Conflicting Family Values in Mutual Fund Families

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Abstract

We analyze the investment behavior of affiliated funds of mutual funds (AFoMFs), which are mutual funds that can only invest in other funds in the family, and are offered by most large families. Though never mentioned in any prospectus, we discover that AFoMFs provide an insurance pool against temporary liquidity shocks to other funds in the family. We show that though the family benefits because funds can avoid fire-sales, the cost of this insurance is borne by the investors in the AFoMFs. The paper thus uncovers some of the hidden complexities of fiduciary responsibility in mutual fund families.

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A major reason for the existence of conglomerates or business groups is to create internal capital markets to promote the efficiency of the group. One of many efficiency measures that internal capital markets can offer is an insurance pool, which provides temporary liquidity to the members of the group in the event of adverse shocks.[1]

If mutual fund families, which are a collection of legally independent entities tied together by the sponsoring management company, are regarded as groups, it seems reasonable to assume that there would be a group interest.[2] If so, it seems natural to ask whether insurance pools could exist in these families where cash-rich mutual funds direct capital to family funds that are facing large redemption requests, as these redemptions could lead to large fire sale losses. However, by law, they cannot. This is because, while the provision of such an insurance pool against temporary liquidity shocks benefits the family, the cost is borne by the shareholders of the fund providing this "free" insurance. A mutual fund, however, owes a fiduciary responsibility only to its own shareholders, and not to its family.[3] Despite this, several papers

[1] A large theoretical literature, beginning with Levy and Sarnat (1970), analyzed co-insurance as the financial rationale for mergers. Gopalan, Nanda, and Seru (2009) document insurance pools in Indian business groups.

[2] Chevalier and Ellison (1997) argue that the mutual fund family's aim is to maximize the value of the complex, rather than that of an individual fund.

[3] Section 17 of the Investment Company Act of 1940 substantially restricts lending/borrowing/investment between individual funds in a family. These restrictions were originally designed to "prevent fund of funds arrangements that have been used in the past to enable investors in an acquiring fund to control the assets of an acquired fund and use those assets to enrich themselves at the expense of acquired fund shareholders." There are some exceptions. One is the legalization of certain fund of funds structures over time, which we claim is exploited to provide an insurance pool. Another exception is that cross-trades at market prices are permitted via SEC Rule 17(a)-7. The use of cross-trades at favorable prices (or that acquire unwanted positions) is another potential way to pursue family objectives.

suggest that group interest comes before fiduciary responsibilities in certain cases.[4]

In this study, we address whether insurance pools exist in mutual fund families. We examine this by analyzing the investments of affiliated funds of mutual funds (AFoMFs). AFoMFs are mutual funds that *only* invest in other mutual funds within the family. Instead of the investors or their financial advisors choosing which mutual funds of the family to invest in, AFoMFs do that for the investors.[5] Virtually non-existent in the 1990s, these funds have become very popular. In 2007, which is the last year of our sample, of the 30 large families that made up around 75% of the industry's assets,[6] 27 had AFoMFs.

To determine whether AFoMFs provide liquidity to member funds in need, we divide total fund flow to each ordinary mutual fund into AFoMF flow and non-AFoMF (or outside investor) flow. The flows are normalized by the underlying fund's value. We find that when we sort each family fund into deciles based on the flow from its outside investors, the lowest decile (i.e., the group of distressed funds/funds experiencing the largest withdrawals from their outside investors) has a statistically significantly higher average inflow from its family AFoMFs than any of the other nine deciles. This is our primary evidence showing that AFoMFs offset severe

[4] Evans (2010) mentions that families pursue their own objectives by strategically setting fees, promoting the performance of some of their funds, increasing fund offerings (Massa (2003)), and strategically choosing distribution channels. Gaspar, Massa, and Matos (2006) show that high-fee or high-performance funds receive preferential IPO allocations and are likely supported through cross-trades by low-fee or poor-performance funds. Evans (2010) argues that fund incubation is another family strategy to spuriously inflate family returns. Goncalves-Pinto and Sotes-Paladino (2010) theoretically model cross-trading as a way to smooth liquidity shocks in the family. Casavecchia and Tiwari (2011) document the cost cross-trading imposes on client portfolios. Sandhya (2010) studies target date funds and finds that when these funds are structured as funds of funds, they often invest in high-fee or low-performance funds.

[5] In 1996, Congress added Section 12(d)(1)(G) to Section 17. It allowed an AFoMF to legally invest in other funds in its own family. This exception to Section 17 was granted so that mutual fund families could compete with investment advisors to provide their clients the best investments within their family. AFoMFs, being mutual funds, still have a fiduciary responsibility to their own shareholders and not to their family.

[6] See www.ici.org, 2010 Investment Company Fact Book.

liquidity shortfalls of funds in the family. Interestingly, though we scan through the AFoMF prospectuses – relevant excerpts from a couple of them are shown in the Internet Appendix A – we find that none of them mention liquidity provision as an objective.

We perform several additional tests to confirm that what we find is not a spurious result but evidence that AFoMFs are purposefully providing liquidity to distressed funds. First, if AFoMFs provide liquidity to distressed funds, this liquidity support should not exist for funds that rarely need this support. We find that AFoMFs do not favor distressed funds that are money market funds, Treasury funds, or ETFs. Second, the liquidity position of the AFoMF should not matter. We find that AFoMFs provide liquidity to distressed funds even when the AFoMFs are cash poor. Third, if insurance, the AFoMF should be providing liquidity for transient liquidity shortfalls rather than persistent shortfalls. We find that AFoMFs do not help underlying funds that have persistent liquidity shortfalls. Fourth, if insurance, it should not be provided by unaffiliated funds of mutual funds (UFoMFs), which are funds of funds that can only invest outside the family. We find that UFoMFs do not provide liquidity to distressed funds. Fifth, as fire sale costs are higher for less liquid funds than for more liquid funds, the temporary liquidity provision should be more for less liquid funds. We find that AFoMFs provide greater insurance to less liquid distressed funds than to more liquid U.S. equity funds. Sixth, and finally, if most funds in the same style are trying to sell at the same time, costly fire sales are more likely; therefore, temporary liquidity provision by the AFoMF should be more likely. We find that AFoMFs favor distressed funds more if other funds in the distressed fund's style are also selling.

Multivariate tests confirm the above main univariate tests. In these tests, we control for

measures of the underlying fund's liquidity, the AFoMF's liquidity, and various characteristics of the underlying fund, such as size, fund fees, and past performance.

Why do AFoMFs favor distressed mutual funds in their families? Thus far, our discussion is biased towards suggesting that they do so solely to help member funds avoid costly liquidity driven trades. This explanation is motivated by prior research. Existing studies show that liquidity induced mutual fund trading is indeed costly. Edelen (1999) argues that these trades are uninformed and, as a result, lead to losses against informed traders in the order of approximately 140 basis points annually. Moreover, Coval and Stafford (2007) find that large redemptions induce fire sales that generate a significant price impact in the markets.[7]

However, AFoMF investment in distressed funds may not be aimed at helping these funds. An alternative explanation, given to us by fund managers, is that many AFoMFs are asset allocation or target date funds that maintain target weights in various asset classes. This implies a mechanical injection of inflows into any distressed fund whose asset class value has fallen below the target. To check for this, we construct a variable that measures the current deviation from the target weight. We find that our liquidity provision, though diminished by the addition of this control variable, remains. A second explanation is that the temporary liquidity provision is only given to the top-performing or high-fee mutual funds, and so it is just a strategy to protect these funds. We find that liquidity provision exists for all types of funds, except the extreme losers. A third explanation is that liquidity provision to another fund *only* occurs if the manager

[7] Zhang (2009) and Chen, Hanson, Hong, and Stein (2008) find other funds prey on liquidity strapped mutual funds. Also, since the cost of redemptions is borne by the remaining shareholders, Chen, Goldstein, and Jiang (2007) argue that withdrawal is the best response when investors expect that others will withdraw. This leads to a vicious cycle.

of an AFoMF manages the other fund as well. We find that this is not true.

A final alternative explanation is that AFoMFs may have inside information that others do not, and so they act as smart contrarian investors. This is conceivable since the AFoMFs are geographically close to their own family (e.g., Lee (2011), Gervais, Lynch, and Musto (2005), Massa and Rehman (2008), Coval and Moskowitz (2001)). If AFoMFs invest in distressed mutual funds because they have superior information and believe that these distressed funds are undervalued, AFoMFs should profit by going against the crowd. We follow the smart money literature (e.g., Gruber (1996), Zheng (1999), and Sapp and Tiwari (2004)) to examine this alternative hypothesis. We find that AFoMFs lose by providing liquidity to the distressed funds.

Finally, to address whether liquidity provision is a rational family strategy, we test whether the sacrifice, which is the *cost* incurred by AFoMF shareholders from these investments, *benefits* the family. We first measure the benefit. We find that though liquidity shortfalls hurt fund performance, this hurt is ameliorated by the AFoMFs' inflow. This amelioration is the fund's benefit. We next find that if the AFoMF invested in the distressed portfolio the same way it invested in the other portfolios, its performance would have improved. This improvement sacrifice is the AFoMF's cost. We find that the benefit to distressed funds exceeds the AFoMF cost. Though we cannot draw definitive conclusions from our low frequency data and a back-of-the- envelope calculation, the results hint that the cross-subsidy may be rational for the family.

Section I describes our data. Section II presents the tests of the liquidity provision hypothesis. Section III refutes the alternative hypotheses. Section IV estimates the cost and the benefit of liquidity provision, and provides a cost-benefit comparison for the whole family.

Section V provides robustness results. Section VI concludes.

I. Data and Descriptive Statistics

The data used in this study are drawn from the Morningstar Principia and the CRSP Survivor-Bias-Free Mutual Fund databases. First, we obtain the list of funds of mutual funds (FoMFs) from Morningstar Principia for the sample period October 2002 to January 2008. We compare the number of funds in our sample to the number reported in the 2008 ICI Fact Book.[8] The comparison shows that our sample covers more than 90% of the FoMF universe. The Morningstar database contains periodic reports about the exact portfolio composition of each FoMF, including each portfolio weight, the corresponding market value, the number of shares it holds in each underlying fund at the end of the current reporting period, as well as the number of shares it held in the previous reporting period.[9] To classify funds as 'affiliated' ('unaffiliated'), we require that the FoMF and its holdings belong (do not belong) to the same family.[10]

We then hand-match each FoMF and all of its mutual fund holdings to the corresponding funds in CRSP by fund name. After identifying the CRSP fund number for each FoMF and its portfolio funds, we obtain information on monthly fund returns and total net assets (TNA), as well as fund characteristics (such as expense ratio, style, inception date, etc.) from the CRSP mutual funds database. Since FoMFs are also mutual funds, these variables are available for

[8] See www.icifactbook.org/pdf/2008_factbook.pdf

[9] The length of the reporting period is a quarter in most cases, but it ranges from one month to over a year in some cases. In our analyses, we only include those fund reporting periods for which the two consecutive reporting dates are no more than three months apart. So our data allows us to compute flows quarterly for some FoMFs and monthly for other FoMFs. We divide the former by 3, which normalizes all units to be monthly.

