Exit Decisions in the U.S. Mutual Fund Industry*

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Abstract

This paper first examines the similarities and differences in the determinants of the three mutual fund exit forms: liquidation, within-family merger, and across-family merger. All defunct mutual fund portfolios are shown to have smaller size and lower inflows. A family is less willing to liquidate a portfolio but more likely to merge a portfolio within the family if it offers more share classes. Large families are more likely to merge portfolios within the family, while a family with poor performance is more likely to sell relatively unique portfolios to other families to stay focused. This paper also investigates the effect of the share class composition of a portfolio on the likelihood of different exit forms and compares within-objective mergers with across-objective mergers.

JEL classification: G23

I. Introduction

While the mutual fund industry has grown tremendously in the last decade, a considerable number of funds have exited over the same period. The purpose of this paper is to study what determines the decision to terminate funds by fund families. By examining the determinants of fund exits, this research aids in understanding the decision-making process of fund families while helping shareholders, regulators, and researchers better monitor mutual funds and predict their exit probabilities under various conditions.

Despite the importance of exit decisions to the mutual fund industry, Jayaraman, Khorana, and Nelling (2002) is the only published study dedicated exclusively to the topic. The authors examine the determinants of mutual fund mergers and their subsequent wealth impact on shareholders of target and acquiring funds. Other research on the fund exit process is largely scattered in the survivorship bias literature. For example, it is widely claimed that poor performance increases the exit probability of a fund and that funds are more likely to exit when overall market performance is poor (see Brown and Goetzmann 1995; Elton, Gruber, and Blake 1996; Hendricks, Patel, and Zeckhauser 1997; Lunde, Timmermann, and Blake 1999). Fund size, in terms of a fund's total assets, may be a determinant of survival as well (see Brown and Goetzmann 1995; Elton, Gruber, and Blake 1996; Jayaraman, Khorana, and Nelling 2002).

This paper differs from the existing literature on fund exits due to its treatment of exit decisions as decisions made by fund families, similar to the approach taken by Khorana and Servaes (1999) in their study of fund starts. In the existing literature, each fund is treated as an independent identity, and a fund's exit decision is assumed to be its own, dependent only upon its own attributes. In reality, most mutual funds belong to a certain fund family, and it is the fund family, rather than the fund itself, that decides whether a fund should exit. This paper treats exit decisions also as a function of the characteristics of fund families and investment objectives, rather than as solely dependent on those of individual funds.

As in Wermers (2000) and Nanda, Wang, and Zheng (2002), this paper adjusts for multiple share classes of the same fund to avoid possible double counting of fund exits. Although many funds are listed as separate funds, they are actually different *share classes* of the same *portfolio* in a fund family.[1] Therefore, this paper focuses on the exit of a portfolio rather than an individual share class. A portfolio is considered to have exited if and only if all share classes of the portfolio are terminated.[2]

Because alternative exit forms may be based on different considerations by fund families, this study also examines alternative family decisions with respect to the method of portfolio termination. Exits may take the form of a liquidation or a merger with another portfolio either within the same fund family ("within-family merger") or in other families ("across-family merger"). Among the 7,500 portfolios recorded in this study, 828 liquidations, 757 within-family mergers, and 451 across-family mergers are identified. In contrast, previous research focuses on the merger decision alone. Elton, Gruber and Blake (1996) describe the characteristics of funds that merge into partner funds, however, the authors only study the merger form of exit. Jayaraman, Khorana, and Nelling (2002) find that the likelihood of a fund merger is inversely related to fund size for both within- and across-family mergers, and that poor past performance is a significant determinant for only within-family mergers. However, when deciding to terminate a portfolio, a fund family also has the option of liquidation in addition to mergers. Thus, an examination of the liquidation form of exit is essential to arrive at a comprehensive analysis of exit decisions. By providing a joint study of the full spectrum of exit forms, this paper fills a void in the current literature and sheds new light on the fund exit decision process.

This paper finds that portfolio size plays a central role in each of the three mutual fund exit forms: liquidation, within-family merger, and across-family merger. Given the asset-based compensation scheme for mutual fund advisors, portfolios with smaller sizes and lower inflows are more likely to exit. Among them, only portfolios with the smallest sizes are liquidated.

A family is more willing to liquidate a portfolio with fewer share classes. However, to keep the valuable client sources and distribution channels that are linked to multiple share classes, a family is more likely to merge a portfolio within the family if the portfolio offers a greater number of share classes. A family also tends to liquidate a relatively unique portfolio or sell it to other families to stay focused. By doing so, the family eliminates all of the associated special research and marketing costs.

Large families are more likely to merge portfolios within the family because they have the most to gain from the improvement in family image by losing a portfolio with a poor record. In addition, large families are more likely to find an acquiring portfolio for within-family mergers.

Both within-family mergers and across-family mergers are more likely to occur in smaller investment objectives, in which consolidation can more easily lead to a larger market share. Portfolio age affects the three exit forms in different ways. Liquidation occurs to much younger portfolios, while portfolios merged within a family have considerably longer histories. In contrast, portfolio age does not appear to affect across-family mergers. A family with poor performance is more likely to sell relatively unique portfolios to other families to stay focused.

Among multiple-share-class portfolios, if a share class with high back-end loads accounts for a substantial portion of a portfolio's total assets, the capability of the share class to preserve its assets makes the fund family less likely to sell such a portfolio to other families but more likely to keep it in the family through within-family mergers.

Even if the acquiring portfolio and target portfolio do not share the same investment objective, across-objective mergers still occur predominantly between similar investment objectives. This paper further investigates the possible differences between portfolios involved in within-objective mergers and across-objective mergers. For instance, considering the extra effort needed to implement an across-objective merger, the fund family is reluctant to use across-objective merger to keep a portfolio in the family if the portfolio experiences poor performance or high costs. Instead, portfolios with longer histories and more distribution channels are more likely to become candidates for within-family across-objective mergers.

The remainder of the paper is organized as follows. Section II discusses the hypotheses. Section III outlines the data and provides summary statistics. Section IV investigates the determinants of the three fund exit forms. Section V concludes.

II. Hypotheses

Mutual fund exits may take the form of a liquidation, a merger with another portfolio within the same fund family ("within-family merger"), or a merger with a portfolio in other families ("across-family merger"). On one hand, no matter which of the three exit forms a portfolio takes, the portfolio ceases to exist. The hypothesis follows, then, that all three exit forms must share some common determinants. In addition, each pair out of the three exit forms may share some common features only for the pair. Both liquidations and within-family mergers involve only the decision of the family of the target portfolio, while across-family mergers also need the approval of the family of the acquiring portfolio. Assets of portfolios liquidated or acquired by other families are eliminated from the family, while within-family mergers still preserve the assets. Both within-family mergers and across-family mergers lead to consolidation in the fund industry, while liquidation might not serve this purpose. On the other hand, reasons must exist why the defunct portfolios take different exit forms. Motives for fund exits for all or some of the three exit forms are examined in detail in the remainder of this section. In essence, the exit of a mutual fund portfolio is no different from the exit of a firm or plant in the industrial organization literature, from which I derive some of my hypotheses. The mutual fund industry also has its own characteristics, though, which lead to hypotheses specific to this industry. It should be noted that a number of hypotheses regarding within-family and across-family mergers, such as the effects of portfolio size, inflows, performance, and expense ratios, are drawn directly from Jayaraman, Khorana, and Nelling (2002). To help illustrate the hypotheses, Table 1 summarizes the hypothesized signs of the potential determinants for each exit form.

A. Common Determinants for All Three Exit Forms

The industrial organization literature states that smaller firms are more likely to exit (see Lieberman 1989; Deily 1991; Frank 1988). This finding is particularly true in the mutual fund industry. Mutual fund advisors are compensated by charging shareholders annual fees, including a management fee, an administrative fee, and possibly a 12b-1 fee (a distribution fee). All of these fees are expressed as a percentage of a mutual fund's total assets, and they sum up to an expense ratio. Given this asset-based compensation scheme, the fund advisor's revenue should be positively linearly related to the total assets under management. In addition, a portfolio that is too small fails to achieve economies of scale, as documented in Indro et al. (1999) and Perold and Salomon (1991). Therefore, if a portfolio is small in size or generates low inflows that might lead to a small size, the fund family is more likely to terminate the portfolio to avoid net losses. This is also consistent with the findings that firms with lower profitability have a higher probability of exit (see Doi 1999; Siegfried and Evans 1994; Deily 1988; Reynolds 1988). Furthermore, fund families experiencing low inflows should be more likely to eliminate such portfolios to stay focused.

The industrial organization literature suggests that the lack of industry growth tends to lead to more firm exits (see Ilmakunnas and Topi 1999; Doi 1999). In the context of mutual funds, the investment objective of a portfolio best stands for an industry. Therefore, I hypothesize mutual fund exits are more likely to occur in investment objectives with poor inflows or poor returns, since they contribute to slow growth in the investment objective.

B. Common Determinants for Liquidation and Within-Family Merger

Both liquidations and within-family mergers involve only the decision of the family of the target portfolio, while across-family mergers also need the approval of the acquiring family. Therefore, I hypothesize that portfolios liquidated or merged within a family might have other negative characteristics not shared by portfolios acquired by other families.

Portfolios with poor performance are very likely to be liquidated or merged within the family. From the shareholders' point of view, portfolios with poor performance do not serve their interests and should be terminated. On the other hand, because the family no longer has to report the poor track records of portfolios liquidated or merged out of existence, a fund family may terminate a portfolio with poor performance to improve the image of the entire family. However, poor performance does not make a portfolio a good candidate for acquisition by other families. In the same fashion, a portfolio that exhibits inefficiencies in management, which might be manifested in higher expense ratios, is more likely to be liquidated or merged within a family, while other families might not be interested in acquiring such a portfolio.

In the industrial organization literature, independent establishments are shown to have a lower likelihood of exit than those establishments belonging to a multi-plant firm (see Audretsch 1994; Reynolds 1988). For mutual funds, this finding implies that large families might be more likely to liquidate portfolios or merge portfolios within the family. With a greater number of portfolios in the family, liquidation has less of a negative effect on the options offered to investors or the management fees collected by fund advisors. Large families also have the most to gain if liquidation improves the overall family image. The same reasoning also applies to within-family mergers. In addition, a large family is more likely to find an acquiring portfolio for within-family mergers. In contrast, small families might be more likely to be involved in across-family mergers since there are fewer suitable acquiring portfolios within the family.

