	0.59	2	0.18	2	0.41	4	0.25	8	1.22	3	1.02	11	1.15
No-Load	486	19.22	464	42.76	17	3.46	481	30.52	2	0.30	3	1.02	5	0.52
12b-1 Only	49	1.94	32	2.95	5	1.02	37	2.35	8	1.22	4	1.36	12	1.26
Institutional	643	25.43	253	23.32	122	24.85	375	23.79	209	31.76	59	20.00	268	28.12
Advisory	21	0.83	0	0.00	5	1.02	5	0.32	14	2.13	2	0.68	16	1.68
Other	3	0.12	2	0.18	0	0.00	2	0.13	1	0.15	0	0.00	1	0.10
Total	2,529	100.00	1,085	100.00	491	100.00	1,576	100.00	658	100.00	295	100.00	953	100.00

Note: Among the 3,047 funds, 2,529 funds were started in the ten-year period from 1987 to 1996. New Institutional funds and A funds are the two largest groups, each accounting for about 25% of all new funds, followed by No-Load funds, B funds, and C funds. Among these new funds, 1,576 funds are the initial share classes of new portfolios, while the remaining 953 funds are introduced as new share classes in existing portfolios. The distributions of these two types of new funds across different major share classes appear to be very different, except for the Institutional share class.

Table 4. Distribution of New Funds from Each Share Class across Different New Fund Categories

Share Class	Total		As Initial Share Classes in New Portfolios						As New Share Classes in Existing Portfolios					
			Single Share Class		Multiple Share Class		Sub Total		Single Share Class		Multiple Share Class		Sub Total	
	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%
A	620	100.00	282	45.48	165	26.62	447	72.10	122	19.68	51	8.22	173	27.90
B	434	100.00	36	8.29	106	24.43	142	32.72	185	42.63	107	24.65	292	67.28
C	258	100.00	14	5.43	69	26.74	83	32.17	109	42.25	66	25.58	175	67.83
D	15	100.00	2	13.33	2	13.33	4	26.66	8	53.33	3	20.00	11	73.33
No-Load	486	100.00	464	95.47	17	3.50	481	98.97	2	0.41	3	0.62	5	1.03
12b-1 Only	49	100.00	32	65.31	5	10.20	37	75.51	8	16.33	4	8.16	12	24.49
Institutional	643	100.00	253	39.35	122	18.97	375	58.32	209	32.50	59	9.18	268	41.68
Advisory	21	100.00	0	0.00	5	23.81	5	23.81	14	66.67	2	9.52	16	76.19
Other	3	100.00	2	66.67	0	0.00	2	66.67	1	33.33	0	0.00	1	33.33
All New Funds	*2,529*	*100.00*	*1,085*	*42.90*	*491*	*19.42*	*1,576*	*62.32*	*658*	*26.02*	*295*	*11.66*	*953*	*37.68*

Note: This table shows that 98.97% of No-Load funds are introduced as the initial share classes of new portfolios. In fact, 95.47% of them are introduced as the single share class of new portfolios. They are almost never introduced as new share classes in existing portfolios. More than 70% of A funds are introduced as the initial share classes of new portfolios, with 45.48% of them introduced as the single initial share class of a new portfolio. In contrast, almost 70% of B funds and C funds are introduced as new share classes in existing portfolios. Even when they are started as initial share classes of new portfolios, they are rarely started as the single initial share class but with other initial share classes instead.

The distributions of these two types of new funds across different major share classes appear to be very different, except for the Institutional share class. The most striking distinction comes from No-Load funds. No-Load funds, the largest group in the initial share classes of new portfolios with a share of 30.52%, account for a mere 0.52% of new share classes in existing portfolios. The share in the initial share classes of new portfolios is also significantly higher for A funds. On the other hand, although only 9.01% of the initial share classes of new portfolios are B funds, they account for more than 30% of new share classes in existing portfolios, the largest group in new share classes in existing portfolios. A very similar distribution can also be observed for C funds.

Table 4 exhibits the distribution of new funds from various share classes in different new fund categories. It shows that 98.97% of No-Load funds are introduced as the initial share classes of new portfolios. In fact, 95.47% of them are introduced as the single share class of new portfolios. They are almost never introduced as new share classes in existing portfolios.[1] More than 70% of A funds are introduced as the initial share classes of new portfolios, with 45.48% of them introduced as the single initial share class of a new portfolio. In contrast, almost 70% of B funds and C funds are introduced as new share classes in existing portfolios. Even though B funds and C funds have gained popularity recently, they are seldom the single share class offered for a portfolio. Even when they are started as initial share classes of new portfolios, they are rarely started as the single initial share class but are offered with other initial share classes. Once again, compared to these four share classes, Institutional funds appear to be fairly evenly distributed between new portfolios and existing portfolios, following the roughly 60/40 split between new portfolios and existing portfolios of all new funds.

As for the distribution of different share classes across the five investment objectives, no significant difference can be observed except in the Aggressive Growth objective. Institutional share classes account for more than 20% in all of the other four objectives, but only comprise 13.69% in the Aggressive Growth objective. Aggressive Growth is by far the riskiest among the five objectives. Aggressive Growth funds are most likely to invest in stocks with high price/earnings and price/book ratios, and may also use such investment techniques as heavy sector concentrations and short-selling. As a result, they may not be appropriate for many institutional investors, such as pension funds and endowments.

Variable Construction

To study fund families' decisions to introduce new portfolios and new share classes for existing portfolios, four levels of variables are created, spanning family and portfolio characteristics, as well as differences among investment objectives. Full details as to variable construction appear in Appendix A.

Objective-level variables relate to specific investment objectives, e.g., Growth or Small Company, and include the general performance, size, inflow, capital gains overhang, and

5. The five new No-Load share classes in existing portfolios are all introduced in portfolios with only Institutional share classes. Most of the 17 No-Load funds introduced as initial share classes with other initial share classes are also introduced with Institutional share classes only.

records of introduction and termination in an objective. They are created with data of funds in the same investment objective.