[10] In a few cases, a given fund of funds appears to be both affiliated and unaffiliated. We mark these as 'hybrid' FoMFs. These funds typically emerge toward the end of our sample period due to the SEC's rule change in 2006. For hybrid funds, we only include the affiliated holdings. Excluding these funds has no effect on our results.

both the FoMFs and their fund holdings. In a few cases, previous portfolio dates are missing or the FoMF or the portfolio funds are not identified in CRSP. Such observations are eliminated.

Throughout the paper, we work with fund-level data. Therefore, we combine each fund's share classes into one series in the CRSP database. We aggregate the share classes by calculating the total net asset value (TNA) weighted average return, net asset value (NAV), and expense ratio of the fund. For the TNA of the FoMF and the underlying funds, we sum the TNAs across the different share classes. In the Morningstar database, the dollar value of each FoMF holding (as well as the total number of shares held) is reported as the aggregate amount held across all share classes of the FoMF; therefore, no adjustment is needed for Morningstar.

[Insert Table I about here]

Table I provides information about our sample. Panel A reports the number of families that offer AFoMFs, the average size of these families, the average number of AFoMFs offered, and how the AFoMFs' size compares to the aggregate size of the family. For comparison, we present similar data of those families that offer unaffiliated funds of mutual funds (UFoMFs) and families that offer no fund of funds products in Panels B and C, respectively. We notice that AFOMF assets account for about 10% of family assets in 2007; the rapid growth came from pension plans adopting this new type of fund in the 2000s, often as the Qualified Default Investment Alternative. AFoMFs are typically offered by larger families, large in terms of size (TNA) and in the number of funds offered. This makes sense because, as AFoMFs only invest in family funds, AFoMFs will not exist if their investment opportunity set is small. In 2007, of the 30 largest families that accounted for 75% of the size of the industry, 27 offered AFoMFs.

II. Liquidity Provision by AFoMFs

The extant literature argues that when mutual funds experience large outflows, the only option they are often left with is to sell existing portfolio positions[11] and, as a result, meeting large redemptions is very costly. We show that when a family has AFoMFs, these AFoMFs may provide an insurance pool to offset temporary liquidity shocks of member funds.

We proceed in two steps. First, we document that AFoMFs invest a disproportionately large amount of money in funds that are experiencing extreme outflows from their outside investors. Second, we provide several sub-sample results to show that this behavior is consistent with liquidity provision.

A. AFoMF Flows and non-AFoMF Flows

Ordinary mutual funds in families that have AFoMFs have two groups of investors: AFoMFs and non-AFoMF investors. To examine how the investment behavior of AFoMFs is related to the investment/redemption decisions of the non-AFoMF investors, we decompose total flow to each ordinary fund into AFoMF flow and non-AFoMF (outsider) flow, respectively. The standard measure of total net dollar flow to each ordinary mutual fund j in family k during portfolio period t is given as follows:

$$Flow^{Total}_{j,k,t} = TNA_{j,t} - TNA_{j,t-1} \cdot (1 + r_{j,t}) \tag{1}$$

[11] Other solutions to meet redemption requests, such as borrowing or short selling, are severely limited. Moreover, funds tend not to hold significant cash positions. Several papers estimate mutual fund transaction cost. See, for instance, Blume and Edelen (2004), Bollen and Busse (2006), Christoffersen, Keim and Musto (2007), and Edelen, Evans and Kadlec (2007).

where TNA_j is the total assets under management of the jth fund and r_j is the net-of-fees return for the relevant time period. Equation 1 assumes that cash flows arrive at the end of the reporting period.[12] To calculate the investment (flow) mutual fund *j* receives from AFoMFs during the portfolio period, we first determine the dollar change in each AFoMF's position in fund *j*. This is expressed by the change in the number of shares held by AFoMF *i* in fund *j* multiplied by the net asset value (NAV) of fund *j*. Note that NAV is just the price per share of fund *j*. We then aggregate this dollar change across all AFoMFs in the family that are investing in fund *j*:

$$Flow_{j,k,t}^{AFoMF} = \sum_{i=1}^{n_k} \Delta shares_{i,j,t} \cdot NAV_{j,t} \tag{2}$$

where n_k is the number of AFoMFs in family *k* that are investing in fund *j*, *NAV* is fund *j*'s average net asset value in the portfolio period, and *Δshares* is the change in the number of shares of fund *j* held by AFoMF *i* between date *t-1* and date *t*. Finally, we obtain the flow (investment) from outsiders, by taking the difference between Equations 1 and 2:

$$Flow_{j,k,t}^{Outside} = Flow_{j,k,t}^{Total} - Flow_{j,k,t}^{AFoMF} \tag{3}$$

In all our analyses, we divide the three flow measures above by $TNA_{j,t-1}$.

In addition to quantifying the magnitude of the AFoMF flow to each underlying fund (Equation 2), we classify each AFoMF flow as a new position, liquidation, a maintained position (zero flow), a position increase, or a position decrease. Maintained positions are existing positions that remain the same over the portfolio period, that is, the fund of funds engages in no

[12] For robustness, we also adopt a flow measure that assumes that flows arrive at the beginning of the period instead. All results are robust to this alternative specification.

trade in the underlying fund between the previous and the current portfolio dates. It is important to recognize that there are also funds in the family in which AFoMFs do not have an existing position and choose not to acquire positions. We call these the no-trade funds.

It is very important for our research design to answer why AFoMFs do not invest in these no-trade funds. Are they outside the investment opportunity set of the AFoMF, or are they in the investment opportunity set, but the AFoMF chooses not to trade in them? In other words, what is the investment opportunity set of the AFoMF? For the purpose of our study, we define the investment opportunity set of an AFoMF as all funds in the family whose fund styles are consistent with the investment objectives of the AFoMF. Since style category is probably not the only determinant of the AFoMF investment opportunity set, our definition is imprecise. For robustness, we re-define the investment opportunity set of the AFoMF in two extreme ways. The first way – where the investment opportunity set of the AFoMF consists of all funds they trade at least once in our sample period – is the most conservative definition and biases us towards our results. The second way – where the investment opportunity set of the AFoMF consists of all funds in the family – is the most liberal definition and biases us against our results. All our results are robust to both of these extreme definitions (see Table IV.3 in the Internet Appendix B).

Table II compares the funds held by AFoMFs with those in the family that are eligible to be held based on style but are not ever held by the AFoMFs. The table shows that the two are different in a number of characteristics. Funds held by AFoMFs tend to be larger and younger on average. The Sharpe ratio, the seven-factor alpha, and the flow-performance sensitivities, however, do not have statistically significant differences across the two groups. The minimum

expense ratio (i.e., the expense ratio of the lowest expense share class) is higher for funds held by AFoMFs[13] and the fraction of index funds held is lower. Note here that if AFoMFs were really following an asset allocation strategy, they should be investing more in low-cost index funds.

[Insert Table II about here]

We now start by sorting ordinary mutual funds in each family into deciles according to the flows these funds face from their outside investors, as described in Equation 3 above. We follow the literature and define funds in decile 1 (i.e., funds that have flows below the 10th flow percentile) as the distressed funds. These are funds that experience severe redemption requests. Since aggregate flows may vary across different time periods, we reset our decile breakpoints each portfolio period. For each decile, we calculate the average flow from AFoMFs (scaled by TNA) and the fraction of the AFoMF positions that are new positions, liquidations, maintained (positive) positions, position increases, position decreases, or maintained zero positions.

Figure 1 depicts average flow from AFoMFs by outside investor flow decile. The dashed line in the graph indicates the breakpoint between negative and positive average outsider flows: bins to the left (right) of the line contain those ordinary mutual funds that are experiencing a negative (positive) flow, on average, from their outside investors. The figure reveals a generally positive correlation between the investment behavior of AFoMFs and that of outside investors. This implies that AFoMFs generally tend to prefer funds that outside investors favor during the

[13] While this could indicate investment in better managers, it may also be simply due to differences in the proportion of low cost index funds in the two groups. Additionally, it is important to note that throughout the paper, the fee variables have to be interpreted with caution. First, we do not know which share class AFoMFs would invest in should they invest in the no-trade funds (however, as a legal matter, it is almost certain that the AFoMF pays the lowest fee class; therefore, we use these for comparison). Second, the fees CRSP reports for each fund do not necessarily correspond to the actual fees paid (e.g., due to waivers).

portfolio period. If flows are the market's response to managerial talent, it seems that AFoMFs and outside investors make very similar assessments on how ordinary funds rank with respect to each other. The only exception, however, is decile 1. While outside investors are fleeing funds in decile 1, AFoMFs invest statistically significantly more in these distressed funds than in any of the other flow groups. The t-statistics we compute to test the equality of the mean AFoMF flow of decile 1 and that of each decile $i=\{2,\ldots,10\}$ range from a low of 1.76 to 9.79 with corresponding p-values that are statistically significant. The large AFoMF investment in decile 1 funds described in Figure 1 constitutes our primary evidence on liquidity provision.

[Insert Figure 1 about here]

The figure also indicates that average AFoMF flow to distressed funds is a little over 0.6%. In decile 1, the average flow from outside investors is approximately -5.6%, which means that the average AFoMF inflow represents more than 10% of the outflow. This is a very conservative estimate as our averages in Figure 1 include a generously defined investment opportunity set. When we concentrate on those funds that belong to the AFoMFs' portfolio at some point during the reporting period (i.e., exclude no-trade funds), the average AFoMF inflow offsets over 1/3 of the outflow by outside investors in decile 1. Figure 1 also suggests that AFoMFs are not following contrarian or momentum strategies. If they followed a contrarian (momentum) strategy, AFoMF flow would be negatively (positively) correlated with outsider flows. Figure 1, instead, shows a U-shaped function.

Table III provides additional confirmation that AFoMFs provide liquidity to distressed member funds in the family. The table reports the proportion of position types in each decile

and, in parenthesis, the average AFoMF flow scaled by the TNA of the fund. Column 4, for instance, indicates that AFoMFs are more active in decile 1 than in most of the other deciles. Of the funds in decile 1, only 48.24% are not held by AFoMFs. The other deciles have higher non-participation rates, the highest being decile 10, where 64.55% of the funds are not traded by AFoMFs. Column 7 tells us that AFoMFs also initiate a disproportionately large number of new positions in decile 1. The number here is 5.37%, and this new activity is the highest amongst all the deciles. The numbers in parenthesis give us qualitatively similar results if we use the average AFoMF flow for each category.