C. Common Determinants for Liquidation and Across-Family Merger

Assets of portfolios liquidated or acquired by other families are eliminated from the family, while within-family mergers still preserve the assets. A portfolio may offer more than one share class to attract different investors, and such portfolios are often offered through different brokers. As a result, a portfolio with more share classes has the ability to support alternative clienteles. I hypothesize that a family is more willing to liquidate a portfolio or sell it to other families if the portfolio has fewer share classes. Likewise, the family is more likely to merge a portfolio within the family if the portfolio offers more share classes, because the family does not want to lose the valuable client sources and distribution channels.

The uniqueness of a portfolio relative to other portfolios in the family could also affect the likelihood that it will be terminated. A truly unique portfolio offers a differentiated set of assets and trading strategies and therefore caters to the need of a special clientele. As a result, the family will have the incentive to keep such a portfolio. However, a truly unique portfolio also comes with a price, since it entails separate research and marketing efforts. Therefore, to achieve economies of scale and to remain focused, the family might choose to liquidate a unique portfolio or sell it to other families, which eliminates all of the associated special research and marketing costs. This reasoning does not apply to within-family mergers, though, since the assets will still be kept in the family.

D. Common Determinants for Within-Family Merger and Across-Family Merger

Both within-family mergers and across-family mergers lead to consolidation in the industry. I hypothesize that these mergers are more likely to occur in investment objectives with fewer portfolios because consolidation can more easily lead to larger market share in smaller investment objectives.

E. Determinants with Different Effects on the Three Exit Forms

This paper also intends to examine whether older portfolios or younger portfolios are more likely to exit. The industrial organization literature documents that the process of firm exit tends to conform either to the model of the revolving door, where the bulk of exiting businesses are new entrants, or to the metaphor of the forest, where incumbent establishments tend to be displaced by new entrants (see Audretsch 1995). These findings indicate that portfolio age could have different effects on the three exit forms. Morningstar ratings are only available for funds with a minimum of three years of history. Therefore, a family might liquidate a portfolio that does not meet expectations at its early stage to avoid poor Morningstar ratings. Because it takes time to develop clients and distribution channels, portfolios with longer histories are more likely to be merged within the family. Portfolio age does not appear to have a significant effect on across-family mergers.

When the rest of the family has superior performance, the family should be less hesitant to liquidate a portfolio with poor performance and small size, because the gains from an unblemished track record for the family easily outweigh the negligible loss of management fees from the liquidated portfolio. On the other hand, families with poor performance should be more likely to sell portfolios to other families to stay focused by eliminating the separate research and marketing costs associated with these relatively unique portfolios.

III. Data and Summary Statistics

A. Data

A data set of quarterly data from the first quarter of 1992 to the third quarter of 2001 of 15,853 open-end mutual funds is created using the CRSP Survivor-Bias Free US Mutual Fund Database. The data set covers all equity funds, bond funds, and hybrid funds. All funds are categorized in 19 investment objectives based on the Investment Company Data, Inc. (ICDI)'s Fund Objective Code, which indicates the fund's investment strategy as identified by Standard & Poor's Fund Services.[3] The data include: fund name, fund family (management company), inception date, fund age (months), quarterly return, NAV (net asset value), expense ratio, turnover ratio, fund loads (front-end load, back-end load, and 12b-1 fee), and total assets. For funds that exited during the ten years, the data set has information on when they exited, their history until exits, whether they were liquidated or merged with other funds, and the identity of the acquiring funds in the latter case.

Many funds are simply different share classes of the same portfolio. Using fund name, NAV, return, and turnover ratio, I identify the portfolio for each fund. The 15,853 funds belong to 7,500 portfolios, as depicted in Panel A of Table 2. These portfolios are almost evenly split between having only one share class and having more than one share class. These 7,500 portfolios belong to 615 families, tabulated in Panel B of Table 2. While 126 families have just one portfolio, the remaining 489 families have at least two portfolios.

Over the ten-year sample, 3,640 funds exit. Among them, 1,286 funds are the sole share class in the portfolio. In addition, 2,022 funds belong to 750 multiple-share-class portfolios and exit with all other share classes of their portfolios at the same time. They are treated as exits of 750 portfolios. The remaining 332 funds are terminated while there are still surviving share classes in their portfolios, while 212 of them are merged with these surviving share classes. Altogether, the exits of 2,036 portfolios out of 343 families are recorded.

Table 3 reports the number of defunct portfolios by year and investment objective. A greater number of exits are recorded over the last four years of the sample. A total of 1,146 portfolios exit in 1998, 1999, 2000, and 2001, accounting for 56.3 percent of all exits. Equity portfolios and bond portfolios are almost equally represented, each with 47.1 percent (960 portfolios) and 45.4 percent (924 portfolios) of the total sample, respectively. The remaining 7.5 percent of the defunct portfolios (152 portfolios) consist of balanced and total return portfolios. Long-Term Growth, Single State Municipal Bond, International Equity, and Government Security are the top four investment objectives with the most defunct portfolios, each with 11.5 percent (234 portfolios), 10.8 percent (220 portfolios), 10.5 percent (213 portfolios), and 9.8 percent (199 portfolios) of all defunct portfolios, respectively.

There are three distinct avenues by which a share class of a defunct portfolio may exit. A share class may be liquidated or merged with a share class in another portfolio either within the same fund family ("within-family merger") or in other families ("across-family merger"). For 741 out of the 750 portfolios that exit with multiple share classes, the share classes in the same portfolio all take the same exit form, which is also (trivially) identified as the exit form of the portfolio. As for the nine portfolios involving different exit forms for different share classes, except for one using both within-family merger and across-family merger, the remaining eight are equally split between combining liquidation with either within-family merger or across-family merger. The exit forms for these portfolios are identified as the form that represents the majority of the portfolio total assets. As a result, among the 2,036 defunct portfolios, I record 828 liquidations, 757 within-family mergers, and 451 across-family mergers.

B. Summary Statistics

Table 4 presents the medians of portfolio performance and other portfolio characteristics for surviving portfolios, liquidated portfolios, portfolios merged within a family, and portfolios merged across families. Panel A reports various measures of portfolio performance. *Quarterly (annual) objective-adjusted performance* is the quarterly (annual) portfolio holding period return in excess of the asset-weighted average return for all portfolios with the same investment objective, as used in Khorana (2001) and Jayaraman, Khorana, and Nelling (2002). Single-factor alpha and multiple-factor alpha are estimated using different models for equity portfolios and bond portfolios. The models used are explained as follows:

I employ both the single-factor Capital Asset Pricing Model (CAPM) and the Carhart four-factor model (see Carhart 1997), which is based on the Fama and French (1993) three-factor model, to evaluate an equity portfolio's performance.

$$R_{it} = \alpha_i + \beta_{i1} RMRF_t + \varepsilon_{it} \tag{1}$$

$$R_{it} = \alpha_i + \beta_{i1} RMRF_t + \beta_{i2} SMB_t + \beta_{i3} HML_t + \beta_{i4} UMD_t + \varepsilon_{it} \tag{2}$$

where R_{it} is the portfolio return in excess of the quarterly T-bill return; *RMRF* is the value-weighted return on all NYSE, AMEX, and NASDAQ stocks in excess of the quarterly T-bill return; *SMB* (Small Minus Big) is the difference in returns across small and big equity portfolios; *HML* (High Minus Low) is the difference in returns between high and low book-to-market equity portfolios; *UMD* (Up Minus Down) is the difference in returns between equity portfolios with high and low prior returns. *SMB*, *HML*, and *UMD* are incorporated to control for size, value, and momentum effects, respectively.[4]

For bond portfolios, I employ the single-factor and four-factor models used by Jayaraman, Khorana, and Nelling (2002) to compute the risk-adjusted excess return for each portfolio. As noted by Jayaraman, Khorana, and Nelling (2002), these model specifications are consistent with those in Blake, Elton, and Gruber (1993):

$$R_{it} = \alpha_i + \beta_{i1} GOVCREDIT_t + \varepsilon_{it} \quad (3)$$

$$R_{it} = \alpha_i + \beta_{i1} GOVCREDIT_t + \beta_{i2} MBS_t + \beta_{i3} LONGGOVT_t + \beta_{i4} INTGOVT_t + \varepsilon_{it} \quad (4)$$

where R_{it} is the portfolio return in excess of the quarterly T-bill return; *GOVCREDIT* is the excess return on the Lehman Brothers Government/Credit Bond Index and is a weighted market average of government and investment grade corporate issues that have more than one year until maturity; *MBS* is the excess return on the Lehman Brothers Mortgage-Backed Securities Index; *LONGGOVT* is the excess return on the Lehman Brothers Long-Term Government Bond Index; and *INTGOVT* is the excess return on the Lehman Brothers Intermediate-Term Government Bond Index.[5]

All performance measures provide the same qualitative results. Liquidated portfolios and portfolios merged within a family exhibit inferior performance to surviving portfolios. Median annual objective-adjusted performance (multiple-factor alpha) is -0.34 (-0.21) percent, -3.04 (-0.49) percent and -1.63 (-0.42) percent for surviving portfolios, liquidated portfolios, and portfolios merged within a family, respectively. Portfolios acquired by other families also underperform surviving portfolios, but the gap is not as striking as those of the other two exit forms.

Panel B of Table 4 presents the medians of other portfolio characteristics. Among them, *portfolio size* is the total assets in the portfolio; *portfolio age* is the age of the initial share class of the portfolio; *portfolio expense ratio* is the objective-adjusted expense ratio for each portfolio; and *portfolio number of share classes* is the number of surviving share classes in the portfolio.

Since *portfolio inflow* is not available directly from the data, I compute *portfolio inflow* as the asset growth rate net of portfolio holding period return:

$$Portfolio\ inflow_{i,t} = (Asset_{i,t} - (1+r_{i,t})\ Asset_{i,t-1})/\ Asset_{i,t-1} \quad (5)$$

where $Asset_{i,t}$ is the total assets of portfolio i at the end of time t, and $r_{i,t}$ is the holding period return of portfolio i during time t. Both quarterly and annual portfolio inflows are calculated.

All defunct portfolios are much smaller than surviving portfolios, especially liquidated ones. They all suffer from net outflows, losing more than 13 percent of their assets due to net redemptions in the four quarters before exits, while the assets of a median surviving portfolio increase slightly. Portfolios liquidated or merged within a family are also distinguished from surviving portfolios by their higher expense ratios. Compared to surviving portfolios, liquidated portfolios are much younger, portfolios merged within a family are slightly older, while portfolios acquired by other families are approximately of the same age. The median *portfolio number of share classes* is one for all categories.