The general situation of the fund family, such as its performance, size, inflow, age, expense ratio, capital gains overhang, and records of introduction and termination, constitute *family-level* variables, which are created with data of funds in the same fund family.

Family-objective-level variables describe the distribution among different objectives within a family, such as shares of assets in different objectives in a family, and whether the family has many or only a few portfolios in a certain objective.

Portfolio-level variables include attributes of portfolios, such as performance, size, inflow, age, expense ratio, capital gains overhang, and records of introduction and termination of share classes. They are created with data of share classes in each portfolio.

Introduction of New Portfolios by Fund Families

In this section, I study the effects of the family level, objective level, and family-objective level variables on the introduction of new portfolios by fund families.

For each fund family in each quarter, five observations correspond to the five objectives. Each observation includes dummy variables indicating whether the family introduced new single-share-class or multiple-share-class portfolios in the objective, as well as family-level variables, and corresponding objective and family-objective variables. I use a fixed-effects logit model to study whether a fund family will introduce new portfolios. With the fixed-effects dummies for each cross-sectional unit, fund family, the model is capable of accounting for unobservable differences across fund families.

The Statistical Model

Let i = 1,2, ..., n denote each fund family, j = 1, 2, 3, 4, 5 denote each investment objective, and t = 1, 2, ..., T denote each time period. It is assumed that a family introduces a new portfolio if the benefits outweigh the costs of doing so.[2] The latent variable, y^*_{ijt}, indexes the benefit of introduction relative to cost, but is unobservable. Let y_{ijt} denote the observable dependent variable,

$$y_{ijt} = 1 \text{ if } y^*_{ijt} > 0 \qquad (1)$$
$$= 0 \text{ otherwise}$$

6. The direct costs of introducing a new portfolio include registration costs with the SEC and initial marketing costs, and direct operating costs of a new portfolio include mainly research costs and administrative costs. In terms of benefits, a new portfolio capable of attracting new investments becomes a new source of fees for a fund family since mutual funds have an assets-based compensation scheme. The fund family also benefits from economies of scale by introducing new portfolios since average operating costs can be lowered when research costs and administrative costs are spread over more portfolios.

where 1 stands for fund family i opening at least one portfolio in objective j in period t, and 0 stands for no opening. The latent variable underlying the choice is assumed to be a linear index function of the corresponding family level, objective level, and family-objective level variables,

$$y^*_{ijt} = \alpha_i + w_{it-1}\delta + z_{jt-1}\gamma + v_{ijt-1}\varphi + u_{ijt} \quad (2)$$

where α_i is the unobservable family-specific fixed effect for the i_{th} family; $\alpha_i + u_{ijt}$ is the error term, with u_{ijt} as an idiosyncratic error; w_{it-1} is a row vector of the family level variables, z_{jt-1} is a row vector of the objective level variables, while v_{ijt-1} is a row vector of the family-objective level variables ; δ, γ, and φ are three column vectors of coefficients to be estimated. The error terms across observations within the same family are not independent relative to one another, since they share the same α_i. Details of how to estimate this model are provided in Appendix B.

Portfolio Introduction: Single-Share-Class vs. Multiple-Share-Class

When fund families introduce new portfolios, they may introduce a single-share-class portfolio or a multiple-share-class portfolio. As shown in Table 3, among the 1,576 new funds started as the initial share classes of new portfolios, about one-third of them are introduced with other initial share classes.

Among the 591 fund families, 251 introduced new portfolios. The majority of them, 181 families, only introduced new single-share-class portfolios, 25 families only introduced multiple-share-class portfolios, while the remaining 45 families introduced both. Among the fund families that only introduced new single-share-class portfolios, more than 40% of them are no-load families that only rely on direct distributions. As for the fund families that have introduced new multiple-share-class portfolios, more than 90% of them rely on brokers or financial advisors to sell shares.

Table 3 also shows that the share class compositions are quite different for new single-share-class portfolios and new multiple-share-class portfolios. Almost 70% and 25% of the share classes in new multiple-share-class portfolios belong to the three load share classes (A, B, and C) and institutional share class, respectively, while no-load share class accounts for more than 40% of new single-share class portfolios.

Considering the differences between new single-share-class and multiple-share-class portfolios, I decide to study the two decisions separately, both using the fixed-effects logit model. For each decision, I estimate two models. For flow variables such as return and inflows, Model 1 uses their quarterly values, while Model 2 is implemented with their annual values. The results for the two decisions are shown in Table 5 and Table 6, respectively.[3]

7. For all of the estimations in this chapter, besides using a complete list of variables, other model specifications using different sub-groups of variables are also tested. Similar qualitative results are obtained and therefore not reported.

Table 5. Fixed-effects Logit Model Estimates on Introduction of New Single-Share-Class Portfolios by Fund Families

	Model 1 (Quarterly)		Model 2 (Annual)	
Variables	Coefficients	P-values	Coefficients	P-values
Family Level				
Assets	0.007	0.211	0.008	0.169
Inflow	-0.004	0.835	0.002†	0.038
Overhang	-0.015	0.946	0.039	0.865
Age	0.005†	0.045	0.012‡	0.003
Return	-0.009	0.577	0.323	0.719
Expense ratio	-0.130	0.479	-0.141	0.551
Number of surviving portfolios	-0.334‡	0.000	-0.376‡	0.000
Number of new portfolios	0.128	0.273	0.086	0.242
Number of terminated portfolios	0.232	0.311	-0.339*	0.065
Objective Level				
Assets	0.000	0.781	-0.001	0.405
Inflow	-0.815	0.658	-0.142	0.816
Overhang	2.402‡	0.000	2.206†	0.020
Return	-0.006	0.499	-0.358	0.528
Number of new portfolios	0.054‡	0.000	0.028	0.000
Number of terminated portfolios	-0.009	0.700	-0.272*	0.052
Family-Objective Level				
Assets (share)	0.000	0.966	-0.001	0.675
Inflow	-0.157	0.311	-0.041	0.224
Overhang	0.204	0.183	0.132	0.379
Number of surviving portfolios	0.165‡	0.000	0.147‡	0.001
Number of new portfolios	-0.605†	0.049	-0.196	0.176
Pseudo R^2	0.0623		0.0782	

‡, †, and * indicate significance at the 1, 5, 10 percent confidence levels, respectively.