[Insert Table III about here]

To examine the relation between AFoMF flow and outside investor flow more formally, we run the following multivariate regression:

$$Flow_{j,t}^{AFoMF} = \beta_0 + (\beta_1 + \beta_2 \cdot I_{j,t}) \cdot Flow_{j,t}^{Outside} + controls + \varepsilon_{j,t}, \quad (4)$$

where $Flow_{j}^{AFoMF}$ and $Flow_{j}^{Outside}$ are AFoMF flow and outside investor flow to underlying fund *j* during the current reporting period, respectively, and I_j is an indicator that takes the value of 1 if fund *j* is distressed and 0 otherwise. The control variables are 1) measures of AFoMF liquidity represented by the contemporaneous and lagged flow AFoMFs receive from their own investors and the percentage of AFoMF assets held in cash; 2) measures of fund *j*'s liquidity represented by lagged AFoMF flow ($Flow_{j,t-1}^{AFoMF}$) and lagged outside investor flow to underlying fund *j*, fund *j*'s cash holdings, and an interaction variable between the cash holdings and distress ($I_{j,t}$); and 3) additional characteristics of fund *j* including previous performance measured by fund *j*'s Sharpe

ratio in the previous year, fund *j*'s expense ratio, and fund *j*'s size measured by average TNA in the three months immediately preceding the current portfolio period. The control variables are motivated by previous research. Existing studies find a strong relation between mutual fund performance and the subsequent flow of investor capital into or out of a fund (Chevalier and Ellison (1997), Sirri and Tufano (1998), and Del Guercio and Tkac (2002)). Flow is also found to be persistent; moreover, in our context, AFoMF flow is likely to be influenced by the liquidity of the fund and the AFoMF.

We estimate Equation 4 using the Fama-MacBeth (1973) method. Table IV reports the results. Consistent with the univariate analyses above, the regression results (the β_1 coefficient) indicate a generally positive and significant relation between AFoMF flow and outside investor flow. For distressed funds however, this relation is significantly negative, and is represented by the sum of the β_1 and β_2 coefficients, which are the coefficients in the first two rows. The coefficient estimates indicate that a 1% decrease in outside investor flow from distressed funds results in a 0.04%-0.08% increase in flows from family AFoMFs.

[Insert Table IV about here]

B. AFoMF Flows and non-AFoMF Flows – Various Sub-Groups

In this section, we examine the insight that if the results are really due to liquidity provision by the AFoMFs, the results should be different for different sub-groups of funds. For each sub-group, we first present univariate results that repeat the analysis conducted to obtain Figure 1. We then provide a multivariate formal test by running the multivariate regression

given in Equation 4 for each sub-sample.

First, if AFoMF activity reflects liquidity provision for the underlying fund, we expect the behavior not to exist for funds that rarely need liquidity support. Since fire sales are not much of an issue for near cash funds (money market funds or Treasury funds) – an exception is the fire sales of some money market funds during the 2008-09 financial crisis – or not an issue at all for ETFs, the liquidity provision hypothesis predicts little AFoMF help here. Panel A of Figure 2 reports our univariate results for these funds. As shown, there is no spike in the lowest flow decile: AFoMFs provide little liquidity to the distressed near cash fund or the ETF.

[Insert Figure 2 about here]

In Column 1 of Table V, we run our multivariate regression for near cash (money market funds and Treasury funds) and ETF holdings. As can be seen, the β_2 coefficient is insignificant. This is consistent with the interpretation that there is no liquidity provision by AFoMFs for distressed funds that do not need liquidity support.

[Insert Table V about here]

Second, if the results are really due to liquidity provision, the liquidity position of AFoMFs should not matter. Alternatively, an innocuous correlation could be at work. In particular, the distress of ordinary funds may simply coincide with significant inflows to AFoMFs from their own shareholders. Since AFoMFs have to invest the money they receive from their investors, such correlation would also result in high AFoMF inflow in high outside investor outflow periods. Therefore, under this alternative explanation, it matters whether the AFoMFs are cash rich or cash poor.

In Figure 1 above, average AFoMF flow is positive in each of the ten bins. This is because AFoMFs grew significantly during our sample period. Since AFoMFs are also mutual funds, their portfolio allocation decisions are related to their budget constraints, that is, to the investment/redemption decisions of their own investors. Analogous to Equation 1 above, we calculate the flow to all AFoMFs in family *k* as follows:

$$AFoMFflow_{k,t} = \frac{\sum_{i=1}^{n_k}(TNA_{i,t}^{AFoMF} - TNA_{i,t-1}^{AFoMF} \cdot (1 + r_{i,t}^{AFoMF}))}{\sum_{i=1}^{n_k} TNA_{i,t-1}^{AFoMF}} \tag{5}$$

where TNA_i^{AFoMF} is AFoMF *i's* total assets under management and r^{AFoMF} is the net-of-fees return of the AFoMF for the relevant time period. In our sample, in over 75% of the observations, investor flows to family AFoMFs are non-negative, that is, AFoMFs are generally cash rich. In contrast, approximately 51% of fund portfolio periods feature non-negative investor flows among ordinary mutual funds. In addition, even when AFoMFs face outflows, the magnitude of the flow is much less severe. In our sample, the 10th flow percentile for AFoMFs is -0.9% compared to -2.6% for ordinary mutual funds.[14]

To examine whether the tendency of AFoMFs to heavily invest in decile 1 funds is influenced by the AFoMF's own budget constraint, we sort each outside investor flow decile into further deciles based on the AFoMFs' own flow from Equation 5 above. The purpose of this double sort is to investigate distress periods in which AFoMFs are cash poor. A family's

[14] In our analyses, we aggregate all AFoMFs of a given family into a single entity. This probably is also contributing to observing smaller outflows for AFoMFs.

AFoMFs are defined to be cash poor if they belong to the bottom decile of investor flows to the family's AFoMFs. Panel B in Figure 2 reports the results. The figure reveals that AFoMFs allocate a disproportionate amount of money to distressed funds even when the AFoMFs are cash poor: their average flow to decile 1 funds is statistically significantly larger than average flow to any other decile. Column 2 in Table V is our multivariate formal test of Panel B in Figure 2. The test is run only for cash poor AFoMFs. The table shows that the β_2 coefficient is negative and significant at 10%, implying that there is liquidity provision even by cash poor AFoMFs.[15]

Third, if the results are really due to liquidity provision, AFoMFs should provide liquidity for transient shortfalls rather than persistent shortfalls. This is because persistent shortfalls signal that the underlying fund's troubles are deeper than just bad luck. Such a fund is not likely to be helped, because it is bad marketing for any fund to invest in an imploding fund, or the plug needs to be pulled because of unbearable losses.

To investigate this issue, we define a persistently distressed fund as one whose outside investor flows for the previous year are in the lowest decile. Panel C in Figure 2 reproduces Figure 1 for the sub-sample of persistently distressed funds. The graph shows no spike in the lowest decile. The multivariate results are summarized in Column 3 in Table V. Though individually statistically significant, the sum of the β_1 and β_2 coefficients is statistically insignificant (p-value of 0.3754). This is consistent with the interpretation that there is no

[15] The results hold for all deciles, cash poor to cash rich. The p-values are more significant for the cash rich deciles.

liquidity provision by AFoMFs for distressed funds whose liquidity shortfalls are persistent.[16]

Fourth, if the results are really due to liquidity provision, unaffiliated funds of mutual funds (UFoMFs) should not provide liquidity support. As UFoMFs are funds that can only invest in mutual funds not affiliated with their families, the liquidity provision story does not make sense for them. Panel D in Figure 2 graphs the average UFoMF flow by outside investor flow deciles. As can be seen, there is no spike in the lowest decile: UFoMFs do not provide liquidity to their portfolio funds. Column 4 in Table V is a multivariate formal test of Panel D in Figure 2. The test is run only for UFoMFs. Consistent with our univariate result, the β_2 coefficient is statistically insignificant. We should interpret this test with caution, however, because UFoMFs face very different regulatory constraints (restrictions on investment size) than AFoMFs. More importantly, the investment opportunity set of UFoMFs is nearly the entire mutual fund universe, which is impossible to accommodate in some of our test designs described above. This restricts us to define the investment opportunity set of UFoMFs as the set of mutual funds in which they invest in our sample.

Fifth, if AFoMF activity reflects liquidity provision for the underlying fund, we expect the behavior to exist more for funds that are less liquid because fire-sales caused by extreme redemptions are more costly for these funds. As U.S. equity markets are one of the most liquid markets in the world, we remove all near cash and ETF holdings, and split the remaining sample into two sub-groups: U.S. equity funds and the rest. The univariate results in Panel E of Figure 2

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[16] We also redefine persistent distress in terms of returns. A persistently distressed fund is a fund whose style-adjusted performance is below the 10th percentile of its distribution. We find that AFoMFs provide no liquidity support to such funds.

show that the spike in the lowest decile is higher for all other funds ((ii) in Panel E of Figure 2) than it is for U.S. equity funds ((i) in Panel E of Figure 2). More liquidity support by AFoMFs exists for less liquid distressed funds. Mean investment is also higher across all deciles for non-U.S. funds, indicating that a multivariate comparison is warranted.

In Column 5 of Table V we re-estimate Equation 4 with one additional variable. This variable is an interaction term between three variables: I, which, as before, is an indicator that takes the value of 1 when fund j is distressed and 0 otherwise; I^{ILLIQ}, which is an indicator variable that takes the value of 0 if fund j is a U.S. equity fund and 1 if it is not; and outside investor flow in fund j during the portfolio period. The column shows that the β_3 coefficient on this interaction variable is negative and significant. This is consistent with the interpretation that though there is liquidity provision by AFoMFs for distressed funds, the provision is stronger for less liquid funds that need this support more.

Sixth, as it is more costly for ordinary mutual funds to engage in liquidity trades when the redemption requests they face are style-wide, because a single fund experiencing a fund-specific shock can easily sell its existing positions as long as other funds are there to buy,[17] it follows that liquidity provision by AFoMFs should be stronger if the distress is style-wide.

We label mutual fund j as a style-wide distress fund if many funds in its style category are also suffering from a liquidity event. In every reporting period, we calculate for every fund j in its style s the ratio of $Flow_{j,t}^{Outside}$ to its cash holdings. We then average this ratio for all funds in

[17] This argument is motivated by Coval and Stafford (2007), who study domestic equity funds. Since we focus on all AFoMF holdings, rather than only equity funds, price impact is a concern even when the fund is experiencing a fund-specific shock. Nonetheless, the fund's problem is further exacerbated when similar funds are also struggling.

style s and sort these style averages into deciles. Style s is said to suffer a style-wide liquidity event if it falls in the lowest decile.