C. The Uniqueness of a Portfolio

As noted earlier, a family might be inclined to keep a truly unique portfolio because it caters to the needs of a special clientele. However, the family might also liquidate a unique portfolio or sell it to other families to eliminate all of the associated separate research and marketing costs. The effect of the uniqueness of a portfolio in the family on its survival is unclear without an empirical investigation.

An empirical investigation starts with the measurement of the uniqueness of a portfolio. Mamaysky and Spiegel (2002) find that fund families first spread their funds across a variety of categories (investment objectives) when they try to spread out their offerings in strategy space.

This finding indicates that the investment objective of a portfolio provides the foremost information to determine how differentiated the portfolio is from other portfolios in the family. Portfolios with different investment objectives may invest in totally different asset classes. For instance, Long-Term Growth Funds primarily invest in equities, while Single State Municipal Bond Funds largely invest in bonds. Even if two portfolios with different investment objectives invest in the same asset class, e.g. fixed income securities, they may have a very different focus. For example, High Yield Bond Funds mainly invest in corporate bonds rated BB or lower, while Government Security Funds mostly invest in securities backed by the federal government. Therefore, if a portfolio is the only portfolio with a certain investment objective in a family, such a portfolio can be considered truly unique in the family.

Applying this measurement of uniqueness, I find very different results among the three exit forms. Among the 451 portfolios acquired by other families, 72.95 percent of them (329 portfolios) are the only portfolios with their corresponding investment objectives in their families. By selling these portfolios to other families, their families eliminate these investment objectives from their offerings. I find similar results for liquidated portfolios. Among the 828 liquidated portfolios, 41.06 percent of them (340 portfolios) are the only portfolios with their corresponding investment objectives in their families. The uniqueness of these portfolios and the associated extra research and marketing costs apparently lead to their termination. Within-family mergers appear to be different. Only 12.95 percent of the 757 portfolios (98 portfolios) are the only portfolios with their corresponding investment objectives in their families. Considering that the acquiring portfolios for 62.09 percent of the within-family mergers (470 portfolios) are portfolios with the same investment objective, this finding is not a surprise.

Even though most of the portfolios merged within a family are not as unique as the sole representatives of their investment objectives in their families, they may still be fairly unique within their investment objectives. Detailed data on portfolio characteristics would be helpful to create a direct measure; unfortunately, such data are not available in the CRSP database. As a result, I rely on the findings of Mamaysky and Spiegel (2002) to create a proxy for the uniqueness within investment objective. Mamaysky and Spiegel (2002) use a time varying beta series for a given fund as a proxy for its dynamic trading strategy, and show that funds introduced earlier in a family's life exhibit lower time varying beta correlations with other funds than do those funds that are introduced later. In other words, funds that are introduced earlier are more unique than funds that are introduced later. Therefore, I use a portfolio's "organization number," as defined by Mamaysky and Spiegel (2002) to be one if the portfolio is the first to be introduced by a family, two if it is the second portfolio, three if it is the third, etcetera, as a proxy for the uniqueness of a portfolio within its investment objective. A smaller organization number indicates a higher level of uniqueness. I find that 234 portfolios merged within a family are the first portfolios to be introduced in their investment objectives by their families, while 164 portfolios are the second. Combined together, these portfolios with higher levels of uniqueness account for 52.58 percent of all portfolios merged within a family.

In summary, unique portfolios with separate research and marketing costs are very likely to be sold to other families or liquidated. I do not find any evidence that unique portfolios are more likely to survive in within-family mergers.

IV. Determinants of Mutual Fund Exits

A. Multinomial Logit Model

The summary statistics in Section III suggest that portfolios liquidated, merged within a family, or merged across families have different characteristics. In addition, Jayaraman, Khorana, and Nelling (2002) find that certain factors can have different effects on within-family and across-family mergers. For instance, poor past performance is a significant determinant only for within-family mergers. As a result, to investigate the distinction among different exit forms, I estimate a four-choice multinomial logit model. For each portfolio in each quarter, the fund family selects among four choices: (1) keep the portfolio; (2) liquidate the portfolio; (3) merge the portfolio with another portfolio within the family; and (4) merge the portfolio with another portfolio in another family. Keeping the portfolio is used as the comparison group. By studying the dichotomies of the exit decisions, more light is shed on the exit decision process.

The exit decision is made according to the values of a set of family, objective, and portfolio attributes:

$$\Pr ob(Y=j)=\frac{\exp(\beta_j^{'}\mathbf{x_i})}{1+\sum_{k=1}^{4}\exp(\beta_k^{'}\mathbf{x_i})} \quad \text{for j = 1, 2, 3, and 4} \tag{6}$$

where j stands for each choice, and k takes the values from 1 to 4, which also stand for each choice.[6]

$$\beta_j^{'}x_i = \alpha_0 + \beta_1\textit{(family number of portfolios)}_{i,t-1} + \beta_2\textit{(family inflow)}_{i,t-1} + \beta_3\textit{(family inflow)}_{i,t-2} + \beta_4\textit{(family performance)}_{i,t-1} + \beta_5\textit{(family performance)}_{i,t-2} + \beta_6\textit{(objective number of portfolios)}_{i,t-1} + \beta_7\textit{(objective inflow)}_{i,t-1} + \beta_8\textit{(objective inflow)}_{i,t-2} + \beta_9\textit{(objective performance)}_{i,t-1} + \beta_{10}\textit{(objective performance)}_{i,t-2} + \beta_{11}\textit{(portfolio size)}_{i,t-1} + \beta_{12}\textit{(portfolio inflow)}_{i,t-1} + \beta_{13}\textit{(portfolio inflow)}_{i,t-2} + \beta_{14}\textit{(portfolio age)}_{i,t-1} + \beta_{15}\textit{(portfolio performance)}_{i,t-1} + \beta_{16}\textit{(portfolio performance)}_{i,t-2} + \beta_{17}\textit{(portfolio expense ratio)}_{i,t-1} + \beta_{18}\textit{(portfolio number of share classes)}_{i,t-1} + \varepsilon_{i,t} \tag{7}$$

where j, i, and t stand for each choice, portfolio, and quarter, respectively. *Portfolio size* is the natural log of the total assets in the portfolio and the other portfolio-level variables are as defined in Section III.[7]

To control for the lack of independence in the observations for the same fund family, I estimate a clustered multinomial logit model, with the cluster defined as the family. This method assumes independence across families but not within families. In addition, I include quarter dummies in all model specifications.

To correctly describe the characteristics in the *rest* of the fund family and to perform a clearer test of the importance of family-level factors, for each portfolio in each time period, I exclude values of the specific portfolio under consideration when I calculate family-level variables. As a result, *family number of portfolios* gives the total number of all other surviving portfolios in the family; *family performance* is the asset-weighted average of the objective-adjusted portfolio returns of all other portfolios in the family; and *family inflow* is the asset growth rate net of holding period return in the rest of the family. Objective-level variables are calculated in the same fashion. *Objective number of portfolios* gives the total number of all other surviving portfolios with the same investment objective; *objective performance* is the asset-weighted average of the portfolio holding period returns of all other portfolios with the same investment objective; and *objective inflow* is the asset growth rate net of holding period return for all other portfolios with the same investment objectives.

To test both the short-term and long-term effects of *performance* and *inflow* factors at all levels, I calculate both a quarterly value and an annual value for these variables. I calculate my annual values differently from the existing literature. Rather than grouping exits by year and just using annual values in the previous twelve months, I group exits by quarters and compute annual values by using quarterly values of the factors in the four quarters prior to the portfolio exit. I believe this method better reflects the long-term effects of the factors studied. I also include additional lagged values of *performance* and *inflow* variables in my estimation to test if they are important drivers of the exit decision.

I only use observations from families with more than one portfolio, because only these families have access to all of the four choices, including within-family mergers, which are possible only when the family has at least one other portfolio. In addition, only for such portfolios can I calculate nontrivial family-level variables. In addition to all of the 757 portfolios involved in within-family mergers, 775 out of 828 liquidated portfolios and 438 out of 451 portfolios acquired by other families are from families with more than one portfolio.

B. Estimation Results

Table 5 reports the results from the multinomial logit model, using quarterly values for *performance* and *inflow* variables.[8] To examine the robustness of the results, I estimated four models with different specifications. Model (i) only includes portfolio-level variables, while Model (ii) uses all family-level, objective-level, and portfolio-level variables. Model (iii) and Model (iv) are implemented without *objective performance* and *objective inflow*, respectively, due to their relatively high correlations (correlation between quarterly *objective performance* and *objective inflow* is 0.28). For each model specification, quarter dummies are also included (not reported).

To measure the economic significance of the results, for each explanatory variable, I obtain the percentage change in the probability of each exit form when the value of the variable is increased from its 25th percentile to its 75th percentile, while other explanatory variables are set equal to their means. For brevity, the percentage changes are only reported in brackets for Model (ii), while similar results are obtained for other models.

Across all model specifications, *portfolio size* and *inflow* have significant and negative effects on all three exit forms. An increase from the 25th percentile to the 75th percentile in portfolio size reduces the probability of liquidation, within-family merger, and across-family merger by 79 percent, 63 percent, and 51 percent, respectively. An increase from the 25th percentile to the 75th percentile in portfolio inflow in the previous quarter reduces the likelihood of all three exit forms by around 25 percent. These findings are consistent with the hypothesis that portfolios with smaller sizes and lower inflows, which lead to smaller sizes, are more likely to be terminated. Each of the model specifications also predicts the same order of likelihood. Portfolios with small sizes are most likely to be liquidated and least likely to survive. Portfolios merged within a family are also smaller than portfolios acquired by other families. Only portfolios with the smallest size are liquidated, presumably because fund families cannot recover the fixed costs needed to manage them, and it is unprofitable even for other portfolios to acquire them. This finding reveals the central role of portfolio size in exit decisions.

Even though the negative relations between *family inflow* and all three exit forms are statistically significant, varying the value of family inflow from the 25^{th} percentile to the 75^{th} percentile barely changes the likelihood of any of the three exit forms. Contrary to the hypothesis, *objective inflow* or *objective performance* shows little effect on any of the three exit forms across all model specifications. These results suggest that fund families pay little attention to prior family inflows or the growth in an investment objective when making exit decisions.

As predicted, portfolios liquidated or merged within a family have other negative characteristics not shared by portfolios acquired by other families. They both have poor performance and exhibit inefficiencies in management, as indicated by the statistically significant and negative estimates for portfolio performance variables (including lags) and statistically significant and positive estimates for portfolio expense ratios across all model specifications. However, the economic significance of these results only appears to be marginal, as shown by the small percentage changes when the values of these variables are varied. It should be noted that the findings regarding the statistical effects of portfolio size, performance, and expense ratios on within-family and across-family mergers reconfirm the results documented in Jayaraman, Khorana, and Nelling (2002).