Note: I use a fixed-effects logit model, with each fund family as the cross-sectional unit, to study the effects of the family level, objective level, and family-objective level variables on the decisions to introduce new single-share-class portfolios by fund families. I estimate two models. For flow variables such as return and inflows, Model 1 uses their quarterly values while Model 2 is implemented with their annual values. I did not include objective level number of surviving portfolios because it is highly correlated to objective level total assets.

Table 6. Fixed-effects Logit Model Estimates on Introduction of New Multiple-Share-Class Portfolios by Fund Families

Variables	Model 1 (Quarterly)		Model 2 (Annual)	
	Coefficients	P-values	Coefficients	P-values
Family Level				
Assets	0.026	0.552	0.047	0.296
Inflow	0.189‡	0.004	-0.135	0.718
Overhang	-1.169	0.324	-0.683	0.574
Age	0.061‡	0.000	0.081‡	0.000
Return	-0.072	0.126	-3.026	0.248
Expense ratio	-0.083	0.888	-0.686	0.302
Number of surviving portfolios	-0.699	0.000	-0.983‡	0.000
Number of new portfolios	-1.196†	0.025	0.126	0.489
Number of terminated portfolios	-0.608	0.119	-0.782‡	0.002
Objective Level				
Assets	0.000	0.970	-0.002	0.315
Inflow	2.105	0.627	1.260	0.337
Overhang	3.673*	0.065	2.545	0.276
Return	-0.433*	0.084	-0.723	0.579
Number of new portfolios	0.069‡	0.000	0.026‡	0.000
Number of terminated portfolios	0.028	0.487	0.015	0.586
Family-Objective Level				
Assets (share)	0.002	0.606	0.003	0.470
Inflow	-0.071	0.392	0.006	0.920
Overhang	-0.006	0.990	-0.136	0.775
Number of surviving portfolios	-0.033	0.777	-0.086	0.497
Number of new portfolios	1.688†	0.013	0.101	0.715
Pseudo R^2	0.210		0.2103	

‡, †, and * indicate significance at the 1, 5, 10 percent confidence levels, respectively.

Note: I use a fixed-effects logit model, with each fund family as the cross-sectional unit, to study the effects of the family level, objective level, and family-objective level variables on the decisions to introduce new multiple-share-class portfolios by fund families. I estimate two models. For flow variables such as return and inflows, Model 1 uses their quarterly values while Model 2 is implemented with their annual values. I did not include objective level number of surviving portfolios because it is highly correlated to objective level total assets.

A comparison of the two tables first illustrates that some determinants are shared in the decisions to introduce new single-share-class and multiple-share-class portfolios. Nonetheless, in spite of the similarities, significant differences can also be observed in the determinants of the two decisions.

Similarities in the Introduction of Single-share-class and Multiple-Share-Class Portfolios

In both tables, the coefficients for family number of surviving portfolios are significantly negative in both models. This shows fund families with a smaller number of portfolios are more likely to introduce new portfolios. Fund families with fewer portfolios may take better advantage of the economies of scale if they introduce new portfolios. Since a fund family must start with a certain level of office space, research facilities, software, data bases, and management, research, and administrative staff, adding new portfolios may lower average operating costs, as long as the family does not have as many portfolios as can be supported by the current level of resources. I also find that fund families with a longer history are more likely to introduce new portfolios.

Fund families also are more likely to introduce new portfolios in objectives with high capital gains overhang due to a tax effect. Capital gains overhang of a portfolio is the fraction of the portfolio's total asset value consisting of unrealized capital gains. To avoid all taxes, mutual funds have to distribute at least 98% of all income and capital gains to shareholders. If the unrealized capital gains are realized and distributed to fund shareholders, shareholders' tax liabilities are increased immediately. Therefore, if current portfolios in an objective on average have high unrealized capital gains, this makes a distribution more likely in the near future and results in tax inefficiency for investors; therefore, tax-sensitive investors will be reluctant to invest in these portfolios. But new portfolios do not have unrealized capital gains problem and may be introduced to attract these investors.

Both quarterly and annual objective number of new portfolios are significantly positive, while annual family number of terminated portfolios is significantly negative. Fund families are more likely to introduce new portfolios in an objective if there has been a strong introduction record both recently and in the past year. On the other hand, a family is reluctant to introduce new portfolios if it has terminated a considerable number of portfolios in the past year.

Neither quarterly nor annual family return is significant in either table. This suggests that families with good returns or poor returns may both introduce new portfolios. Fund families with good track records are more likely to succeed in introducing new portfolios and therefore "should" introduce new portfolios. On the other hand, families with poor performance "need" to introduce new portfolios, since unsatisfactory performance leads to slow growth or even a decrease in assets and an inability to collect high management fees from current portfolios. These families need new sources of fees and an opportunity to improve the image of the family.

Differences in the Introduction of Single-Share-Class and Multiple-Share-Class Portfolios

Neither quarterly nor annual objective return is significant in Table 5, which suggests that fund families introduce new single-share-class portfolios in investment objectives with both good returns and poor returns. Fund families introduce new single-share-class portfolios in "hot" objectives to attract investors following a momentum strategy, and introduce new single-share-class portfolios in objectives with cheaper share prices to attract contrarian investors. However, fund families are more likely to start multiple-share-class portfolios in investment objectives when recent performance is poor. Considering that almost 70% of the share classes in new multiple-share-class portfolios belong to the three load share classes (A, B, and C), the fund families clearly are trying to resort to the brokers and financial advisors to attract new investors in a down market when investors are reluctant to make new investments voluntarily.