Panel F in Figure 2 reports that the spike in the lowest decile is higher when the fund is experiencing a style-wide distress ((i) in Panel F of Figure 2) than when it is suffering from a fund-specific distress ((ii) in Panel F of Figure 2). The corresponding multivariate result is reported in Column 6 in Table V. We again augment Equation 4 with one additional variable. This variable is an interaction term between three variables: I, which, as before, is an indicator that takes the value of 1 when fund j is distressed and 0 otherwise; I^{SYST}, which is an indicator variable that takes the value of 1 if fund j is experiencing a style-wide liquidity shock and 0 otherwise; and outside investor flow in fund j during the portfolio period. In Column 6, the β_3 coefficient on this indicator variable is negative and significant. This suggests that AFoMFs provide more liquidity support to funds that are experiencing a style-wide shock.

III. Possibility of Other Interpretations

A. Is it Asset Allocation?

Thus far, our results are consistent with the argument that AFoMFs provide liquidity to distressed family funds to help these funds avoid costly liquidity trades, which is our null hypothesis. However, AFoMF investment in distressed funds may not be aimed at helping these funds. An alternative explanation, as suggested to us by several fund managers, is that many AFoMFs are asset allocation or target date funds that maintain target weights in various asset classes. This implies a mechanical injection of inflows into any distressed fund whose asset

class value has fallen below the target.

To check for this, we construct a variable, 'asset allocation,' which is defined as the difference between the weight the AFoMFs of the family place in the asset class of fund *j* at the beginning of the current portfolio period and their target weight. The manager knows the target weight, but we do not. We assume the target weight is the average of the weight over time in an asset class for the whole sample period.

We now run the same multivariate regression given in Equation 4 with this additional indicator variable. Column 1 in Table VI gives the results. The table shows that the coefficient on this 'asset allocation' variable is indeed negative, implying that AFoMFs invest in (take money out of) funds whose asset class weight falls below (rises above) the target weight. This supports the asset allocation hypothesis. However, the β_2 coefficient continues to remain negative and significant. This is consistent with the interpretation that AFoMFs' preference for distressed funds cannot be fully explained by asset allocation.

Using the name of the AFoMF for identification, we notice that approximately 32% of our AFoMFs are target date funds and about 19% are other asset allocation funds. We now define a variable, I^{TGT}, as an indicator variable that equals one when at least 50% of the AFoMFs in fund *j*'s family are target date or asset allocation funds. We interact this indicator variable with our 'asset allocation' variable. Column 2 in Table VI gives the results. The column shows that the coefficient on the 'asset allocation' variable is insignificant, but the coefficient on the interaction variable is negative and significant. This suggests that asset allocation mainly occurs for these special types of funds, which reveals that our 'asset allocation' measure is valid.

However, the β_2 coefficient continues to remain negative and significant.

[Insert Table VI about here]

B. Is it a Cross-Subsidy to Favored Funds?

Gaspar et al. (2006) argue that family strategies aimed at maximizing total revenue are often directed towards helping high-value funds. They define high-value funds as those funds that either exhibit good previous performance or charge high fees. The argument for supporting funds that have performed well in the past is based on Nanda et al. (2004), who show that star funds in the family attract flows to other member funds as well. Therefore, it is possible that our findings simply describe another star protection strategy. To investigate this issue, we sort member funds into deciles based on past performance. For measures of past performance, we use their 1) the Sharpe ratio; 2) cumulative return; and 3) style adjusted return in the past 3 months, 1 year and 3 years. For the longer look-back horizon of 3 years, we also add the four- and seven-factor alphas as alternative measures.

We run, using the Fama-Macbeth methodology, the multivariate model in Equation 4 for each of the ten deciles under each performance metric. Table VIII in the Internet Appendix B summarizes the results. Table VIII.1 in the Internet Appendix B gives the results using pooled regressions. Independent of how we measure previous performance, the tables reveal that liquidity provision does not merely involve high-value funds in the family. Except for the very worst performing funds (decile 1 and decile 2), the other distressed funds are also provided liquidity. This result is consistent with our finding in Section II on persistent versus transient

illiquidity: funds with bad performance or with persistent liquidity problems are not helped.

We also repeat the analyses for fund fees, as fees are an alternative criterion for high-value funds in Gaspar et al. (2006). We find that liquidity provision is prevalent in all fee deciles. These results are not tabulated in the paper.

A mutual fund manager may manage multiple funds side-by-side in the same fund complex, and may cross-subsidize the various funds. We compare manager names across the family AFoMFs and their holdings to check for cases when an AFoMF and its portfolio funds share the same manager. For team managed funds, we check each name individually. We find that at least one of the managers overlaps in a little less than 5% of the sample. We then divide our sample into those reporting periods for which the underlying fund and the AFoMF share the same manager and those for which they do not. We find overinvestment in distressed funds in both sub-samples. These results are not reported.

C. Is it Inside Information?

A powerful alternative explanation is that AFoMFs favor distressed funds due to information based reasons. For example, AFoMFs may know more about the funds than outside investors because they are in the same family. Or, alternatively, they may use extreme outflow by retail investors as a contrarian signal to buy if retail investors consistently make mistakes when evaluating a certain group of funds, or if retail investors overreact to signals about these funds.[18]

[18] Frazzini and Lamont (2008), Ben-Rephael et al. (2010a,b), and Edelen, Marcus, and Tehranian (2010) suggest that a counter-tilting strategy may be profitable.

We follow the smart money literature (see, for instance, Gruber (1996), Zheng (1999), or Sapp and Tiwari (2004)) and form portfolios at the beginning of each quarter based on whether the AFoMF bought or sold the underlying fund, respectively. Underlying funds that are bought comprise the positive flow portfolio, while those that are sold are placed in the negative flow portfolio. Within the positive and negative flow portfolios, we create two additional sub-groups. The first group includes funds experiencing distress (decile 1), and the second contains all non-distressed funds (all other deciles). We rebalance our portfolios every three months. We examine the subsequent risk adjusted performance of each portfolio. For risk adjustment, we use the Fung and Hsieh (2004) seven-factor model. The results are shown in Table IX in the Internet Appendix B. We see that AFoMF positive flows directed to distressed funds significantly underperform. This is in contrast with the positive performance of those AFoMF buys that involve non-distressed funds. These findings indicate that investing in distressed funds is not based on inside information because it is costly for the AFoMFs, but AFoMFs do appear to exhibit fund selection abilities in their other fund trades. Table IX.1 in the Internet Appendix B gives the results using the Carhart (1997) four-factor model.

IV. A Cost-Benefit Analysis

A. Is Liquidity Provision Beneficial to Funds Experiencing Severe Liquidity Shortfalls?

We examine how extreme outflows from outsiders affect the performance of the fund, and whether AFoMF inflows during these extreme outflow periods make any difference. In other words, is liquidity provision beneficial to the underlying funds? Our test is similar to the

design in Edelen (1999). We measure performance by fund alphas (abnormal return) obtained from the seven-factor model above. We use the following regression specification:

$$\alpha_{j,t} = \beta_0 + \beta_1 \cdot I_{j,t} + \beta_2 \cdot I_{j,t} \cdot Flow_{j,t}^{AFoMF} + controls + \varepsilon_{j,t} \tag{6}$$

where α_j is the abnormal monthly return of fund j, $Flow_{j,t}^{AFoMF}$ is the flow fund j receives from the AFoMFs in its family, and I_j is an indicator that takes the value of 1 if fund j is distressed (defined as above). We control for the past abnormal returns of fund j, the size of fund j, the fees charged by the fund, as well as the total flow received by fund j during the reporting period. We instrument AFoMF and total flow using lagged AFoMF and total flow, respectively.

Several issues need to be addressed before estimating Equation 6, which are carefully considered by Edelen (1999). First, flows themselves should have no impact on abnormal fund performance; they will have an effect on performance only if they induce additional trading. Therefore, in models such as Equation 6, the flow measures are only a proxy; a better right hand side variable is the actual amount of trading caused by the flow, which is not observable. Flows are bad proxies because they are often only weakly related to the amount of trading. In our case, this issue is less of a concern because extreme outflows are likely to induce sales.

The second concern is reverse causality. It emerges because flows are measured at a low frequency (monthly or quarterly). For instance, our specification is biased if the fund's performance in the early part of the portfolio period determines AFoMF flows in the later part. Moreover, flows may also be smart (Gruber (1996)); that is, they predict rather than influence returns. We follow Edelen (1999) to address these issues. In particular, we use lagged flows as instruments for our AFoMF and total flow variables, and include lagged abnormal returns as

additional controls in Equation 6 above. We estimate the lagged flow instruments (fitted value of the flow) for each fund individually using its time-series of total and AFoMF flows. In addition to the problems associated with generated regressors, the errors of the model are likely to be cross-correlated; so we use the Fama-MacBeth method to estimate Equation 6.

We report the results in Table VII. We find that the estimated β_1 coefficient is significantly negative and equals -0.0009, implying that large redemptions hurt returns, and this is probably due to costly liquidity motivated trades that have to be undertaken to meet these redemptions. We find that β_2 is positive and statistically significant, implying that though liquidity shortfalls hurt returns, this hurt is ameliorated by liquidity provision from the AFoMFs. Our estimate of β_2 is 0.0481, which means that a 1% increase in AFoMF flow during fund distress reduces the negative impact of the distress by 4.8 basis points. This is direct evidence in favor of the hypothesis that AFoMFs that fund liquidity shortfalls improve the investment performance of the mutual funds that receive such liquidity. So the sacrifice of the AFoMFs benefits the family.

[Insert Table VII about here]

B. Is The Benefit Worth The Cost?

What is the cost to the AFoMF of providing liquidity to distressed funds? We form hypothetical portfolios for each of the outside investor flow deciles. Each hypothetical portfolio consists of all funds that fall into the decile during the portfolio period weighted in proportion to the size of the AFoMF investment in these funds. We rebalance the portfolios after each

reporting period. The cost to the AFoMF is the weighted average performance of the top nine deciles minus the weighted average performance of all ten deciles. The assumption here is that if the AFoMF invested in the distressed portfolio in the same way as it invested in the other portfolios, the difference would be zero. We use the seven-factor model to evaluate the performance of the individual decile portfolios.

We find that only the decile 1 portfolio has a significantly negative alpha; all other portfolios deliver insignificant or positive performance. To calculate cost, we adopt two different weighting schemes. Our lower cost comes from equal weighting and equals 3.55 basis points a month. When we flow weight the estimated alphas, the estimated cost becomes 7.11 basis points per month. To be conservative, we take the higher estimated cost above, 7.11 basis points per month. This is the performance AFoMFs in the average family give up to support distressed funds. The average aggregate TNA of family AFoMFs in our sample is 1.73 billion. On average, 71.63 families have AFoMFs during our sample period. Multiplying these three numbers, we estimate that AFoMFs lose about $88 million a month to provide liquidity.