Across all model specifications, the results also provide strong evidence of a significant and positive relation between within-family merger probability and the number of portfolios in a family. The probability of within-family merger is increased by almost 50 percent if the value of the number of portfolios in a family increases from the 25th percentile to the 75th. In addition, even though the hypothesized positive relation between liquidation probability and the number of portfolios in a family and negative relation between across-family merger probability and the number of portfolios in a family are not statistically significant, the results still exhibit some economic significance. These findings are consistent with the prediction that larger families are more likely to merge portfolios within the family. These families have the most to gain from the improvement in family image by losing a portfolio with poor record, and they are more likely to find an acquiring portfolio for within-family mergers.

I also find that a family is more willing to liquidate a portfolio if the portfolio has fewer share classes, but more likely to merge a portfolio within the family if the portfolio offers more share classes. The family does not want to lose the valuable client sources and distribution channels linked to multiple share classes. A negative but marginal relation is also found between the number of share classes and across-family merger probability.

The estimates for *objective number of portfolios* are significant and negative for both within-family mergers and across-family mergers, implying that portfolio mergers are more likely to occur in smaller investment objectives where consolidation can lead to larger market share more easily. In addition, I find that the likelihood of liquidation is also increased if an investment objective has fewer portfolios.

Portfolio age is shown to have different effects on the three exit forms. Varying *portfolio age* from the 75th percentile to the 25th percentile increases the liquidation probability by almost 30 percent, reduces within-family merger probability by seven percent, but does not appear to affect across-family mergers. Considering that 45 percent (373 out of 828) of liquidated portfolios are less than three years old, it seems that many families make “to be or not to be” decisions for new portfolios that have not yet reached expectations in their early stages to avoid poor Morningstar ratings, because Morningstar ratings are only available for funds with a minimum of three years of history.

As predicted, family performance affects across-family mergers and within-family mergers differently. It has a significantly negative effect on across-family mergers, and an insignificant effect on within-family mergers, indicating that a family with poor performance is more likely to sell relatively unique portfolios to other families to stay focused. However, contrary to the prediction, family performance does not appear to affect liquidations.

C. Exits of Portfolios with Multiple Share Classes

As noted earlier, out of the 2,036 defunct portfolios, 750 portfolios have multiple share classes. Among them, 192 portfolios are liquidated, 368 portfolios are merged with portfolios within the same family, while 190 portfolios are merged with portfolios in other families. Multiple-share-class portfolios account for 46.19 percent of portfolio mergers. Around 90 percent of the share classes that constitute these target multiple-share-class portfolios are merged with the same type of share class. For instance, 94.08 percent of share classes with a front-end load, often designated as class A, are merged with another class A; 93.09 percent of share classes with a high back-end load (at least 3 percent), often designated as class B, are merged with another class B. As a result, 95.16 percent of these multiple-share-class portfolios are merged with other multiple-share-class portfolios with at least the same number of share classes.

Among the 368 multiple-share-class portfolios involved in within-family mergers, 81.25 percent of them (299 portfolios) offer a class B, while only 53.16 percent of the 190 multiple-share-class portfolios (101 portfolios) involved in across-family mergers offer a class B. This sharp contrast suggests that the composition of share classes in a multiple-share-class portfolio, especially the presence of a class B, might affect the probability of the type of merger in which a portfolio is involved. The high back-end load charged by a class B could serve to reduce redemption from the share class. In addition, the back-end load can typically be phased out by one percent for each year money is left invested in the share class, and therefore, provides strong incentives for investors to refrain from redemption. As a result, if class B accounts for a substantial portion of a portfolio's total assets, the fund family should be less likely to sell the portfolio to other families, because such a portfolio has strong capability to preserve its assets. Instead, the fund family should have an incentive to keep such a portfolio in the family through within-family mergers.

To test this hypothesis, while controlling for the effects of other variables, I replace *portfolio number of share classes* in Equation (7) with *portion of class B*, which is calculated as the percentage of total assets in a portfolio accounted for by class B, and estimate the multinomial logit model reported in Section IV. A only using observations from multiple-share-class portfolios. For completeness, the liquidation choice is still included. The results are reported in Table 6. As in Table 5, I also estimate four models with different specifications. As predicted, a higher *portion of class B* significantly increases the likelihood of within-family merger while lowering the likelihood of across-family merger across all model specifications. An increase from the 25th percentile to the 75th percentile in *portion of class B* increases the probability of within-family merger by 45 percent while reduces the probability of across-family merger by 59 percent.

D. Within-Objective vs. Across-Objective Mergers

When a portfolio is merged with another portfolio, the acquiring portfolio may have the same investment objective as that of the target portfolio or a different investment objective. Consequently, mergers can also be categorized into "within-objective merger" and "across-objective merger". Among the 1,208 mergers, 794 are within-objective mergers while 414 are across-objective mergers. Across-objective mergers occur predominantly between similar investment objectives. For instance, as shown in Panel A of Table 7, which tabulates the top ten pairs of investment objectives between which across-objective mergers occur, 73 Single State Municipal Bond portfolios are merged with High Quality Municipal Bond portfolios, while 31 Long-Term Growth portfolios are merged with Growth and Income portfolios. Only 1.69 percent of across-objective mergers (7 portfolios) occur between an equity investment objective and a fixed-income investment objective.

Categorized by whether acquiring portfolios and target portfolios share the same fund family or investment objective, mergers can be classified into the following four categories: within-family within-objective merger, within-family across-objective merger, across-family within-objective merger, and across-family across-objective merger. Panel B of Table 7 tabulates the number of mergers for each category. To study the possible differences among portfolios involved in these different types of mergers, I modify the multinomial logit model reported in Section IV. A by further disaggregating within-family merger and across-family merger into subcategories according to whether the acquiring portfolio and the target portfolio share the same investment objective. As a result, I estimate a six-choice multinomial logit model. For each portfolio in each quarter, the fund family selects among six choices: (1) keep the portfolio; (2) liquidate the portfolio; (3) merge the portfolio with another portfolio with the same investment objective within the family; (4) merge the portfolio with another portfolio with a different investment objective within the family; (5) merge the portfolio with another portfolio with the same investment objective in another family; and (6) merge the portfolio with another portfolio with a different investment objective in another family. Keeping the portfolio is still used as the comparison group.

To examine the robustness of the results, I also estimated the same four models with different specifications as in Table 5. However, only results from Model (i) and Model (ii) are reported in Table 8 for brevity. It should first be noted that the same qualitative results obtained for within-family mergers and across-family mergers in Table 5 can still be obtained for many variables for the corresponding subcategories, regardless of whether the target portfolio and acquiring portfolio share the same investment objective, such as the negative effects of portfolio size and inflows. Nevertheless, some differences can also be observed.

First, for within-family mergers, lower performance and higher expense ratios only increase the likelihood of within-objective mergers, while longer history and more share classes only lead to more across-objective mergers. Considering the extra effort needed to implement an across-objective merger, the fund family appears reluctant to use across-objective merger to keep a portfolio in the family if it experiences poor performance or high costs. Instead, portfolios with longer history and more distribution channels are more likely to become candidates for within-family across-objective mergers.

Second, better objective performance increases the likelihood of across-objective mergers but not within-objective mergers. Since a mutual fund can invest up to 20 percent of its assets outside its declared investment objective, the acquiring portfolio might be interested in the winning securities of the target portfolios.

Third, a significant and negative relation only exists between *objective number of portfolios* and the probabilities of within-family within-objective mergers and across-family across-objective mergers. The evidence suggests that the fund family either makes its own portfolio gain a larger market share or prevents portfolios in other families from having a larger market share in a more consolidated investment objective.

Finally, family performance only has a significant and negative effect on across-family within-objective mergers but not on across-family across-objective mergers. Once again, considering the extra effort needed to implement an across-objective merger, it should be relatively easier for a family with poor performance to negotiate across-family within-objective merger deals.

E. Additional Tests

To test if different motives exist for the exit decisions of equity funds and bond funds, I perform separate estimation using the four-choice multinomial logit model in Section IV. A on two sub-samples with only equity portfolios or bond portfolios. I find the same qualitative results for most variables from both sub-samples, with only a few exceptions. Only bond portfolios merged within a family appear to have longer histories, while higher expense ratios only lead to the liquidation of equity portfolios. Due to the overwhelming similarities between the determinants of the exit decisions for equity funds and bond funds, I omit the extra tables and discussion.

I also estimate a separate three-choice multinomial logit model for single-portfolio families, the three choices being: (1) keep the portfolio; (2) liquidate the portfolio; and (3) merge the portfolio with another portfolio in another family. Family-level variables, which describe the "rest" of the family, are dropped since they cannot be computed for single-portfolio families. The results are reported in Table 9. Liquidated portfolios are still smaller and younger, and have lower inflows (both short-term and long-term), but their performance does not appear to affect their liquidations. Liquidations are more likely to occur in investment objectives with poor performance and poor inflows in the long run. Portfolios acquired by other families appear to be quite different from the portfolios sold to other families by multiple-portfolio families, except that they are not shown to have poor short-term performance or high expense ratios either, and they also suffer from low inflows. Poor objective inflows also increase the probability of acquisitions. The most attractive feature of these acquired portfolios is that they appear to have a greater number of share classes, which make them desirable to acquiring families interested in their distribution channels.

VI. Conclusion

This paper first examines the similarities and differences in the determinants of the three mutual fund exit forms — liquidation, within-family merger, and across-family merger, based on a quarterly data set from 1992 to 2001 of all equity funds, bond funds, and hybrid funds. To avoid double counting due to the multiple-share-class structure of mutual funds, I study the exit of portfolios instead of share classes. Out of a total of 7,500 portfolios, I record 828 liquidations, 757 within-family mergers, and 451 across-family mergers.

Exit forms taken by defunct portfolios are affected by portfolio characteristics. All defunct portfolios have smaller sizes and lower inflows. Among them, only portfolios with the smallest size are liquidated. A family is willing to liquidate a portfolio if the portfolio has fewer share classes, but more likely to merge a portfolio within the family if it offers more share classes. The family does not want to lose the valuable client sources and distribution channels linked to multiple share classes. Portfolios that are liquidated tend to be much younger; portfolios merged within a family have considerably longer histories; yet, portfolio age does not appear to affect across-family mergers. A family is more likely to liquidate a relatively unique portfolio or sell it to other families to stay focused. By doing so, the family eliminates all of the associated special research and marketing costs.

Fund family characteristics and strategies also play important roles in the selection of different exit forms. Large families are more likely to merge portfolios within the family, while a family with poor performance is more likely to sell relatively unique portfolios to other families to stay focused.