Fund families with high inflows are more likely to introduce new portfolios, not only because high inflows make it easier for new portfolios to grow, but also because new portfolios can divert inflows from existing portfolios, so that they will not grow too big to be managed efficiently. A negative relation between a fund's abnormal return and investor flows is documented in Edelen (1999). However, I find that short-term family inflows and long-term family inflows have different effects on the two decisions. High family inflows in the previous quarter only lead to the introduction of more multiple-share-class portfolios, while fund families with high inflows in the past year are more likely to only add new single-share-class portfolios. Multiple-share-class portfolios appear to be used more often by fund families to seize the opportunity of the abundant supply of money in the short run.

Economies of scale should be most significant if new portfolios are introduced in objectives in which the fund family currently has a presence, since no significant increase in research costs is necessary. But the downside would be that new portfolios may cannibalize existing portfolios. It turns out that the economies of scale effect dominates the cannibalization effect only in the introduction of single-share-class portfolios. The coefficients for family-objective number of surviving portfolios are significantly positive in both models in Table 5, but insignificant in Table 6. If a family has already had many portfolios in a certain objective, it would try to enhance its presence in that objective by introducing more single-share-class portfolios in it. Due to the multiple share classes in each portfolio, new multiple-share-class portfolios certainly cause increased concerns over cannibalization.

When many portfolios are terminated in an objective in the past year, fund families may refrain from introducing more new single-share-class portfolios in such an objective, while the introduction of multiple-share-class portfolios does not appear to be affected.

Fund families are more likely to introduce new multiple-share-class portfolios if they have not introduced many new portfolios in the previous quarter. However, when they introduce, they tend to focus on investment objectives in which they have introduced more recently. When fund families introduce new single-share-class portfolios, they have a completely different strategy on investment objective concentration. They focus on objectives in which they have not introduced many new portfolios recently.

Fund families starting multiple-share-class portfolios appear to follow a very risky introduction strategy. They chase recent inflows, bet against market trend, and tend to add more portfolios in the same investment objective in consecutive quarters. In addition, we have to notice that, introducing new multiple-share-class portfolios itself is already a fairly risky strategy, since many share classes of an untested portfolio are introduced at the same time.

INTRODUCTION OF NEW SHARE CLASSES FOR EXISTING PORTFOLIOS

I now turn to the introduction of new share classes for existing portfolios by mutual fund families. Share classes are a major innovation in the development of mutual funds, and the best- known fund families played leading roles in this process. Fidelity Advisor Funds Family appears to be the pioneer in introducing new share classes for existing portfolios.[4] Merrill Lynch Fund Group was second in line to introduce new share classes. By 1991, more fund families, such as Nations Funds, Prudential, Alliance Capital Funds, and PIMCO, had introduced new share classes in existing portfolios, the majority being adding B share classes to front-end load funds and adding A share classes to back-end load funds.

Among the 591 fund families, 191 families have multiple-share-class portfolios, and 165 families have introduced new share classes in existing portfolios. Only less than 3% of these families are no-load families that rely only on direct distributions. More than 85% of these families rely on brokers or financial advisors to sell shares, while the remaining 10% of the families focus on the institutional channels, such as pension funds or endowments.

Determinants of New Share Class Introduction

A fixed-effects logit model is applied again to study what factors affect a fund family's decision whether to add new share classes to an existing portfolio. Besides the family-level, objective-level, and family-objective-level variables used in the analysis of the introduction of new portfolios, I also include portfolio-level variables. Intuitively, whether a fund family will add new share classes to an existing portfolio also depends on the characteristics of the portfolio. For flow variables such as return and inflows, I estimate using their quarterly values in Model 1 and annual values in Model 2, as before. The results are reported in Table 7, and appear to be quite different from the results for the introduction of new portfolios.

First, new share classes are found to be introduced in star portfolios with good performance, more assets, longer history, a smaller number of share classes which makes further expansion feasible, and high expense ratio, which indicates high fee-generating ability. Table 7 shows that the coefficients for portfolio total assets, annual return, age, and expense ratio are significantly positive, while the coefficient for portfolio number of surviving share classes is significantly negative. According to industrial organization literature on differentiated products (see, e.g., Aron and Lazear, 1990; Burton, 1994; Pepall, 1990), a firm with a successful product tends to introduce more varieties of the product with limited modifications to best utilize the brand name and reach as many different clienteles as possible. Nanda, Wang, and Zheng (2003) also discuss the impacts of "stars" on a fund family.

8. In 1983, Fidelity Special Situations Fund was started as a front-end load fund. In 1986, a new share class, still with the same front-end load but a different 12b-1 fee, called Fidelity Special Situations-Plymouth was added to the original fund, whose name was changed to Fidelity Special Situations/Initial Class. Fidelity Special Situations-Plymouth is the first known new share class in an existing portfolio. In 1993, the portfolio name was changed to Fidelity Advisor Strategic Opportunities Fund. The Initial Class kept its share class name, while the Plymouth share class was renamed A. A B share class was added in 1994, and an institutional share class was added in 1995.

Table 7. Fixed-effects Logit Model Estimates on Introduction of New Share Classes for Existing Portfolios