On the benefit side, the β_2 coefficients reported in Table VII is 0.0481. We multiply this by the average AFoMF flow to decile 1, that is, by 0.0061 (see Figure 1) to get 2.94 basis points monthly abnormal return per ordinary mutual fund. The average distressed fund has $1.44 billion under management. The average family has 3.54 distressed mutual funds a month. On average, 71.63 families have AFoMFs. Multiplying these four numbers, we estimate ordinary mutual funds in this industry save approximately $107 million per month in liquidation costs due to AFoMF help. This suggests that the benefit exceeds the cost.

We should stress here that the above calculations are back of the envelope and crude. Formal statistical tests are impossible. Nevertheless, they do imply that the liquidity provision for temporary liquidity shocks may be rational for the family. Further, these calculations overstate costs and understate benefits. First, we ignore fund fees. For instance, though AFoMF expense ratios are lower than the expense ratio of ordinary funds, these are fees on fees, and for affiliated funds, both fee layers accrue to the family. It is not clear how to determine the double layer fee, that is, how the fees AFoMFs actually pay to ordinary funds are related to the expense ratio of these funds reported in CRSP (because of, for instance, the prevalence of waivers and quantity discounts). Second, we ignore the potential flow consequences of the performance transfer from AFoMFs to distressed mutual funds. Better performance is likely to increase the size of the ordinary distressed fund, but lower AFoMF performance is less likely to affect the size of AFoMFs, due to the convex nature of the flow-performance relationship. Third, and finally, we overstate the AFoMF cost, because our calculations ignore the fact that in many cases, the AFoMFs already have a position in the underlying distressed fund, and so part of the benefit of mitigating fire sales is accruing to the AFoMFs.[19]

V. Robustness

In Internet Appendix B, we verify our results using pooled regressions with time- and family-fixed effects. Tables IV.1, V.1, VI.1 and VII.1 are the equivalents of the Fama-Macbeth

[19] AFoMFs provide liquidity even in cases when they do not have a previous position (i.e., liquidity provision is not simply self-serving). In section III we show that AFoMFs open more new positions in decile 1 funds than in any other flow decile.

Tables IV, V, VI and VII, respectively. Finally, in untabulated analyses, we verify our results in Tables IV, V, and VI using style-adjusted, as well as four- and the seven-factor abnormal returns.

Second, our data are from 2002 to 2007. We now hand-collect the data for 2008 and 2009 to ask whether there is any change in the behavior of the AFoMFs during the financial crisis. Table IV.2 in the Internet Appendix reproduces Table IV for the 2008-09 period. As can be seen, the β_2 coefficient is still negative and statistically significant. This is consistent with the interpretation that there is liquidity provision by AFoMFs for distressed funds even during the financial crisis. However, as expected, the liquidity provision is less than before (the magnitude of the β_2 coefficient is now less than half of the magnitude during the 2002-07 period).

Third, we redefine the investment opportunity set of the AFoMF in two extreme ways. These two ways have been discussed in Section II.A above. Table IV.3 in the Internet Appendix shows that the results remain for these extreme cases. Fourth, low frequency data may mask significant trading during the portfolio period. We run our tests again using the sub-sample of AFoMFs where we actually have monthly data. As can be seen in Table IV.4 in the Internet Appendix, the results remain. Fifth, since part of the AFoMF flow may come from mechanical/automatic dividend reinvestments, our estimate of the strategic AFoMF inflow may be upward-biased. To address this issue, we run our tests again using dividend-adjusted flow. Table IV.5 in the Internet Appendix shows that our results remain.

Finally, throughout the paper, we express AFoMF investment as a percent of the underlying fund's size (i.e., scale by $TNA_{j,t-1}$). Though this measures the importance of liquidity provision to the fund, it does not measure its importance to the AFoMF. Moreover, it could be

that we are artificially getting a U-shape in Figure 1 because the lowest and the highest deciles are populated by smaller funds. To check for this, Figure 1.1 in the Internet Appendix reproduces Figure 1 by expressing AFoMF flow as a percent of the family AFoMFs' assets instead (i.e., we scale Equation 2 by $\sum_i TNA_{i,t-1}^{AFoMF}$). As can be seen, the largest fraction of AFoMF resources, amounting roughly to 0.5% of the AFoMF assets, goes to the distressed fund decile. The pairwise difference with other deciles is statistically significant.

VI. Conclusion

Using a data set of affiliated funds of mutual funds, which are mutual funds that only invest in funds in their own families, we document that AFoMFs offset severe liquidity shortfalls of other funds in their fund complex. We show that though this action reduces their own investment performance, this sacrifice does benefit the family. It improves the investment performance of the mutual funds that receive such liquidity because it prevents them from doing fire sales. Finally, we show that the benefit exceeds the AFoMF cost, which suggests that the cross-subsidy is rational for the family as a whole.

The managers of target funds are happy because they are benefiting from the liquidity provision. Family headquarters is happy because the family has a net benefit. The manager of the AFoMF may be happy with an appropriate compensation scheme that is also tied to family performance. So the only group that may be unhappy about providing free insurance is the AFoMF investors. But they may be unaware that this insurance is being provided.

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Figure 1. Do AFoMFs Favor Distressed Funds?

This graph reports average AFoMF flow to the underlying funds by outside investor flow deciles. We divide total flow to ordinary mutual fund j in family k into AFoMF flow and non-AFoMF flow, that is, net flow by all other investors. Total dollar flow is estimated by

$$Flow^{Total}_{j,k,t} = TNA_{j,t} - TNA_{j,t-1} \cdot (1 + r_{j,t})$$

where TNA_j is the total assets under management of the jth fund and r_j is the net-of-fees return for the relevant time period. Flow from AFoMFs is determined by:

$$Flow^{AFoMF}_{j,k,t} = \sum_{i=1}^{n_k} \Delta shares_{i,j,t} \cdot NAV_{j,t}$$

where $\Delta shares_{i,j}$ is the change in the number of shares held by AFoMF i in fund j during the reporting period, n_k is the number of AFoMFs in family k, and NAV_j is the net asset value of fund j. Finally, non-AFoMF or outside investor flow is expressed as follows:

$$Flow^{Outside}_{j,k,t} = Flow^{Total}_{j,k,t} - Flow^{AFoMF}_{j,k,t} \, .$$

All three flow measures are normalized by $TNA_{j,t-1}$. Outside investor flow deciles are determined by sorting our sample into deciles based on normalized $Flow^{Outside}_{j,k,t}$. Decile 1 collects the underlying funds that receive the lowest percentage flow (highest outflow) from outside investors, while Decile 10 includes funds with the highest outside investor flow. The dashed line in the graph indicates the breakpoint between negative and positive average non-AFoMF flow. In the graph below, the X-axis denotes outside investor flow deciles, while the Y-axis denotes average percentage flow from AFoMFs.

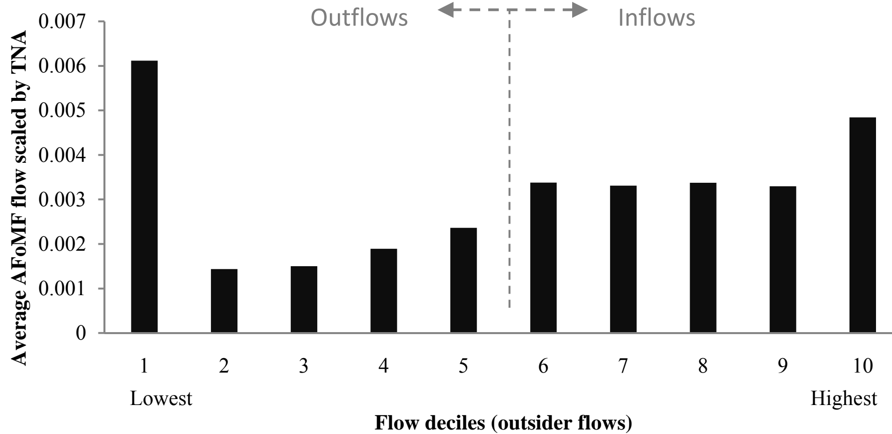
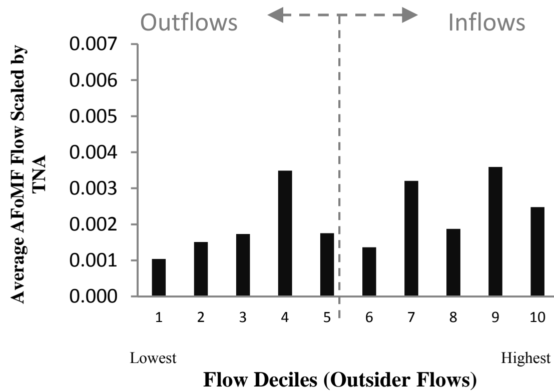


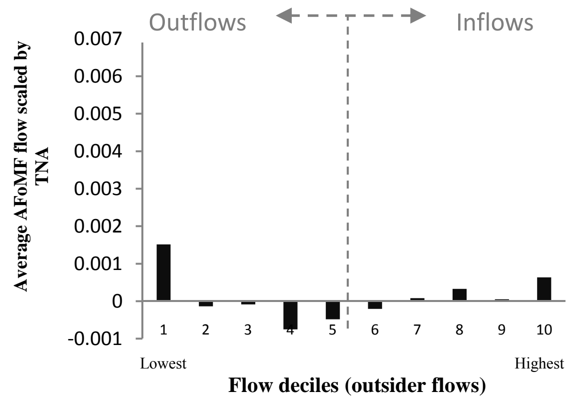
Figure 2. Sub-sample Characteristics of Liquidity Provision

The figure reports average AFoMF flow to the underlying funds by outside investor flow deciles. We calculate total flow, AFoMF flow, and non-AFoMF flow using the formulas described in Figure 1. Decile 1 collects the underlying funds that receive the lowest percentage flow (highest outflow) from outside investors, while Decile 10 includes funds with the highest outside investor flow. The figure depicts sub-sample results based on the following characteristics. In Panel A, we calculate the average AFoMF flow by outside investor flow deciles for underlying funds that fall into the categories of ETFs, money market funds, or Treasury funds. We then remove these funds from our sample for the rest of the analysis. In Panel B, we restrict our sample to cash poor AFoMFs. To denote AFoMFs as cash poor, we sort our sample into deciles based on investor flow to AFoMFs. "Cash Poor" is the bottom decile. In Panel C, we restrict our sample to funds whose distress is persistent (defined as mutual funds in the bottom decile, when funds are ranked into deciles based on their outsider flows in the year immediately preceding the current portfolio period). In Panel D, we restrict our sample to unaffiliated funds of mutual funds (UFoMFs). In Panel E, we restrict our sample to U.S. equity funds and then the rest. In Panel F, we restrict our sample to style-wide distress funds and then fund-specific distress funds. A style-wide distress fund is a mutual fund that is in a style that is suffering a style-wide liquidity event. Every month we calculate for every fund j in style s the ratio of $Flow_{j,t}^{Outside}$ to its cash holding, and average this ratio for all funds in a particular style s. We then sort these style averages into deciles. Style s is said to be experiencing a style-wide (fund-specific) liquidity event if it falls in the lowest (highest) decile.