Investment objective conditions are also determinants of mutual fund exit decisions. Both within-family mergers and across-family mergers are more likely to occur in smaller investment objectives in which consolidation can more easily lead to larger market share.

Among multiple-share-class portfolios, if a share class with high back-end load accounts for a substantial portion of a portfolio's total assets, the capability of the share class to preserve its assets makes the fund family less likely to sell such a portfolio to other families but more likely to keep it in the family through within-family mergers.

I further investigate the possible differences between portfolios involved in within-objective mergers and across-objective mergers. For instance, considering the extra effort needed to implement an across-objective merger, a fund family is reluctant to use across-objective merger to keep a portfolio in the family if it experiences poor performance or high costs.

Appendix

The Accuracy of Liquidation and Merger Dates

The CRSP Survivor-Bias Free US Mutual Fund Database is the only readily available source of data with information on both liquidated and merged funds. Elton, Gruber, and Blake (2001) claim that merger dates are often inaccurately recorded in the CRSP database, based on their investigation of the merger dates of a relatively small sample of 42 funds. Per my request, Christopher Myers, Director of Database Research of CRSP, was kind enough to lead an analysis of the accuracy of the merger and liquidation dates in the CRSP database.

Since CRSP researchers are very confident that the L_DATE variable (last record date) in the database, which gives the last date for which NAV is available, correctly represents the date on which a liquidated or merged fund ends trading, they compare the merger or liquidation dates with the last record dates and find a 73.40 percent match in the time frame of this study — from the first quarter of 1992 to the third quarter of 2001. In addition, for 21.47 percent of the mergers and liquidations, the merger or liquidation date is recorded as one business day after the last record date. Despite the fact that there is a perfect match or only one business day difference between the merger or liquidation date and the last record date for 94.87 percent of the cases, the

CRSP researchers suggest that I adopt a conservative approach of using the last record date as merger or liquidation date, and I have followed their suggestion in this paper. Furthermore, in the rest of the data, liquidation or merger dates and the last record dates are recorded in different quarters for only one percent of the total cases. Since I group liquidations and mergers by quarters in this study, the impacts of any misidentified liquidation or merger dates should be minimal. I also estimate the tests in this paper using the 73.40 percent of the cases where there is a perfect match between the liquidation or merger dates and the last record dates, and I obtain the same qualitative results for all of these tests.

[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.

[2] If the exit of each share class is counted as a unique exit decision, a double counting problem may exist. The different share classes of the same portfolio might be terminated at the same time, thereby creating perfectly correlated events. For instance, the three share classes (A, B, and D) of Paine Webber Blue Chip Growth Fund were all terminated in August 1995.

[3] Among all ICDI's Fund Objectives, Money Market Funds and Special Funds, which are primarily currency funds, are excluded. Exchange Traded Funds (ETFs) are also excluded. Utility Funds are combined into Sector Funds. To be consistent with most mutual fund research (e.g. Jayaraman, Khorana, and Nelling 2002), I also create a separate Small Company Growth Funds objective using the SCG (Small Company Growth Funds) Strategic Insight Fund Objective Code. For a list of all fund objectives and their description, please refer to Appendix A to the CRSP Survivor-Bias Free US Mutual Fund Database Guide.

[4] In Carhart (1997), the momentum factor, *UMD*, is designated *PR1YR*. I follow Ken French's designation in this paper. Data on all factors except *UMD* are directly downloaded from Ken French's website (http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html). I compute quarterly values for UMD using the method as described on Ken French's website (http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/Data_Library/det_mom_factor.html) on original data kindly provided by Ken French.

[5] I thank Lehman Brothers for kindly providing the data on Lehman Brothers Indices.

[6] See Greene (1997) for details of a multinomial logit model and the designations.

[7] In addition to the variables included in the model, many other variables, such as family age, total assets, number of objectives, and expense ratio are also considered. However, they are highly correlated to variables already included in the model (correlations > 0.50) and therefore dropped. Correlations between quarterly and annual *portfolio inflow* and *objective-adjusted performance* are only 0.04 and 0.09,

respectively. I also use measures based on Barclay, Pearson, and Weisbach (1998) to compute portfolio capital gains overhang, but do not include it in the final model reported in this paper, because it does not have a significant effect with various specifications.

[8] To eliminate the effects of outliers, I drop observations with quarterly portfolio inflow above 100 (117 observations) and below – 0.90 (119 observations) in Table 5. The dropped observations only account for less than 0.1 percent of the entire sample. I also drop observations with annual portfolio inflow above 200 (230 observations) and below – 0.99 (260 observations) when annual values for *performance* and *inflow* variables are used instead. Since the same qualitative results are obtained for almost all of the variables, I omit the extra table and discussion.

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TABLE 1 Summary of the Hypothesized Effects of Potential Determinants on Various Exit Forms

Variables	Liquidation	Within-family Merger	Across-family Merger
Family Level			
Number of portfolios	+	+	—
Inflow	—	—	—
Performance	+	?	—
Objective Level			
Number of portfolios	?	—	—
Inflow	—	—	—
Performance	—	—	—
Portfolio Level			
Size	—	—	—
Inflow	—	—	—
Age	—	+	?
Performance	—	—	?
Expense ratio	+	+	?
Number of classes	—	+	—
Uniqueness	+	?	+

This table summarizes the hypothesized signs of the potential determinants for each exit form. A positive sign (+) indicates that a higher value of the corresponding variable is expected to increase the likelihood of the exit form, while a negative sign (—) indicates that a higher value of the corresponding variables is expected to decrease the likelihood of the exit form. A question mark (?) indicates that the corresponding variable is not expected to significantly affect the likelihood of the exit form.

TABLE 2 Share Classes, Portfolios, and Fund Families

Panel A: Number of share classes in portfolios	
Number of Classes	Number of Portfolios
1	3,588
2	1,293
3	1,136
4	1,168
5	293
6	21
8	1
Total	7,500

Panel B: Number of portfolios in fund families	
Number of Portfolios	Number of Fund Families
1	126
2-5	209
6-10	104
11-50	142
51-100	28
101-200	5
223	1
Total	615

Many mutual funds are different share classes of the same portfolio. Using fund name, NAV, return, and turnover ratio, I identify the portfolio for each fund. The 15,853 funds belong to 7,500 portfolios. These portfolios are almost evenly split between having only one share class and having more than one share class. The maximum number of classes a portfolio has is eight. These 7,500 portfolios belong to 615 fund families. While 126 families have just one portfolio, the remaining 489 families have at least two portfolios.

TABLE 3 Distribution of Defunct Mutual Fund Portfolios by Year and Investment Objective

Investment Objective	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001 (as of 9/30/02)	Objective Total	% of Total Exits
Aggressive Growth	6	8	5	7	5	5	8	9	12	8	73	3.6
Balanced	2	2	4	5	7	4	10	10	16	10	70	3.4
High Quality Bond	6	6	5	22	20	16	22	21	31	21	170	8.3
High Yield Bond	9	5	4	0	1	2	3	3	9	4	40	2.0
Global Bond	2	5	8	11	11	5	19	19	23	15	118	5.8
Global Equity	7	1	2	9	2	5	12	14	15	17	84	4.1
Growth and Income	6	11	11	12	15	8	21	14	25	23	146	7.2
Ginnie Mae	2	2	3	16	8	6	4	8	8	4	61	3.0
Government Security	8	12	14	31	26	21	25	23	21	18	199	9.8
International Equity	9	4	6	8	22	10	36	33	50	35	213	10.5
Income	2	2	2	5	2	4	0	4	7	4	32	1.6
Long -Term Growth	15	11	17	24	23	20	28	21	43	32	234	11.5
High Quality Municipal Bond	4	5	4	18	21	14	13	10	14	9	112	5.5
Single State Municipal Bond	4	0	9	27	34	24	45	26	21	30	220	10.8
High Yield Municipal Bond	1	1	0	0	0	0	1	0	0	1	4	0.2
Precious Metals	4	1	1	1	1	2	2	3	3	2	20	1.0
Sector	3	2	8	9	3	5	4	7	10	13	64	3.1
Small Company Growth	3	3	3	3	6	8	11	17	30	10	94	4.6
Total Return	12	3	2	5	6	8	10	11	16	9	82	4.0
Total	105	84	108	213	213	167	274	253	354	265	2,036	100.0

This table lists the 2,036 defunct portfolios by year and investment objective. All portfolios are categorized in 19 investment objectives primarily based on the ICDI's Fund Objective Code, which indicates the fund's investment strategy as identified by Standard & Poor's Fund Services. The Small Company Growth objective is based on the SCG (Small Company Growth Funds) Strategic Insight Fund Objective Code. A greater number of exits are recorded over the last four years of the sample. A total of 1,146 portfolios exit in 1998, 1999, 2000, and 2001, accounting for 56.3 percent of all exits. Equity portfolios and bond portfolios are almost equally represented, each with 47.1 percent (960 portfolios) and 45.4 percent (924 portfolios) of the total sample, respectively.

TABLE 4 Summary Statistics of the Three Exit Forms

	Surviving Portfolios	Liquidated Portfolios	Portfolios Merged within a Family	Portfolios Merged across Families
Panel A: Portfolio Performance (%)				
Quarterly Objective-adjusted Performance	-0.08	-0.62	-0.24	-0.21
Annual Objective-adjusted Performance	-0.34	-3.04	-1.63	-0.92
Single-factor alpha	-0.12	-0.53	-0.38	-0.25
Multi-factor alpha	-0.21	-0.49	-0.42	-0.28
Panel B: Other Portfolio Characteristics				
Size ($ million)	104.631	6.343	37.125	43.48
Quarterly Inflow (%)	0.3	-5.77	-5.65	-4.44
Annual Inflow (%)	1.86	-16.87	-16.79	-13.45
Age (months)	66	36.5	72	62
Expense ratio (%)	0.16	0.28	0.41	0.23
Number of share classes	1	1	1	1

This table presents the medians of portfolio performance and other portfolio characteristics for surviving portfolios, liquidated portfolios, portfolios merged within a family, and portfolios merged across families. Panel A reports various measures of portfolio performance. *Quarterly (annual) objective-adjusted performance* is the quarterly (annual) portfolio holding period return in excess of the asset-weighted average return for all portfolios with the same investment objective. Single-factor alpha and multiple-factor alpha are estimated using different models for equity portfolios and bond portfolios. I employ both the single-factor Capital Asset Pricing Model (CAPM) and the Carhart four-factor model, which is based on the Fama and French (1993) three-factor model, to evaluate an equity portfolio's performance. For bond portfolios, I employ the single-factor and four-factor models used by Jayaraman, Khorana, and Nelling (2002) to compute the risk-adjusted excess return for each portfolio. The factors used include excess returns on the Lehman Brothers Government/Credit Bond Index, the Lehman Brothers Mortgage-Backed Securities Index, the Lehman Brothers Long-Term Government Bond Index, and the Lehman Brothers Intermediate-Term Government Bond Index. Panel B presents the medians of other portfolio characteristics. Among them, *portfolio size* is the total assets in the portfolio; quarterly (annual) *portfolio inflow* is the asset growth rate net of quarterly (annual) portfolio holding period return; *portfolio age* is the age of the initial share class of the portfolio; *portfolio expense ratio* is the objective-adjusted expense ratio for each portfolio; and *portfolio number of share classes* is the number of surviving share classes in the portfolio.