Variables	Model 1 (Quarterly)		Model 2 (Annual)	
	Coefficients	P-values	Coefficients	P-values
Family Level				
Assets	0.004	0.779	0.000	0.977
Inflow	- 0.131	0.382	- 0.154*	0.084
Overhang	- 0.281	0.367	- 0.070	0.826
Age	0.071 ‡	0.000	0.072‡	0.000
Return	0.014	0.565	- 0.048‡	0.001
Expense ratio	- 0.554*	0.081	- 0.721*	0.051
Number of surviving portfolios	- 0.186‡	0.000	- 0.229‡	0.000
Number of new portfolios	0.191*	0.098	0.222‡	0.001
Number of terminated portfolios	- 1.384 ‡	0.000	- 0.050	0.662
Objective Level				
Assets	0.000	0.874	0.000	0.997
Inflow	- 0.957	0.650	0.439	0.516
Overhang	0.064	0.939	0.168	0.883
Return	- 0.014	0.168	- 0.012*	0.057
Number of new portfolios	0.016 ‡	0.008	0.011‡	0.001
Number of terminated portfolios	- 0.034 †	0.045	- 0.022*	0.061
Family-Objective Level				
Assets (share)	- 0.001	0.555	- 0.002	0.386
Inflow	0.022	0.596	0.004	0.872
Overhang	0.064	0.532	0.051	0.573
Number of surviving portfolios	- 0.075	0.146	- 0.091	0.116
Number of new portfolios	- 0.312	0.227	- 0.198	0.154
Portfolio Level				
Assets	0.105 ‡	0.002	0.117‡	0.001
Inflow	- 0.018	0.659	- 0.006	0.670
Overhang	- 0.045	0.311	- 0.069	0.391
Age	0.001 ‡	0.006	0.001‡	0.007
Return	0.015	0.324	0.013*	0.089
Expense ratio	0.562 ‡	0.000	0.507‡	0.000
Number of surviving share classes	- 1.323‡	0.000	- 1.290‡	0.000
Number of new share classes	0.024	0.902	- 0.243*	0.056
Number of terminated share classes	- 29.600	1.000	-31.325	1.000
Pseudo R^2	0.165		0.167	

‡, †, and * indicate significance at the 1, 5, 10 percent confidence levels, respectively.

Note: I use a fixed-effects logit model, with each fund family as the cross-sectional unit, to study the effects of the family level, objective level, family-objective level, and portfolio level variables on fund families' decisions to introduce new share classes for existing portfolios. I estimate two models. For flow variables such as return and inflows, Model 1 uses their quarterly values while Model 2 is implemented with their annual values. I did not include objective level number of surviving portfolios because it is highly correlated to objective level total assets.

Meanwhile, I also find that fund families most likely to introduce new share classes in their star portfolios are those families with unsatisfactory performance and inflows, as well as low expense ratios. Model 2 shows that the coefficients for family annual inflow, annual return, and expense ratio are all significantly negative. To promote the new share classes, the fund family only needs to rely on the good track record of the portfolio and can ignore the dismal picture of the family.

Economies of scale still appear to be a reason for fund families to introduce new share classes, since families with a smaller number of portfolios are also more likely to introduce new share classes. In fact, economies of scale are best achieved by introducing new share classes, since a new share class belongs to an existing portfolio, requiring no additional research or investment decision. Also, the cannibalization effect is minimized with new share classes, since a new share class should only attract investors not satisfied with current share classes.

Tax concerns do not affect fund families' decision to introduce new share classes, as is shown by the insignificant coefficients of capital gains overhang variables at all levels. Tax effects are not expected to play a role in a fund family's decision to introduce new share classes. This is due to SEC Rule 18f-3, requiring income, realized and unrealized capital gains and losses of multiple-share-class funds to be allocated to each share class on the basis of the net asset value of that share class in relation to the net asset value of the fund. Unlike new portfolios, which do not have capital gains overhang at initiation, new share classes are components of an existing portfolio and are also subject to the capital gains overhang in the portfolio. Therefore, new share classes are unable to attract tax-sensitive investors.

The coefficient of objective annual return is shown to be significantly negative, which suggests that new share classes are more likely to be introduced in investment objectives with poor performance. Considering that new share classes are almost all load share classes or institutional share class, as shown in Table 3, the assistance of brokers, financial advisors, and institutional investors makes it more likely for the portfolio to succeed in attracting new investments in a down market.

Strong family and objective introduction records lead a family to introduce more share classes, while termination records have the opposite effect. In both models, the coefficients for family number of new portfolios and objective number of new portfolios are significantly positive, while the coefficients for objective number of terminated portfolios are significantly negative. The coefficient for quarterly family number of terminated portfolios is also significantly negative.

It is interesting to notice that none of the family-objective level variables are significant, which suggests that the current presence in different objectives does not affect a family's decision to introduce new share classes for existing portfolios.

Expansion of Front-end Load Funds and Institutional Funds

A study of the existing share classes of portfolios that introduce new share classes shows that multiple-share-class portfolios are primarily the results of the expansion of traditional front-end load funds and institutional funds.

Single-share-class portfolios introduced about 67% of new share classes. For such single-share-class portfolios that introduced new share classes, 54.49% of them are front-end load funds, while 25.51% of them are institutional funds. If we consider all portfolios that have introduced new share classes, around 70% and 35% of them have an A share class and an institutional share class, respectively.

Among the 953 new share classes, once again, almost 70% of them are introduced in portfolios with an A share class. This reconfirms the central role of traditional front-end load funds in the development of multiple-share-class mutual funds. The front-end load funds first focus on introducing B share classes, which account for 53.54% of new share classes added by portfolios with only A share classes, to attract long-term buy-and-hold investors. Chordia (1996) indicates that a mutual fund's expected profits will increase if it can persuade investors to refrain from redeeming their holdings, and mutual funds seek to dissuade redemptions through front-end and back-end load fees. Chordia (1996) documents that back-end loads are more effective than front-end loads at dissuading redemptions, because investors will incur additional cost at redemption. This finding explains why B share classes are the top choice for traditional front-end load funds.

To attract investors who tend to trade more frequently, C share classes, which have lower back-end loads, higher 12b-1 fees, but no front-end loads, are also added. After adding a B share class, a portfolio further expands by adding a C share class, which accounts for 41.94% of new share classes added by portfolios with both A and B share classes. In the meantime, traditional front-end load funds also expand to the institutional market by adding institutional share classes, which account for 21.25% of new share classes added by portfolios with only A share classes, and 39.78% of new share classes added by portfolios with both A and B share classes. For portfolios with all three load share classes (A, B, and C), 87.23% of the new share classes introduced by them are institutional share classes.