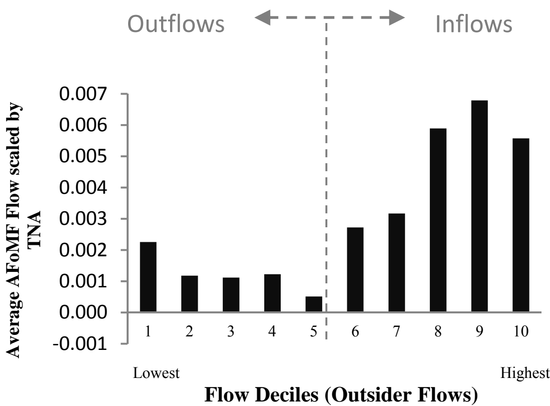
Panel A
Near Cash Holdings and ETFs



Panel B
"Cash Poor" AFoMFs



Panel C
Funds Experiencing Persistent Outflows



Panel D
Unaffiliated Funds of Mutual Funds

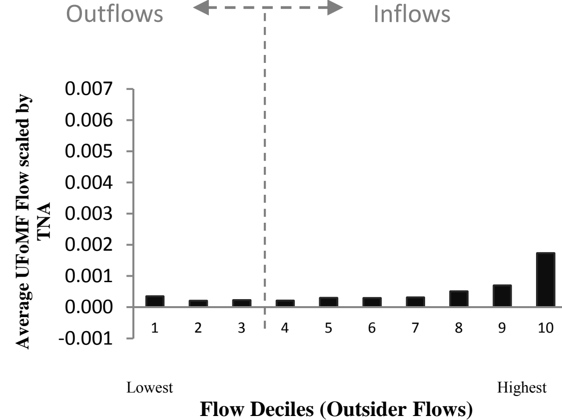
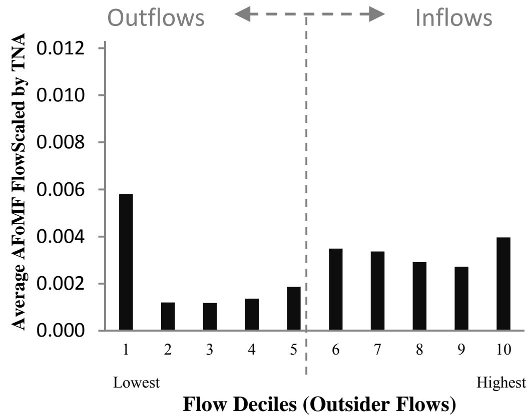


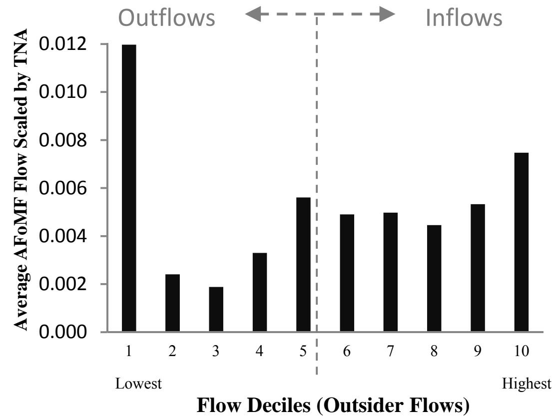
Figure 2 (*continued*)

Panel E

(i) US equity funds

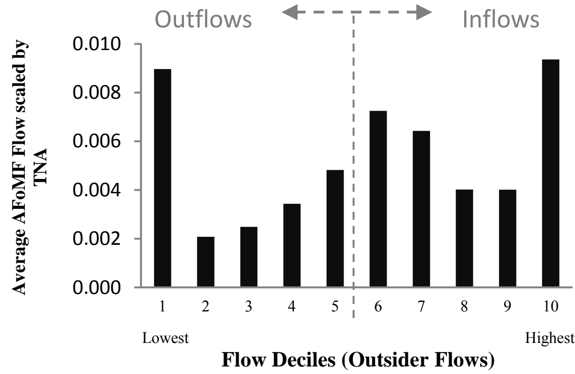


(ii) All other funds



Panel F

(i) Style-wide Distress



(ii) Fund-specific Distress

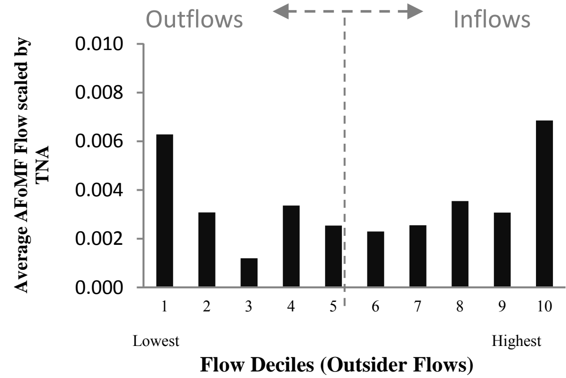


Table I. Descriptive Statistics of Fund Families

This table provides summary statistics of mutual fund families in our sample. Panel A describes fund families that offer AFoMFs. For comparison, Panel B lists the characteristics of those mutual fund families that offer unaffiliated FoMFs (UFoMFs), while Panel C lists summary statistics of families with no fund of funds products. The summary statistics are 1) the number of families in each group; 2) the total number of fund families in the mutual fund universe; 3) the average size of the assets under management by each fund family; 4) the average number of ordinary mutual funds and 5) FoMFs available in each family; and 6) the average proportion of assets under management by the aggregate FoMF relative to the size of the corresponding fund family.

Panel A: AFoMFs

Year	Number of Families with AFoMFs	Total Number of Fund Families	Average Size of Family with AFoMFs (in $ Billions)	Average Number of Ordinary Funds per Family with AFoMFs	Average Number of AFoMFs per Family with AFoMFs	Average Size of Aggregate AFoMFs Relative to the Size of Family with AFoMFs
2002	63	651	57.7	48	4	6.10%
2003	66	645	64.6	48	4	7.00%
2004	76	616	68.3	50	4	9.00%
2005	80	626	74.5	52	5	11.00%
2006	84	613	82.7	52	6	11.90%
2007	86	620	113.6	57	6	10.50%

Panel B: UFoMFs

Year	Number of Families with UFoMFs	Total Number of Fund Families	Average Size of Family with UFoMFs (in $ Billions)	Average Number of Ordinary Funds per Family with UFoMFs	Average Number of UFoMFs per Family with UFoMFs	Average Size of Aggregate UFoMFs Relative to the Size of Family with UFoMFs
2002	23	651	4.9	14	5	25%
2003	23	645	2.3	10	4	44%
2004	27	616	2.8	11	4	49%
2005	34	626	2.7	11	4	45%
2006	42	613	8.4	15	5	29%
2007	47	620	48.9	25	6	14%

Panel C: Others

Year	Number of Families without FoMFs	Total Number of Fund Families	Average Size of Family without FoMFs (in $ Billions)	Average Number of Ordinary Funds per Family without FoMFs
2002	565	651	9.2	11
2003	556	645	10.8	11
2004	513	616	12.6	12
2005	512	626	13.8	12
2006	487	613	16.7	12
2007	487	620	20.2	13

Table II. Comparison of Mutual Funds in Family Held by AFoMF and Mutual Funds in Family Not Ever Held by AFoMF

This table compares funds in the family that are held by AFoMFs to those that are not ever held by AFoMFs though their style is consistent with the investment objectives of the AFoMFs in the family. Various fund characteristics are compared including outside investor flow, size (measured by total net assets under management), age, expense ratio, previous performance (measured by the previous year's cumulative raw return, the Sharpe ratio, and the seven-factor before fees alpha), and flow-performance sensitivity. Flow-performance sensitivity is measured by regressing the percentage flow of each fund on the average monthly raw returns over the past 12 months and the square of the average monthly raw returns over the past 12 months. In this table, we report the coefficient of the return squared variable. *P-value* indicates the significance of a *t*-test comparing the mean values of each fund statistic across the group of family funds held and not held by AFoMFs, respectively.

	Mutual Funds in Family Held by AFoMF	Mutual Funds in Family Not Ever Held by AFoMF	p-value
Non-AFoMF flow/TNA	0.42%	1.32%	<0.0001
Flow from AFoMFs/TNA	0.80%	N/A	
Size in $ Billions (previous year TNA)	2.30	1.66	<0.0001
Size in $ Billions (excluding AFoMFs' stake)	2.06	1.66	<0.0001
Age (years)	9.46	11.53	0.0023
Minimum expense ratio	0.86%	0.84%	0.0004
Index funds	11.05%	17.81%	<0.0001
Raw return (annual)	11.76%	11.61%	0.3578
Sharpe ratio	0.24	0.22	0.6152
Seven-factor alpha (gross)	0.11%	0.07%	0.0843
Flow-performance sensitivity	9.48	11.79	0.9076
Number of fund portfolio periods	12,122	12,371	

Table III. Do AFoMFs Favor Distressed Funds? (Univariate Test)

This table examines how AFoMFs' mutual fund holdings change conditional on outside investor flow to the holding. First, we divide total flow to mutual fund *j* in family *k* into AFoMF flow and non-AFoMF flow, that is, the net flow by all other investors. Total dollar flow is estimated by

$$Flow^{Total}_{j,k,t} = TNA_{j,t} - TNA_{j,t-1} \cdot (1 + r_{j,t})$$

where TNA_j is the total assets under management of the jth fund and r_j is the net-of-fees return for the relevant time period. Flow from AFoMFs is determined by:

$$Flow^{AFoMF}_{j,k,t} = \sum_{i=1}^{n_k} \Delta shares_{i,j,t} \cdot NAV_{j,t}$$

where $\Delta shares_{i,j}$ is the change in the number of shares held by AFoMF i in fund j, n_k is the number of AFoMFs in family k, and NAV_j is the net asset value of fund j. Finally, non-AFoMF or outside investor flow is expressed as the difference between total dollar flow and flow from AFoMFs. All three flow measures are normalized by $TNA_{j,t-1}$. We sort our sample into deciles based on normalized $Flow^{Outside}_{j,k,t}$. Decile 1 collects the underlying funds that receive the lowest percentage flow (highest outflow) from outside investors, while Decile 10 includes funds with the highest outside investor flow. For each outside investor flow decile, the table reports the average fraction of the AFoMF positions in the AFoMFs' investment opportunity set that are maintained (no change in position), eliminated (complete liquidation of the current position), new positions (complete new buy), reduced (decrease in the current position), or expanded (increase in the current position). Reported proportions are based on the total number of funds in the AFoMF's investment opportunity set (i.e., all family funds whose investment objectives are consistent with the investment objectives of the AFoMFs in the family). The number in parenthesis reports the average AFoMF flow in each category (as a fraction of the portfolio fund's TNA).