TABLE 5 Multinomial Logit Model Estimates for Liquidation, Within-Family Merger, and Across-Family Merger for Multiple-Portfolio Fund Families Using Quarterly Data

Variables	Model (i)			Model (ii)			Model (iii)			Model (iv)		
	Liquidation	Within-family Merger	Across-family Merger	Liquidation	Within-family Merger	Across-family Merger	Liquidation	Within-family Merger	Across-family Merger	Liquidation	Within-family Merger	Across-family Merger
Family Level												
Number of portfolios				0.002 [9]	0.008*** [48]	-0.003 [-12]	0.002	0.008***	-0.003	0.002	0.008***	-0.003
Inflow (t-1)				-0.053 [0]	-0.078*** [0]	-0.079** [0]	-0.053	-0.078***	-0.077**	-0.053	-0.076***	-0.078**
Inflow (t-2)				-0.082*** [0]	-0.048 [0]	-0.052** [0]	-0.082***	-0.047	-0.052**	-0.082**	-0.048	-0.051**
Performance (t-1)				0.939 [1]	0.959 [1]	-4.466** [-7]	0.969	0.963	-4.438**	0.923	0.936	-4.414***
Performance (t-2)				0.840 [1]	0.037 [0]	1.939 [3]	0.807	0.053	2.024	0.858	0.033	1.923
Objective Level												
Number of portfolios				-0.001** [-17]	-0.001*** [-22]	-0.001* [-16]	-0.001**	-0.001***	-0.001*	-0.001**	-0.001***	-0.001*
Inflow (t-1)				-1.806 [-7]	-1.218 [-5]	-2.467 [-9]	-1.007	0.962	-1.399			
Inflow (t-2)				-1.290 [-5]	-2.102 [-8]	-0.902 [-3]	-2.259	-2.026	-0.633			
Performance (t-1)				0.899 [5]	0.085 [0]	0.477 [2]				0.516	0.032	-0.034
Performance (t-2)				-0.673 [-3]	0.408 [2]	1.618 [8]				-1.343	-0.371	0.717
Portfolio Level												
Size	-0.639***	-0.373***	-0.301***	-0.644*** [-79]	-0.415*** [-63]	-0.294*** [-51]	-0.644***	-0.415***	-0.294***	-0.646***	-0.415***	-0.295***
Inflow (t-1)	-2.746***	-2.900***	-2.660***	-2.659*** [-25]	-2.765*** [-26]	-2.640*** [-25]	-2.658***	-2.764***	-2.635***	-2.677***	-2.789***	-2.676***
Inflow (t-2)	-0.083***	-0.091***	-0.082***	-0.080*** [-1]	-0.082*** [-1]	-0.083*** [-1]	-0.080***	-0.082***	-0.083***	-0.080***	-0.082***	-0.084***
Age	-0.004***	0.001	0.000	-0.004*** [-29]	0.001* [7]	0.000 [3]	-0.004***	0.001*	0.000	-0.004***	0.001*	0.000
Performance (t-1)	-1.466**	0.128	-0.182	-1.495** [-4]	0.074 [0]	0.616 [2]	-1.596**	0.072	0.588	-1.429**	0.101	0.624
Performance (t-2)	-1.578***	-1.146**	1.871**	-2.118*** [-5]	-1.476*** [-3]	1.607* [4]	-2.010***	-1.525***	1.514	-1.972***	-1.283**	1.643*
Expense ratio	3.940*	5.363*	2.281	4.858** [3]	6.190* [4]	1.826 [1]	4.886**	6.183*	1.850	4.529**	5.995*	1.429
Number of classes	-0.141*	0.156**	-0.082	-0.150** [-26]	0.129** [29]	-0.086 [-16]	-0.150**	0.128**	-0.087	-0.144*	0.133**	-0.082
Intercept	-3.204***	-3.148***	-4.459***	-2.885***	-2.904***	-4.218***	-2.924***	-2.898***	-4.199***	-3.007***	-3.023***	-4.342***
Number of observations	154,453			153,734			153,734			153,734		
Pseudo R^2	0.1363			0.1443			0.1442			0.1438		

TABLE 5 Multinomial Logit Model Estimates for Liquidation, Within-Family Merger, and Across-Family Merger for Multiple-Portfolio Fund Families Using Quarterly Data (Continued)

To investigate the distinction between different exit forms, I estimate a clustered four-choice multinomial logit model, with the cluster defined as the family. For each portfolio in each quarter, the fund family selects among four choices: (1) keep the portfolio; (2) liquidate the portfolio; (3) merge the portfolio with another portfolio within the family; and (4) merge the portfolio with another portfolio in another family. Keeping the portfolio is used as the comparison group.

$$\Pr ob(Y = j) = \frac{\exp(\beta_j' \mathbf{x_i})}{1 + \sum_{k=1}^{4} \exp(\beta_k' \mathbf{x_i})} \quad \text{for j = 1, 2, 3, and 4}$$

$\beta_j' x_i = \alpha_0 + \beta_1$ *(family number of portfolios)*$_{i,t-1}$ + β_2 *(family inflow)*$_{i,t-1}$ + β_3 *(family inflow)*$_{i,t-2}$ + β_4 *(family performance)*$_{i,t-1}$ + β_5 *(family performance)*$_{i,t-2}$ + β_6 *(objective number of portfolios)*$_{i,t-1}$ + β_7 *(objective inflow)*$_{i,t-1}$ + β_8 *(objective inflow)*$_{i,t-2}$ + β_9 *(objective performance)*$_{i,t-1}$ + β_{10} *(objective performance)*$_{i,t-2}$ + β_{11} *(portfolio size)*$_{i,t-1}$ + β_{12} *(portfolio inflow)*$_{i,t-1}$ + β_{13} *(portfolio inflow)*$_{i,t-2}$ + β_{14} *(portfolio age)*$_{i,t-1}$ + β_{15} *(portfolio performance)*$_{i,t-1}$ + β_{16} *(portfolio performance)*$_{i,t-2}$ + β_{17} *(portfolio expense ratio)*$_{i,t-1}$ + β_{18} *(portfolio number of share classes)*$_{i,t-1}$ + $\varepsilon_{i,t}$

Family number of portfolios gives the total number of all other surviving portfolios in the family; *family inflow* is the asset growth rate net of holding period return in the rest of the family; and *family performance* is the asset-weighted average of the objective-adjusted portfolio returns of all other portfolios in the family. *Objective number of portfolios* gives the total number of all other surviving portfolios with the same investment objective; *objective performance* is the asset-weighted average of the portfolio holding period returns of all other portfolios with the same investment objective; and *objective inflow* is the asset growth rate net of holding period return for all other portfolios with the same investment objectives. *Portfolio size* is the log of the total assets in the portfolio; *portfolio inflow* is the asset growth rate net of portfolio holding period return; *portfolio age* is the age of the initial share class of the portfolio; *portfolio performance* is the portfolio holding period return in excess of the asset-weighted average return for all portfolios with the same investment objective; *portfolio expense ratio* is the objective-adjusted expense ratio for each portfolio; and *portfolio number of share classes* is the number of surviving share classes in the portfolio. I also include quarter dummies (not reported). This table reports the results of using quarterly *performance* and *inflow* variables (including additional lag values) at all levels.
I only use observations from families with more than one portfolio, because only such families have access to all of the four choices, including within-family mergers, which are possible only when the family has at least one other portfolio. In addition to all of the 757 portfolios involved in within-family mergers, 775 out of 828 liquidated portfolios and 438 out of 451 portfolios acquired by other families are from families with more than one portfolio.
To examine the robustness of the results, I estimate four models with different specifications. Model (i) only includes portfolio-level variables, while Model (ii) uses all family-level, objective-level, and portfolio-level variables. Model (iii) and Model (iv) are implemented without *objective performance* and *objective inflow*, respectively, due to their relatively high correlations. To eliminate the effects of outliers, I drop observations with quarterly portfolio inflow above 100 (117 observations) and below – 0.90 (119 observations). ***, **, and * indicate significance at the 1, 5, and 10 percent confidence levels, respectively. To measure the economic significance of the results, for each explanatory variable, I obtain the percentage change in the probability of each exit form when the value of the variable is increased from its 25th percentile to its 75th percentile, while other explanatory variables are set equal to their means. For brevity, the percentage changes are only reported in brackets for Model (ii), while similar results are obtained for other models.