The other major player in the development of multiple-share-class mutual funds is institutional funds. When institutional funds decide whether to choose the no-load path or the load path to expand to the retail market, they overwhelmingly selected the load path. Almost 70% of the new share classes started by portfolios with institutional shares belong to the three load share classes (A, B, and C), while only 1.56% of the new share classes are no-load.[5] A share classes are most likely the first new share class to be added by institutional funds. More than 50% of new share classes introduced by portfolios with only an institutional share are A share classes.

No-load funds only introduced 6.51% of the new share classes, almost all institutional share classes. The no-load nature restricts their options in adding more share classes. Had they introduced load share classes, brokers selling the load share classes would be ethically obliged to remind the investors of the existence of the low-cost no-load share classes. Therefore, brokers are reluctant to sell any load share classes of a portfolio that also has a no-load share class. As a result, no-load funds rarely introduce new share classes.

9. The rest of the new share classes are almost all other institutional share classes. These additional institutional share classes may target different institutions or have different features, such as different minimum initial investments.

Types of New Share Classes

When a fund family decides what new share classes to add to a portfolio, it has to consider what share classes the portfolio already has. As mentioned earlier, B share classes are the top choice for traditional front-end load funds. It turns out that 92.28% of the portfolios (89.22% of single-share-class portfolios) that introduce new B share classes already have an A share class. C share classes are also mostly started in portfolios with an A share class, which account for 88.57% of all portfolios that add new C share classes. In addition, 46.29% of the portfolios that introduce C share classes also have a B share class. It turns out that 44.57% of the portfolios that introduce C share classes have both A and B share classes. This finding reconfirms that C share classes are predominantly used in the further expansion of traditional front-end load funds.

A share classes only account for around 18% of new share classes. Among portfolios that add new A share classes, 55.81% have Institutional share classes, while 33.14% have B share classes; among single-share-class portfolios, the percentages are 57.93% and 22.76%, respectively. Considering that almost 85% of new A share classes are introduced by single-share-class portfolios, A share classes, if not introduced as the initial share class of a portfolio, are most likely to be considered first by an institutional fund trying to expand to the retail market or by a back-end load fund adding more distribution channels.

No-load share classes are almost never added as new share classes to existing portfolios. Fund families do not introduce no-load share classes to existing portfolios with load share classes, for fear that they may upset the existing distribution channels by making the portfolio also available to investors free of charge. The five no-load new share classes in existing portfolios are all introduced in portfolios with only institutional share classes.

New institutional share classes are most likely to be added by load portfolios to expand to the institutional market. Portfolios with A, B, and C share classes account for 63.50%, 30.42%, and 18.25%, respectively, of portfolios that added new institutional share classes, while 28.14% of these portfolios have both A and B share classes. New institutional share classes may also be added by no-load funds; however, this only accounts for less than 15% of new institutional share classes.

Among the 953 new share classes, 295 are added to the portfolio together with other share classes. About 70% of them are added in pairs, while the remaining 30% are added in trios. Single-share-class portfolios introduce around 85% of the pairs. Pairs of B and C share classes and pairs of B and institutional share classes, both started by front-end load funds, account for about 35% and 25% of all pairs, respectively. The third largest category, around 15% of all pairs, is pairs of A and B share classes started by institutional funds. All trios are introduced by single-share class portfolios. More than half of the trios are trios of A, B, and C share classes introduced by institutional funds, while around 25% of them are trios of B, C, and institutional share classes started by a front-end load fund.

CONCLUSION

This chapter examines the entry decisions by mutual fund families. Due to the multiple-share-class structure of mutual funds, the entry decisions include two separate decisions: the introduction of new portfolios and the introduction of new share classes for existing portfolios.

I find that the distributions across different share classes are very different for the initial share classes of new portfolios and new share classes in existing portfolios, except for the institutional share class. Share class compositions are also quite different for new single-share-class portfolios and new multiple-share-class portfolios. Although some determinants are shared in the decisions to introduce new single-share-class and multiple-share-class portfolios, such as economies of scale effect, tax effect, and objective introduction record, significant differences also exist. Fund families starting multiple-share-class portfolios appear to follow a very risky introduction strategy. They chase recent inflows, bet against market trend, and tend to add more portfolios in the same investment objective in consecutive quarters. Fund families tend to introduce both new multiple-share-class portfolios and new share classes in existing portfolios in investment objectives with poor returns, resorting to the assistance of brokers and financial advisors to attract new investments in a down market.

The two decisions to introduce new portfolios and new share classes in existing portfolios are also largely based on different considerations. New share classes in existing portfolios are primarily the results of the expansion of traditional front-end load funds and institutional funds. No-load funds rarely introduce new load share classes and no-load share classes are never observed to be added to load funds. In addition, I find that new share classes are mostly introduced in star portfolios with good performance, more assets, high expense ratio, longer history, and a smaller number of share classes.

The results of this research can benefit not only academicians, but also mutual fund advisors, investors, and regulators. This research aids in understanding the industrial organization of the mutual fund industry and explaining the reasons for its rapid growth. Fund advisors can better understand and learn from the entry decision process of other fund families to improve their own strategies in both product line and distribution channel expansions accordingly. Investors can use the entry behaviors of a fund family to infer the current status of the family. In the same way, fund advisors can learn about their competitors. The SEC can learn the characteristics of the fund families and funds that introduce multiple share classes, and evaluate the effect of its Rule 18f-3, which makes it easier for mutual funds to issue multiple share classes.

APPENDIX A. VARIABLE CONSTRUCTION

Four levels of variables are created, spanning family and portfolio characteristics, as well as differences among investment objectives. *Objective-level* variables relate to specific investment objectives, e.g., Growth or Small Company, and include the general performance, size, inflow, capital gains overhang, and records of introduction and termination in an objective. The general situation of the fund family, such as its performance, size, inflow, age, expense ratio, capital gains overhang, and records of introduction and termination, constitute *family-level* variables. *Family-objective-level* variables describe the distribution among different objectives within a family, such as shares of assets in different objectives in a family, and whether the family has many or only a few portfolios in a certain objective. *Portfolio-level* variables include attributes of portfolios, such as performance, size, inflow, age, expense ratio, capital gains overhang, and records of introduction and termination of share classes.