			Fraction of positions (Average AFoMF Flow scaled by TNA)					
Decile	N	Average Non-AFoMF Flow	Not Held by AFoMF	Maintained	Eliminated	New Position	Reduced	Expanded
1 (largest outsider *out* flows)	2439	-0.0558	48.24% (0)	2.91% (0)	0% (0)	5.37% (0.053)	12.67% (-0.006)	30.81% (0.0155)
2	2451	-0.0202	51.7% (0)	4.77% (0)	0% (0)	2.12% (0.018)	12.65% (-0.0036)	28.76% (0.0057)
3	2453	-0.0131	50.8% (0)	3.91% (0)	0% (0)	1.96% (0.0126)	14.02% (-0.0028)	29.31% (0.0049)
4	2449	-0.0082	48.35% (0)	2.82% (0)	0.04% (-0.0017)	0.98% (0.0112)	12.21% (-0.004)	35.6% (0.0065)
5	2448	-0.0037	48.43% (0)	3.43% (0)	0.04% (-0.0009)	0.82% (0.0121)	12.87% (-0.0044)	34.42% (0.0079)
6	2457	0.0008	45.42% (0)	3.42% (0)	0% (0)	0.85% (0.023)	12.29% (-0.0037)	38.01% (0.0089)
7	2452	0.0068	45.19% (0)	2.41% (0)	0.04% (-0.0014)	1.14% (0.0115)	10.52% (-0.0037)	40.7% (0.0095)
8	2450	0.0161	49.18% (0)	2.82% (0)	0% (0)	1.14% (0.0252)	9.1% (-0.0037)	37.76% (0.0098)
9	2454	0.0341	53.3% (0)	2.77% (0)	0% (0)	1.55% (0.0193)	9.74% (-0.0042)	32.64% (0.0112)
10 (largest outsider *in* flows)	2440	0.1309	64.55% (0)	1.68% (0)	0% (0)	2.95% (0.0419)	6.64% (-0.0063)	24.18% (0.0192)

Table IV. Do AFoMFs Favor Distressed Funds?

The table lists the results of the following regression specification:

$$Flow_{j,t}^{AFoMF} = \beta_0 + (\beta_1 + \beta_2 * I_{j,t}) * Flow_{j,t}^{Outside} + controls + \varepsilon_{j,t}$$

where $Flow_{j,t}^{AFoMF}$ is the percentage flow from AFoMFs to underlying fund *j* during portfolio period *t*, $Flow_{j,t}^{Outside}$ is the net flow by all other investors to fund *j*, and $I_{j,t}$ is an indicator variable that equals one when mutual fund *j* is distressed (defined as a f und in the bottom decile, when funds are ranked into deciles based on their outside flows, $Flow_{j,t}^{Outside}$) and 0 otherwise. The control variables are 1) measures of AFoMF liquidity represented by the contemporaneous and lagged flow AFoMFs receive fro m their own investors and the percentage of AFoMF assets held in cash; 2) measures of fund *j*'s liquidity proxied by lagged AFo MF flow ($Flow_{j,t-1}^{AFoMF}$) and lagged outside investor flow, fund *j*'s cash holdings, and an interaction variable between cash hold ing and distress ($I_{j,t}$); and 3) additional characteristics of fund *j* including previous performance measured by fund *j*'s Sharpe rati o in the previous year, fund *j*'s expense ratio, and fund *j*'s size measured by assets under management in the previous portfolio pe riod. We estimate the above model by using the Fama-MacBeth (1973) method. Statistical significance at the 1, 5, and 10% level s is denoted by '***', '**', and '*', respectively. The number of observations is denoted by *N*, and p-values are in parentheses.

	(1)	(2)	(3)	(4)
Outside Investor flow (β_1)	0.0098*	0.0096*	0.0061	0.0191
	(0.0696)	(0.0908)	(0.1541)	(0.1139)
I*outside investor flow (β_2)	-0.0504***	-0.0650***	-0.0632***	-0.0527***
	(0.0001)	(0.0026)	(0.0019)	(0.0039)
Measures of AFoMF liquidity:				
Flow to AFoMF (budget constraint)	0.0687***	0.0536***	0.0556***	0.6664
	(0.0010)	(0.0095)	(0.0036)	(0.2184)
Lag(Flow to AFoMF)	-0.0072	0.0036	-0.0049	-0.4803
	(0.2048)	(0.7082)	(0.3259)	(0.2699)
AFoMF's cash position				-0.1789
				(0.2542)
Measures of fund *j*'s liquidity:				
Lag(Flow from AFoMF)	0.3940***	0.3914***	0.3953***	0.5928**
	(0.0000)	(0.0000)	(0.0000)	(0.0370)
Lag(Outside investor flow)	0.0084**	0.0088**	0.0079**	-0.0032
	(0.0413)	(0.0164)	(0.0410)	(0.6575)
Fund *j*'s cash position		0.0006	0.0074***	0.0025
		(0.9259)	(0.0018)	(0.6267)
I*Fund *j*'s cash position			-0.0037	0.0894
			(0.7221)	(0.3808)
Other fund characteristics:				
Fund j's pervious performance	-0.0003	0.0001	0.0002	-0.0010
	(0.4638)	(0.9602)	(0.7198)	(0.3423)
Fund j's exp ratio	-0.0771**	-0.0710**	-0.0634*	-0.0779
	(0.0427)	(0.0465)	(0.0684)	(0.1075)
Fund *j*'s size	-0.0006***	-0.0006***	-0.0006***	-0.0004***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)
N	20623	19500	19500	13202
Adj. R-Sqr	0.3065	0.2973	0.2989	0.3594

Table V. Do AFoMFs Favor Particular Types of Distressed Funds?

Columns 1-4 list the results of the following regression specification given in Column 3 of Table IV. In Colu mn 1, we estimate the regression for near cash holdings (money market funds and Treasury holdings) and ETFs. We then remove these funds from our sample for the rest of the analysis. In Column 2, we estimate the regression for cash poor AFoMFs. To denote AFoMFs as cash poor, we sort our sample into deciles based on fund flow to AFoMFs. "Cash Poor" is the bottom decile. Column 3 estimates the model for funds whose distress is persistent (defined as mutual funds in the bottom decile, when funds are ranked into deciles based on their outside flows in the previous year). Column 4 reports results for the unaffiliated funds of mutual funds. In Column 5, $I^{*}_{j,t} = I^{ILLIQ}_{j,t}$ is an indicator variable that equals one if mutual fund *j* is not a U.S. equity fund. In Column 6, $I^{*}_{j,t} = I^{SYST}_{j,t}$ is an indicator variable that equals one if mutual fund *j* is in a style that is experiencing a style-wide liquidity event. Every month we calculate for every fund *j* in style *s* the ratio of $Flow^{Outside}_{j,t}$ to its cash holdings and average this ratio for all funds in a particular style *s*. We then sort these style averages into deciles. A style is said to suffer a style-wide liquidity event if it falls in the lowest decile. We estimate the above model by using the Fama-MacBeth (1973) method. Statistical significance at the 1, 5, and 10% levels is denoted by '***', '**', and '*', respectively. The number of observations is denoted by *N*, and p-values are in parentheses.

	(1)	(2)	(3)	(4)	(5)	(6)
Outside Investor flow (β_1)	0.0086	-0.0091	0.0528*	0.0042***	0.0083	0.0061
	(0.6966)	(0.6047)	(0.0809)	(0.0004)	(0.1383)	(0.1887)
I*outside investor flow (β_2)	-0.0274	-0.0339*	-0.0792**	0.0065	-0.0517**	-0.0377**
	(0.4667)	(0.0933)	(0.0423)	(0.2358)	(0.0110)	(0.0476)
I^{ILLIQ}* I*outside investor flow (β_3)					-0.0300*	
					(0.0773)	
I^{SYST}* I*outside investor flow (β_3)						-0.0592*
						(0.0623)
Measures of AFoMF liquidity:						
Flow to AFoMF (budget const)	0.0356	-0.1677	0.0448*	0.0035	0.0451***	0.0446***
	(0.1839)	(0.5274)	(0.0543)	(0.2963)	(<0.0001)	(0.0002)
Lag(Flow to AFoMF)	0.0637	0.0099	0.0057	0.0023	-0.0036	-0.0020
	(0.1333)	(0.8947)	(0.6353)	(0.1253)	(0.5536)	(0.7395)
Measures of fund *j*'s liquidity:						
Lag(Flow from AFoMF)	0.2793***	0.9387	0.4369***	0.1661**	0.3938***	0.3521***
	(0.0030)	(0.2673)	(0.0003)	(0.0122)	(<0.0001)	(<0.0001)
Lag(Outside investor flow)	-0.0231	-0.0179	-0.0109	-0.0024**	0.0088**	0.0078*
	(0.2020)	(0.3490)	(0.4042)	(0.0447)	(0.0373)	(0.0632)
Fund *j*'s cash position	0.0099	0.0216	0.0155	-0.0000	0.0074***	0.0083***
	(0.1788)	(0.1809)	(0.3427)	(0.9434)	(0.0025)	(0.0007)
I*Fund *j*'s cash position	-0.0484	-0.0192	-0.0405	0.0032	-0.0108	0.0094
	(0.1880)	(0.7794)	(0.2848)	(0.3040)	(0.3739)	(0.4810)
Other fund characteristics:						
Fund j's pervious performance	0.0071	0.0018	0.0017	0.0001	0.0000	0.0002
	(0.1136)	(0.1830)	(0.2347)	(0.5032)	(0.9357)	(0.6228)
Fund j's exp ratio	-0.0672	-0.1942	0.0032	-0.0201	-0.0946**	-0.0799**
	(0.5292)	(0.1393)	(0.9785)	(0.2833)	(0.0202)	(0.0360)
Fund *j*'s size	-0.0009	0.0004	-0.0010**	-0.0001***	-0.0006***	-0.0005***
	(0.2579)	(0.2304)	(0.0433)	(0.0033)	(<0.0001)	(<0.0001)
N	1139	1806	1754	4286	18361	18302
Adj. R-Sqr	0.3987	0.2242	0.4516	0.3810	0.3205	0.3447

Table VI. Is it Liquidity Provision or Rebalancing due to Asset Allocation Targets?