TABLE 6 Multinomial Logit Model Estimates for Liquidation, Within-Family Merger, and Across-Family Merger for Multiple-Share-Class Portfolios in Multiple-Portfolio Fund Families Using Quarterly Data

Variables	Model (i)			Model (ii)			Model (iii)			Model (iv)		
	Liquidation	Within-family Merger	Across-family Merger	Liquidation	Within-family Merger	Across-family Merger	Liquidation	Within-family Merger	Across-family Merger	Liquidation	Within-family Merger	Across-family Merger
Family Level												
Number of portfolios				0.004* [21]	0.006*** [35]	-0.001 [-2]	0.004*	0.007***	-0.001	0.004**	0.006***	-0.001
Inflow (t-1)				-0.209 [-1]	-0.106 [0]	-0.207 [1]	-0.216	-0.118	-0.217	-0.208	-0.107	-0.205
Inflow (t-2)				-0.091 [0]	-0.093** [0]	-0.064 [0]	-0.087	-0.089**	-0.060	-0.086	-0.093**	-0.066
Performance (t-1)				-0.462 [-1]	2.855 [4]	-7.916** [-11]	-0.251	2.829	-7.718***	-0.221	2.831	-7.848***
Performance (t-2)				4.538* [7]	0.072 [0]	0.339 [0]	4.692**	0.201	0.498	4.674*	0.077	0.339
Objective Level												
Number of portfolios				-0.001*** [-33]	-0.001*** [-32]	-0.001*** [-35]	-0.001***	-0.001***	-0.001***	-0.001***	-0.001***	-0.001***
Inflow (t-1)				-9.524** [-29]	1.074 [4]	-3.700 [-13]	-4.854	1.580	0.200			
Inflow (t-2)				0.710 [3]	-0.796 [-3]	3.211 [13]	-0.660	0.294	3.126			
Performance (t-1)				2.421 [14]	-0.319 [-2]	1.838 [10]				0.515	-0.073	1.069
Performance (t-2)				2.124 [11]	1.893 [10]	3.283** [17]				0.014	1.923	3.052***
Portfolio Level												
Size	-0.963***	-0.515***	-0.257***	-0.971*** [-86]	-0.541*** [-70]	-0.269*** [-45]	-0.970***	-0.542***	-0.267***	-0.977***	-0.542***	-0.269***
Inflow (t-1)	-3.534***	-2.723***	-3.685***	-3.395*** [-28]	-2.679** [-23]	-3.680*** [-30]	-3.396***	-2.663**	-3.638***	-3.434***	-2.674**	-3.694***
Inflow (t-2)	-0.939**	-0.826*	-0.663	-0.927* [-9]	-0.799* [-8]	-0.672 [-6]	-0.920*	-0.787*	-0.657	-0.924*	-0.801*	-0.676
Age	-0.002	0.001***	-0.003	-0.003 [-25]	0.001** [14]	-0.002 [-19]	-0.003	0.001***	-0.002	-0.002	0.001**	-0.002
Performance (t-1)	1.321	0.032	-0.437	1.382 [3]	-0.127 [0]	0.628 [1]	1.185	-0.042	0.464	1.371	-0.139	0.692
Performance (t-2)	-1.410	-1.109*	0.953	-2.251* [-5]	-0.904 [-2]	1.358 [3]	-2.481*	-1.096*	1.016	-1.768	-0.915	1.362
Expense ratio	12.701**	10.871	19.106*	16.031** [10]	13.365* [9]	22.303** [15]	15.062**	12.643*	21.590**	15.068**	13.079*	22.223**
Portion of class B (t-1)	-0.475	1.201***	-2.913***	-0.640 [-19]	1.119*** [45]	-2.706*** [-59]	-0.617	1.134***	-2.705***	-0.541	1.120***	-2.713***
Intercept	-32.678***	-3.523***	-28.426***	-26.429***	-3.497***	-28.529***	-27.944***	-3.475***	-28.506***	-26.843***	-3.480***	-28.403***
Number of observations	68,740			68,517			68,517			68,517		
Pseudo R^2	0.1719			0.1841			0.1830			0.1833		

TABLE 6 Multinomial Logit Model Estimates for Liquidation, Within-Family Merger, and Across-Family Merger for Multiple-Share-Class Portfolios in Multiple-Portfolio Fund Families Using Quarterly Data (Continued)

The share class that charges a high back-end load (at least 3 percent) is designated as class B. To investigate the effect of the portion of class B in total assets in a multiple-share-class portfolio on the likelihood of different exit forms, I estimate a clustered four-choice multinomial logit model using only observations from multiple-share-class portfolios in families with more than one portfolio, with the cluster defined as the family. For each portfolio in each quarter, the fund family selects among four choices: (1) keep the portfolio; (2) liquidate the portfolio; (3) merge the portfolio with another portfolio within the family; and (4) merge the portfolio with another portfolio in another family. Keeping the portfolio is used as the comparison group.

$$\Pr ob(Y = j) = \frac{\exp(\beta'_j \mathbf{x_i})}{1 + \sum_{k=1}^{4} \exp(\beta'_k \mathbf{x_i})} \quad \text{for j = 1, 2, 3, and 4}$$

$$\beta'_j x_i = \alpha_0 + \beta_1 \textit{(family number of portfolios)}_{i,t-1} + \beta_2 \textit{(family inflow)}_{i,t-1} + \beta_3 \textit{(family inflow)}_{i,t-2} + \beta_4 \textit{(family performance)}_{i,t-1} + \beta_5 \textit{(family performance)}_{i,t-2} + \beta_6 \textit{(objective number of portfolios)}_{i,t-1} + \beta_7 \textit{(objective inflow)}_{i,t-1} + \beta_8 \textit{(objective inflow)}_{i,t-2} + \beta_9 \textit{(objective performance)}_{i,t-1} + \beta_{10} \textit{(objective performance)}_{i,t-2} + \beta_{11} \textit{(portfolio size)}_{i,t-1} + \beta_{12} \textit{(portfolio inflow)}_{i,t-1} + \beta_{13} \textit{(portfolio inflow)}_{i,t-2} + \beta_{14} \textit{(portfolio age)}_{i,t-1} + \beta_{15} \textit{(portfolio performance)}_{i,t-1} + \beta_{16} \textit{(portfolio performance)}_{i,t-2} + \beta_{17} \textit{(portfolio expense ratio)}_{i,t-1} + \beta_{18} \textit{(portion of class B)}_{i,t-1} + \varepsilon_{i,t}$$

Family number of portfolios gives the total number of all other surviving portfolios in the family; *family inflow* is the asset growth rate net of holding period return in the rest of the family; and *family performance* is the asset-weighted average of the objective-adjusted portfolio returns of all other portfolios in the family. *Objective number of portfolios* gives the total number of all other surviving portfolios with the same investment objective; *objective performance* is the asset-weighted average of the portfolio holding period returns of all other portfolios with the same investment objective; and *objective inflow* is the asset growth rate net of holding period return for all other portfolios with the same investment objectives. *Portfolio size* is the log of the total assets in the portfolio; *portfolio inflow* is the asset growth rate net of portfolio holding period return; *portfolio age* is the age of the initial share class of the portfolio; *portfolio performance* is the portfolio holding period return in excess of the asset-weighted average return for all portfolios with the same investment objective; *portfolio expense ratio* is the objective-adjusted expense ratio for each portfolio; and *portion of class B* is calculated as the percentage of total assets in a portfolio accounted for by class B. I also include quarter dummies (not reported). This table reports the results of using quarterly *performance* and *inflow* variables (including additional lag values) at all levels.

To examine the robustness of the results, I estimate four models with different specifications. Model (i) only includes portfolio-level variables, while Model (ii) uses all family-level, objective-level, and portfolio-level variables. Model (iii) and Model (iv) are implemented without *objective performance* and *objective inflow*, respectively, due to their relatively high correlations. To eliminate the effects of outliers, I drop observations with quarterly portfolio inflow above 100 and below – 0.90. ***, **, and * indicate significance at the 1, 5, and 10 percent confidence levels, respectively. To measure the economic significance of the results, for each explanatory variable, I obtain the percentage change in the probability of each exit form when the value of the variable is increased from its 25th percentile to its 75th percentile, while other explanatory variables are set equal to their means. For brevity, the percentage changes are only reported in brackets for Model (ii), while similar results are obtained for other models.

TABLE 7 Within-Objective Mergers and Across-Objective Mergers

Panel A: Top Ten Pairs of Investment Objectives for Across-Objective Mergers

From	To	Number of Mergers	Percentage (%)
Single State Municipal Bond	High Quality Municipal Bond	73	17.63
Long -Term Growth	Growth and Income	31	7.49
Government Security	High Quality Bond	23	5.56
Growth and Income	Long -Term Growth	20	4.83
Ginnie Mae	Government Security	19	4.59
Total Return	Balanced	17	4.11
Aggressive Growth	Long -Term Growth	15	3.62
Long -Term Growth	Aggressive Growth	13	3.14
Government Security	Ginnie Mae	13	3.14
High Quality Bond	Government Security	11	2.66
Total		235	56.76

Panel B: Numbers of Mergers for Different Categories

	Within-Family Merger	Across-Family Merger	Total
Within-Objective Merger	470	324	794
Across-Objective Merger	287	127	414
Total	757	451	1,208

When a portfolio is merged with another portfolio, the acquiring portfolio may have the same investment objective as that of the target portfolio or a different investment objective. Consequently, mergers can also be categorized into “within-objective merger” and “across-objective merger”. Panel A tabulates the top ten pairs of investment objectives between which across-objective merger occur. “From” and “To” indicate the investment objective of the target portfolio and the acquiring portfolio, respectively. Percentage gives the percentage of the mergers between the pair of investment objectives in the entire 414 across-objective mergers. Panel B tabulates the number of mergers for the following four categories: within-family within-objective merger, within-family across-objective merger, across-family within-objective merger, and across-family across-objective merger.

TABLE 8 Multinomial Logit Model Estimates for Liquidation, Within-Family Within-Objective Merger, Within-Family Across-Objective Merger, Across-Family Within-Objective Merger, and Across-Family Across-Objective Merger for Multiple-Portfolio Fund Families Using Quarterly Data

	Model (i)					Model (ii)				
Variables	Liquidation	Within family-Within objective Merger	Within family-Across objective Merger	Across family-Within objective Merger	Across family-Across objective Merger	Liquidation	Within family-Within objective Merger	Within family-Across objective Merger	Across family-Within objective Merger	Across family-Across objective Merger
Family Level										
Number of portfolios						0.002 [8]	0.009*** [53]	0.007*** [38]	-0.002 [-11]	-0.004 [-17]
Inflow (t-1)						-0.053 [0]	-0.072*** [0]	-0.091*** [0]	-0.066 [0]	-0.112** [-1]
Inflow (t-2)						-0.083*** [0]	-0.063*** [0]	-0.000 [0]	-0.042* [0]	-0.087*** [0]
Performance (t-1)						0.948 [1]	0.543 [1]	1.828 [3]	-5.879** [-9]	-1.011 [-2]
Performance (t-2)						0.844 [1]	-0.124 [0]	0.337 [1]	2.217 [3]	1.364 [2]
Objective Level										
Number of portfolios						-0.001** [-17]	-0.001*** [-23]	-0.001 [-18]	0.000 [2]	-0.002*** [-54]
Inflow (t-1)						-1.833 [-7]	-0.160 [-1]	-3.793 [-14]	-1.438 [-6]	-6.260 [-22]
Inflow (t-2)						-1.287 [-5]	-2.281 [-9]	-1.373 [-5]	-2.323 [-9]	2.267 [9]
Performance (t-1)						0.914 [5]	0.039 [0]	0.405 [2]	-1.795 [-9]	6.726*** [41]
Performance (t-2)						-0.664 [-3]	-1.165 [-6]	3.332** [18]	1.310 [7]	3.229 [17]
Portfolio Level										
Size	-0.639***	-0.335***	-0.436***	-0.286***	-0.333***	-0.645*** [-79]	-0.383*** [-60]	-0.467*** [-68]	-0.276*** [-49]	-0.329*** [-55]
Inflow (t-1)	-2.758***	-2.317**	-3.657***	-2.064**	-3.928***	-2.673*** [-25]	-2.177** [-21]	-3.556*** [-32]	-2.007** [-19]	-3.885*** [-34]
Inflow (t-2)	-0.083***	-0.077**	-0.109***	-0.067**	-0.115***	-0.080*** [-1]	-0.068** [-1]	-0.102*** [-1]	-0.066* [-1]	-0.118*** [-1]
Age	-0.004***	0.000	0.001*	0.000	0.001	-0.004*** [-29]	0.001 [6]	0.001** [10]	0.000 [2]	0.001 [5]
Performance (t-1)	-1.475**	-0.656	0.908**	0.171	-1.051	-1.504** [-4]	-0.597 [-1]	0.823 [2]	1.012 [2]	0.213 [1]
Performance (t-2)	-1.571**	-1.105*	-1.157	1.587*	2.442	-2.114*** [-5]	-1.610** [-4]	-1.128 [-3]	1.056 [3]	2.549* [6]
Expense ratio	3.886*	5.183	4.608	2.449	1.845	4.820** [3]	6.152* [4]	5.522 [3]	2.289 [1]	1.331 [1]
Number of classes	-0.141*	0.066	0.306***	-0.073	-0.112	-0.149** [-26]	0.039 [8]	0.281*** [75]	-0.082 [-15]	-0.105 [-19]
Intercept	-3.202***	-3.699***	-4.037***	-4.696***	-6.187***	-2.881***	-4.547***	-3.885***	-4.572***	-5.629***
Number of observations	154,453					153,734				
Pseudo R^2	0.1336					0.1426				