Objective-level Variables

At the objective level, variables are constructed for objective performance, objective size, objective inflow, objective capital gains overhang, number of portfolios in the objective, number of new portfolios in the objective, and number of terminated portfolios in the objective.

Quarterly objective performance is calculated by taking an asset-weighted average of the raw quarterly returns of all the portfolios in the objective. Objective size is the total assets of all of the portfolios in the objective. Since inflow is not available directly from the data, I define $Inflow_{it}$ as the net money inflow added to share class i in quarter t in excess of the capital gains due to performance,

$$Inflow_{it} = Asset_{it} - (1+r_{it})\, Asset_{it-1} - Masset_{it} \qquad (A.1)$$

where $Asset_{it}$ is the total assets of share class i at the end of quarter t, r_{it} is the raw return of share class i in quarter t, and $Masset_{it}$ is the assets added to share class i in quarter t due to acquiring other mutual funds. Quarterly objective inflow is calculated by adding the inflows of all share classes in the objective. I calculate quarterly relative objective inflow by dividing quarterly objective inflow by objective size at the end of the previous quarter.

I use measures based on Barclay, Pearson, and Weisbach (1998) to compute unrealized capital gains and overhang. For share class i in quarter t,

$$\text{Unrealized Capital Gains}_{it} = \text{Unrealized Capital Gains}_{it-1} + (NAV_{it} - NAV_{it-1})*Shares_{it-1} + (Shares_{it} - Shares_{it-1})*(NAV_{it} - (NAV_{it} + NAV_{it-1})/2) \qquad (A.2)$$

$$Overhang_{it} = \text{Unrealized Capital Gains}_{it} / Asset_{it} \qquad (A.3)$$

Objective overhang is calculated by dividing the sum of unrealized capital gains of all the share classes in an objective by the objective size, which describes the fraction of the total assets of an objective consisting of unrealized capital gains.

For each quarter t, I count the number of all surviving portfolios in the objective, the number of new portfolios in the objective, and the number of terminated portfolios in the objective. When I count the number of new portfolios in the objective, I ignore new share classes of existing portfolios. When I count the number of terminated portfolios in the objective, a portfolio is considered terminated if and only if all of the share classes of the portfolio are terminated.[6]

To test the effects of these variables in a longer horizon, flow variables are also computed on an annual basis. I calculate annual objective performance for each quarter by taking the compounded return of the quarterly objective returns in the last four quarters. Annual objective inflow is obtained for each quarter by adding up the quarterly objective inflows in

10. While a family can, in principle, terminate only some of the share classes in a portfolio in isolation, such an event is not very common in practice.

the last four quarters, and annual relative objective inflow is calculated by dividing annual objective inflow by objective size at the end of the t-4_{th} quarter. For the number of new portfolios in the objective, and the number of terminated portfolios in the objective in the past year, I sum the quarterly numbers in the previous four quarters. Objective size, overhang, and number of surviving portfolios are stock variables rather than flow variables, obviating the need for annual values.

Family-level Variables

At the family level, I examine family performance, family size, family inflow, family overhang, family age, family expense ratio, number of surviving portfolios in the family, number of new portfolios in the family, and number of terminated portfolios in the family.

Excess return for each portfolio in a family is obtained by subtracting the quarterly objective return from the raw return of each portfolio in the family. This measure is equivalent to the objective-adjusted return measure used in Khorana (2001), and is adopted because it measures a portfolio's performance against other portfolios with the same investment objective and tends to have the most effect on the decisions of fund families and investors among different performance measures. Quarterly family performance is calculated by taking the asset-weighted average of the excess returns of all portfolios in the family. Family size is the total assets of all portfolios in the family. Quarterly family inflow is calculated by adding the inflows of all portfolios in the family. I calculate quarterly relative family inflow by dividing quarterly family inflow by family size at the end of the previous quarter. Family overhang is calculated by dividing the sum of unrealized capital gains of all portfolios in a family by the family size, which describes the fraction of the total assets of a family consisting of unrealized capital gains. For family age, I use the age of the first portfolio in the family. Family expense ratio is calculated as the asset-weighted average of the expense ratios of all share classes in the family.

For each quarter, I count the number of all surviving portfolios in the family, the number of new portfolios in the family, and the number of terminated portfolios in the family. When I count the number of new portfolios in the family, I ignore new share classes of existing portfolios. When I count the number of terminated portfolios in the family, a portfolio is considered terminated if and only if all share classes of the portfolio are terminated.

Annual values for family performance, inflow, relative inflow, number of new portfolios, and number of terminated portfolios are computed in the same fashion as for the objective level variables. Family size, overhang, age, expense ratio, and number of surviving portfolios are stock variables rather than flow variables, obviating the need for annual values.

Family-objective-level Variables

I define family-objective asset share as the percentage of a family's total assets in an objective in the total assets of the entire family. Quarterly family-objective inflow is calculated by adding the inflows of all portfolios in an objective in the family. I calculate quarterly relative family-objective inflow by dividing quarterly family-objective inflow by family-objective size (total assets in an objective in a family) at the end of the previous quarter. Family-objective overhang is calculated by dividing the sum of unrealized capital gains of all portfolios in an objective in a family by the family-objective size. For each quarter, I count the number of all surviving portfolios, number of new portfolios, and number of terminated portfolios in an objective in the family. When I count the number of new portfolios, I ignore new share classes of existing portfolios. When I count the number of terminated portfolios, a portfolio is considered terminated if and only if all share classes of the portfolio are terminated. For all variables mentioned above, if a family does not have any portfolio in an objective yet, I set the value of the corresponding family-objective variable to zero.

It is inappropriate to set values of family-objective performance, age, and expense ratio to zero if the family does not have a portfolio in the objective. Also, since it is common that a family does not have portfolios in all five objectives, if I set these values to missing values, I lose 80% of the observations. Therefore, I do not compute family-objective level values for these three variables.