TABLE 8 Multinomial Logit Model Estimates for Liquidation, Within Family-Within Objective Merger, Within Family-Across Objective Merger, Across Family-Within Objective Merger, and Across Family-Across Objective Merger for Multiple-Portfolio Fund Families Using Quarterly Data (Continued)

I estimate a clustered six-choice multinomial logit model, with the cluster defined as the family. For each portfolio in each quarter, the fund family selects among six choices: (1) keep the portfolio; (2) liquidate the portfolio; (3) merge the portfolio with another portfolio with the same investment objective within the family; (4) merge the portfolio with another portfolio with a different investment objective within the family; (5) merge the portfolio with another portfolio with the same investment objective in another family; and (6) merge the portfolio with another portfolio with a different investment objective in another family.

$$\Pr ob(Y = j) = \frac{\exp(\beta_j^{'} \mathbf{x_i})}{1 + \sum_{k=1}^{6} \exp(\beta_k^{'} \mathbf{x_i})} \quad \text{for j = 1, 2, 3, 4, 5 and 6}$$

$\beta_j^{'} x_i = \alpha_0 + \beta_1$ *(family number of portfolios)*$_{i,t-1}$ $+ \beta_2$ *(family inflow)*$_{i,t-1}$ $+ \beta_3$ *(family inflow)*$_{i,t-2}$ $+ \beta_4$ *(family performance)*$_{i,t-1}$ $+ \beta_5$ *(family performance)*$_{i,t-2}$ $+ \beta_6$ *(objective number of portfolios)*$_{i,t-1}$ $+ \beta_7$ *(objective inflow)*$_{i,t-1}$ $+ \beta_8$ *(objective inflow)*$_{i,t-2}$ $+ \beta_9$ *(objective performance)*$_{i,t-1}$ $+ \beta_{10}$ *(objective performance)*$_{i,t-2}$ $+ \beta_{11}$ *(portfolio size)*$_{i,t-1}$ $+ \beta_{12}$ *(portfolio inflow)*$_{i,t-1}$ $+ \beta_{13}$ *(portfolio inflow)*$_{i,t-2}$ $+ \beta_{14}$ *(portfolio age)*$_{i,t-1}$ $+ \beta_{15}$ *(portfolio performance)*$_{i,t-1}$ $+ \beta_{16}$ *(portfolio performance)*$_{i,t-2}$ $+ \beta_{17}$ *(portfolio expense ratio)*$_{i,t-1}$ $+ \beta_{18}$ *(portfolio number of share classes)*$_{i,t-1}$ $+ \varepsilon_{i,t}$

Family number of portfolios gives the total number of all other surviving portfolios in the family; *family inflow* is the asset growth rate net of holding period return in the rest of the family; and *family performance* is the asset-weighted average of the objective-adjusted portfolio returns of all other portfolios in the family. *Objective number of portfolios* gives the total number of all other surviving portfolios with the same investment objective; *objective performance* is the asset-weighted average of the portfolio holding period returns of all other portfolios with the same investment objective; and *objective inflow* is the asset growth rate net of holding period return for all other portfolios with the same investment objectives. *Portfolio size* is the log of the total assets in the portfolio; *portfolio inflow* is the asset growth rate net of portfolio holding period return; *portfolio age* is the age of the initial share class of the portfolio; *portfolio performance* is the portfolio holding period return in excess of the asset-weighted average return for all portfolios with the same investment objective; *portfolio expense ratio* is the objective-adjusted expense ratio for each portfolio; and *portfolio number of share classes* is the number of surviving share classes in the portfolio. I also include quarter dummies (not reported). This table reports the results of using quarterly *performance* and *inflow* variables (including additional lag values) at all levels.
To examine the robustness of the results, I estimate four models with different specifications (only results from Model (i) and Model (ii) are reported for brevity). Model (i) only includes portfolio-level variables, while Model (ii) uses all family-level, objective-level, and portfolio-level variables. Model (iii) and Model (iv) are implemented without *objective performance* and *objective inflow*, respectively, due to their relatively high correlations. To eliminate the effects of outliers, I drop observations with quarterly portfolio inflow above 100 (117 observations) and below – 0.90 (119 observations). ***, **, and * indicate significance at the 1, 5, and 10 percent confidence levels, respectively. To measure the economic significance of the results, for each explanatory variable, I obtain the percentage change in the probability of each exit form when the value of the variable is increased from its 25^{th} percentile to its 75^{th} percentile, while other explanatory variables are set equal to their means. For brevity, the percentage changes are only reported in brackets for Model (ii), while similar results are obtained for other models.

TABLE 9 Multinomial Logit Model Estimates for Liquidation vs. Across-Family Merger for Single-Portfolio Fund Families

Variables	Model (i) Liquidation	Model (i) Across-family Merger	Model (ii) Liquidation	Model (ii) Across-family Merger	Model (iii) Liquidation	Model (iii) Across-family Merger	Model (iv) Liquidation	Model (iv) Across-family Merger
Panel A: Quarterly Data								
Objective Level								
Number of portfolios			0.000	0.002	0.000	0.002	0.000	0.001
Inflow (t-1)			-1.548	31.066**	-11.255	7.571		
Inflow (t-2)			-0.639	-75.280***	11.644	-37.231**		
Performance (t-1)			-8.842*	-27.915***			-9.196**	-23.829***
Performance (t-2)			4.343	36.191**			3.882	23.535
Portfolio Level								
Size	-0.584***	-0.201	-0.605***	-0.154	-0.587***	-0.196	-0.604***	-0.189
Inflow (t-1)	-5.300***	-5.269***	-5.627***	-3.568*	-5.498***	-3.933*	-5.613***	-5.253***
Inflow (t-2)	-0.043	-6.475***	-0.036	-6.776***	-0.048	-7.367***	-0.036	-6.645***
Age	-0.006**	-0.005	-0.007**	-0.003	-0.007**	-0.003	-0.007**	-0.004
Performance (t-1)	-0.474	-3.315	-1.248	-5.707	-0.660	-5.449	-1.243	-3.310
Performance (t-2)	0.417	1.809	0.770	1.843	0.416	1.358	0.738	2.482
Expense ratio	-31.326*	-72.353*	-31.533*	-21.457	-32.863*	-53.619	-31.208*	-73.067
Number of classes	0.084	1.384***	0.036	1.311***	0.072	1.242***	0.044	1.405***
Intercept	-2.878***	-30.238***	-3.204**	-32.744***	-2.767**	-29.115***	-3.317***	-32.979***
Number of observations	4,573		4,573		4,573			4,573
Pseudo R^2	0.3329		0.3718		0.3470			0.3529
Panel B: Annual Data								
Objective Level								
Number of portfolios			0.001	0.003	0.001	0.003	0.001	0.002
Inflow (t-1)			4.742	-7.716	-0.275	-3.321		
Inflow (t-2)			-8.445***	-14.850**	-5.672***	-15.717***		
Performance (t-1)			-6.393**	10.123			-3.586*	6.832
Performance (t-2)			-1.183	-2.145			-2.571	-11.283**
Portfolio Level								
Size	-0.662***	-0.247	-0.621***	-0.146	-0.647***	-0.043	-0.656***	-0.264
Inflow (t-1)	-4.029***	-3.997***	-3.990***	-3.475**	-3.866***	-3.178**	-4.106***	-4.573***
Inflow (t-2)	-0.363	-1.767**	-0.248	-1.416	-0.219	-1.345	-0.333	-1.747**
Age	-0.007*	-0.008*	-0.007	-0.005	-0.006*	-0.005	-0.007*	-0.008*
Performance (t-1)	-0.460	-3.568***	-0.751	-6.581***	-0.285	-7.329***	-0.803	-3.507*
Performance (t-2)	1.213	5.984*	0.847	9.696***	1.168	7.519**	0.886	7.534*
Expense ratio	-60.386**	-83.912	-38.014	-5.200	-44.802	-11.235	-53.225*	-85.187
Number of classes	0.746*	1.749***	0.808*	1.462**	0.687	1.485**	0.822*	1.757***
Intercept	-27.065***	-30.000***	-27.237***	-30.003***	-26.997***	-28.643***	-26.567***	-28.333***
Number of observations	3,744		3,744		3,744		3,744	
Pseudo R^2	0.4124		0.4673		0.4536		0.4281	

I estimate a clustered three-choice multinomial logit model for single-portfolio families, with the cluster defined as the family. The three choices are: (1) keep the portfolio; (2) liquidate the portfolio; and (3) merge the portfolio with another portfolio in another family. Keeping the portfolio is used as the comparison group. Family-level variables, which describe the "rest" of the family, are dropped since they cannot be computed for single-portfolio families. For *performance* and *inflow* variables at all levels, quarterly values are used in Panel A while annual values are used in Panel B. I also include quarter dummies (not reported). ***, **, and * indicate significance at the 1, 5, and 10 percent confidence levels, respectively.