Annual values for family-objective inflow, relative inflow, number of new portfolios, and number of terminated portfolios are computed in the same fashion as for the objective level variables. Family-objective asset share, overhang, and number of surviving portfolios are stock variables rather than flow variables, obviating the need for annual values.

Portfolio-level Variables

At the portfolio level, the variables are portfolio performance, portfolio size, portfolio inflow, portfolio overhang, portfolio age, portfolio expense ratio, number of surviving share classes in the portfolio, number of new share classes in the portfolio, and number of terminated share classes in the portfolio. These variables are created in the same fashion as the family-level variables.

APPENDIX B. FIXED-EFFECTS LOGIT MODEL

Let i = 1, 2, …, n denote each fund family, j = 1, 2, 3, 4, 5 denote each investment objective, and t = 1, 2, …, T denote each time period. It is assumed that a family introduces a new portfolio if the benefits outweigh the costs of doing so. The latent variable, y^*_{ijt}, indexes the benefit of introduction relative to cost, but is unobservable. Let y_{ijt} denote the observable dependent variable,

$$y_{ijt} = 1 \text{ if } y^*_{ijt} > 0 = 0 \text{ otherwise} \tag{B.1}$$

where 1 stands for fund family i opening at least one portfolio in objective j in period t, and 0 stands for no opening. The latent variable underlying the choice is assumed to be a linear index function of the corresponding family level, objective level, and family-objective level variables,

$$y^*_{ijt} = \alpha_i + w_{it-1}\delta + z_{jt-1}\gamma + v_{ijt-1}\varphi + u_{ijt} \tag{B.2}$$

where α_i is the unobservable family-specific fixed effect for the i_{th} family; $\alpha_i + u_{ijt}$ is the error term, with u_{ijt} as an idiosyncratic error; w_{it-1} is a row vector of the family level variables, z_{jt-1} is a row vector of the objective level variables, while v_{ijt-1} is a row vector of the family-objective level variables ; δ, γ, and φ are three column vectors of coefficients to be estimated. The error terms across observations within the same family are not independent relative to one another, since they share the same α_i.

Instead of the two dimensions in a standard fixed-effects logit model, there are three dimensions: i, j, and t. I combine the j and t dimensions into one dimension, k, which stands for each objective at a certain period, so that standard fixed-effects logit model techniques can be applied.[7] The modified model works as follows. Let i = 1,2 ... n denote each fund family and k = 1, 2 ... K_i denote the observations for the i_{th} family. Let y_{ik} be the observable dependent variable,

$$y_{ik} = 1 \text{ if } y^*_{ik} > 0$$
$$= 0 \text{ otherwise} \qquad \text{(B.3)}$$

where 1 stands for opening new portfolios in an objective at a certain period, and 0 stands for no opening, and

$$y^*_{ik} = \alpha_i + x_{ik}\beta + u_{ik} \qquad \text{(B.4)}$$

where y^*_{ik} is the latent variable; α_i is still the unobservable family-specific fixed effect for the i_{th} family; $\alpha_i + u_{ik}$ is the error term; x_{ik} is a row vector of all the variables, a combination of w_{it-1}, z_{jt-1} and v_{ijt-1}, and β is a column vector of all the coefficients to be estimated.

The nonlinearity of the decision model means that the family unobservables cannot be removed by taking deviations from unit means as in a linear fixed-effects model. I use Chamberlain's (1980) conditional probability to facilitate a solution:

$$\text{Prob}\left(y_i \,\middle|\, \sum_{k=1}^{Ki} y_{ik} = k_{1i}\right) = \frac{\exp\left(\sum_{k=1}^{Ki} y_{ik}(\alpha_i + x_{ik}\beta)\right)}{\sum_{y_i \in S_i} \exp\left(\sum_{k=1}^{Ki} d_{ik}(\alpha_i + x_{ik}\beta)\right)} = \frac{\exp\left(\sum_{k=1}^{Ki} y_{ik} x_{ik}\beta\right)}{\sum_{y_i \in S_i} \exp\left(\sum_{k=1}^{Ki} d_{ik} x_{ik}\beta\right)} \qquad \text{(B.5)}$$

where vector $y_i = (y_{i1}, \ldots, y_{iK_i})$ is the opening and no opening outcomes for the i_{th} family as a whole.[8] I let $k_{1i} = \sum_{k=1}^{Ki} y_{ik}$ denote the observed number of openings in the i_{th} family, and $k_{2i} = K_i - k_{1i}$ denote the observed number of observations without opening in the i_{th} family.[9] S_i is

11. For instance, if a family needs to decide whether to start new portfolios in each of the five objectives in 10 periods, then there will be 50 observations for the family, with each observation standing for the decision by the family for each objective at a certain period.

12. For instance, $y_i = (1, 0, 1)$ records openings for the 1st and 3rd observations in the i_{th} family.

13. In the example, $k_{1i} = 1 + 0 + 1 = 2$, $k_{2i} = 3 - 2 = 1$.

the set of all possible y_i 's which give the same k_{1i} and k_{2i}.[10] The d_{ik}'s, the elements of all possible y_i 's, are equal to 0 or 1 with $\sum_{k=1}^{Ki} d_{ik} = k_{1i}$. Based on equation (B5), the estimates of β are obtained by maximizing the following log-likelihood function:

$$\ln L = \sum_{i=1}^{n}\left[\sum_{k=1}^{Ki} y_{ik}\mathbf{x}_{ik}\beta - \ln\left(\sum_{\mathbf{y_i}\in S_i}\exp\left(\sum_{k=1}^{Ki} d_{ik}\mathbf{x}_{ik}\beta\right)\right)\right] \tag{B.6}$$

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[14] Continuing the example, $k_{1i} = 2$, $k_{2i} = 1$, so besides $\mathbf{y_i} = (1, 0, 1)$, S_i also includes $\mathbf{y_i} = (1, 1, 0)$ and $\mathbf{y_i} = (0, 1, 1)$.

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