Columns 1-2 list the results of the regression specification given in Column 3 of Table IV with two additional control variables to measure the role of '*Asset Allocation*'. '*Asset allocation*' is defined as the difference between the weight in the asset class of fund *j* by the AFoMFs of a family at the beginning of the current portfolio period from the average weight over the whole sample. I^{TGT} is an indicator variable that equals one when at least 50% of the AFoMFs in fund *j*'s family are target date or asset allocation funds, as indicated by the funds' name. We estimate the above model by using the Fama-MacBeth (1973) method. Statistical significance at the 1, 5, and 10% levels is denoted by '***', '**', and '*', respectively. The number of observations is denoted by *N*, and p-values are in parentheses.

	(1)	(2)
Outside Investor flow (β_1)	0.0033	0.0027
	(0.5756)	(0.6523)
I*outside investor flow (β_2)	-0.0501**	-0.0467**
	(0.0168)	(0.0313)
Measures of AFoMF liquidity:		
Flow to AFoMF (budget constraint)	0.0573***	0.0636***
	(<.0001)	(<.0001)
Lag(Flow to AFoMF)	-0.0096	-0.0128**
	(0.1755)	(0.0458)
Measures of fund *j*'s liquidity:		
Lag(Flow from AFoMF)	0.3693***	0.3686***
	(<.0001)	(<.0001)
Lag(Outside investor flow)	0.0067	0.0067
	(0.1097)	(0.1049)
Fund *j*'s cash position	0.0058	0.0075*
	(0.2041)	(0.0795)
I*Fund *j*'s cash position	0.0234	0.0290
	(0.5704)	(0.4754)
Other fund characteristics:		
Fund j's pervious performance	0.0002	0.0002
	(0.6496)	(0.6926)
Fund j's exp ratio	-0.0882**	-0.0914**
	(0.0298)	(0.0168)
Fund *j*'s size	-0.0006***	-0.0006***
	(0.0006)	(0.0007)
Asset allocation	-0.0004	-0.0001
	(0.1428)	(0.7252)
I^{TGT}*Asset allocation		-0.0019**
		(0.0297)
N	17486	17486
Adj. R-Sqr	0.3893	0.3952

Table VII. Does Liquidity Provision by AFoMFs Benefit the Underlying Funds?

This table examines whether liquidity provision benefits the funds that get the liquidity from the AFoMFs. To do so, we examine how AFoMF investment affects the abnormal performance of the distressed funds. We define abnormal performance as the alpha of the underlying fund estimated using the seven-factor model, respectively. We use the following regression specification:

$$\alpha_{j,t} = \beta_0 + \beta_1 * I_{j,t} + \beta_2 * I_{j,t} * Flow_{j,t}^{AFoMF} + controls + \epsilon_{j,t}$$

where α_j is the abnormal monthly return of fund *j*, $Flow_{j,t}^{AFoMF}$ is the flow fund *j* receives from the AFoMFs in its family, and I_j is an indicator that takes the value of 1 if fund *j* is distressed (defined as a mutual fund in the bottom decile, when funds are ranked into deciles based on their outside flows, $Flow_{j,t}^{Outside}$). We control for the past abnormal returns of fund *j*, the size of fund *j*, the fees charged by the fund, as well as the total flow received by fund *j* during the reporting period. We instrument AFoMF and total flow using lagged AFoMF and total flow, respectively. The Fama-Macbeth (1973) method is used for the estimation. Statistical significance at the 1, 5, and 10% levels is denoted by '***', '**', and '*', respectively. The number of observations is denoted by *N*, and p-values are in parentheses.

	(1)
I	-0.0009***
	(0.0036)
I*AFoMF Flow	0.0481*
	(0.0972)
Total Flow	-0.0006
	(0.6934)
Total Flow Squared	0.0100
	(0.2974)
Fund Fees	0.0864*
	(0.0996)
Fund Size	0.0001
	(0.5884)
Abnormal Return$_{t-1}$	0.1790***
	(<.0001)
Abnormal Return$_{t-2}$	0.1459***
	(<.0001)
Abnormal Return$_{t-3}$	0.0104
	(0.7226)
Abnormal Return$_{t-4}$	-0.0049
	(0.7899)
Abnormal Return$_{t-5}$	-0.0566*
	(0.0516)
Abnormal Return$_{t-6}$	-0.0288
	(0.1828)
N	20448
R-sqr	0.1460

Internet Appendix for "Conflicting Family Values in Mutual Fund Families"*

Utpal Bhattacharya, Jung Hoon Lee and Veronika K. Pool

This internet appendix provides supplemental analyses to the main tables and figures in "Conflicting Family Values in Mutual Fund Families." Appendix A provides excerpts from a couple of prospectuses. The tables in the main paper use the Fama-Macbeth method. The first four tables in Appendix B give the corresponding results from pooled regressions. The next four tables in Appendix B are new tables that go with Section III in the main paper. The last four tables in Appendix B go with Section V in the main paper. The first set of four tables and the last set of three tables are labeled to correspond to tables in the main paper. Finally, the figure at the end of Appendix B goes with Section V in the main paper.

IA.Table IV.1	Do AFoMFs Favor Distressed Funds? (Pooled regressions)
IA. Table V.1	Do AFoMFs Favor Particular Types of Distressed Funds? (Pooled Regressions)
IA. Table VI.1	Is it Liquidity Provision or Rebalancing due to Asset Allocation Targets? (Pooled Regressions)
IA. Table VII .1	Does Liquidity Provision by AFoMFs Benefit the Underlying Funds? (Pooled Regressions)
IA. Table VIII	Is it Liquidity Provision or a Star Protection Strategy?
IA. Table VIII.1	Is it Liquidity Provision or a Star Protection Strategy? (Pooled Regressions)
IA. Table IX	Is it Liquidity Provision or Information-Based Trades?
IA. Table IX.1	Is it Liquidity Provision or Information-Based Trades? (4-Factor Results)
IA. Table IV.2	Do AFoMFs Favor Distressed Funds? (2008-2009 period)
IA. Table IV.3	Do AFoMFs Favor Distressed Funds? (Different Definitions of Investment Opportunity Set)
IA. Table IV.4	Do AFoMFs Favor Distressed Funds? (Using only monthly data)
IA. Table IV.5	Do AFoMFs Favor Distressed Funds? (Using Dividend Adjustment)
IA. Figure 1.1	Do AFoMFs Favor Distressed Funds? (Scaling by $TNA_{AFoMF,t-1}$)

* Citation format: Utpal Bhattacharya, Jung Hoon Lee, and Veronika K. Pool, 2012, Internet Appendix to "Conflicting Family Values in Mutual Fund Families," *Journal of Finance* [Vol #], [Pages], http://www.afajof.org/IA/2012.asp. Please note: Wiley-Blackwell is not responsible for the content or functionality of any supporting information supplied by the authors. Any queries (other than missing material) should be directed to the authors of the article.

Appendix A: Some Sample Prospectuses

1) Legg Mason Lifestyle Allocation Fund

Investment Objective: This fund seeks capital appreciation.

Principal Investment Strategy: The fund is a fund of funds- it invests in other mutual funds. The fund is managed as an asset allocation program and allocates its assets among Legg Mason-affiliated mutual funds. The fund organizes its investments in underlying funds into two main asset classes: the stock class (equity securities of all types) and the fixed income class (fixed income securities of all types). The fund seeks to maintain a Target Allocation [. . .] The fund may make tactical changes in its allocation within a specified range (the Target Range) around that Target Allocation, based on the portfolio managers' outlook for assets classes and market and economic trends. […]

Liquidity risk. Some securities held by an underlying fund may be difficult to sell, or illiquid, particularly during times of market turmoil. Illiquid securities may also be difficult to value. If an underlying fund is forced to sell an illiquid asset to meet redemption requests or other cash needs, the underlying fund may be forced to sell at a loss.

2) Mainstay Conservative Allocation Fund

Investment Objective: The fund seeks current income and, secondarily, long-term growth of capital.

Principal Investment Strategy: The fund is a "fund of funds," meaning that it seeks to achieve its investment objective by investing primarily in other MainStay Funds (the "Underlying Funds"). The Underlying Funds are described and offered for direct investment in separate prospectuses.

The Fund is designed for investors with a particular risk profile, and invests in a distinct mix of Underlying Funds.

The Fund seeks to achieve its investment objective by normally investing [. . .] in Underlying Fixed Income Funds and in Underlying Equity Funds. The Underlying Equity Funds may consist of approximately 5% (within the range of 0% to 15%) of international equity funds. The Subadvisor may change the asset class allocations, the portfolio of Underlying Funds, or the target weighting without prior approval from shareholders. The Subadvisor uses a two-step asset allocation process to create the Fund's portfolio. The first step is a strategic asset allocation to determine the percentage of the Fund's investable portfolio (meaning the Fund's assets available for investment, other than working cash balances) to be invested in Underlying Funds in two broad asset classes—equity and fixed income. The second step in the portfolio's construction process involves the actual selection of Underlying Funds to represent the two broad asset classes indicated above and determination of target weightings among the Underlying Funds for each Fund's portfolio. A Fund may invest in any or all of the Underlying Funds within an asset class, but will not normally invest in every Underlying Fund at one time. Selection of individual Underlying Funds is based on several factors, including past performance, total portfolio characteristics, (e.g., size, style, credit quality and duration) and assessment of current holdings (e.g., valuation data, earnings growth, technical indicators and quality metrics). For cash management purposes, the Fund may hold a portion of its assets in U.S. government securities, cash or cash equivalents. The Fund also may invest in Underlying Funds that are money market funds. [. . .] In response to adverse market or other conditions, the Fund may, regardless of its normal asset class allocations, temporarily hold all or a portion of its assets in U.S. government securities, money market funds, cash, or cash equivalents.

Appendix B: Tables and Figure

Table IV.1. Do AFoMFs Favor Distressed Funds? (Pooled regressions)

The table lists the results of the regressions in Table IV of the main paper using OLS with time and family level fixed effects. Statistical significance at the 1, 5, and 10% levels is denoted by '***', '**', and '*', respectively. The number of observations is denoted by *N*, and p-values are in parentheses.

	(1)	(2)	(3)	(4)
Outside Investor flow (β_1)	0.0123***	0.0096***	0.0096***	0.0077***
	(<.0001)	(<.0001)	(<.0001)	(0.0061)
I*outside investor flow (β_2)	-0.0732***	-0.0733***	-0.0828***	-0.0633***
	(<.0001)	(<.0001)	(<.0001)	(<.0001)
Measures of AFoMF liquidity:				
Flow to AFoMF (budget constraint)	0.0167***	0.0173***	0.0173***	0.0185***
	(<.0001)	(<.0001)	(<.0001)	(<.0001)
Lag(Flow to AFoMF)	-0.0064***	-0.0055***	-0.0055***	-0.0005
	(<.0001)	(0.0003)	(0.0003)	(0.8155)
AFoMF's cash position				-0.0012
				(0.8592)
Measures of fund *j*'s liquidity:				
Lag(Flow from AFoMF)	0.3242***	0.3288***	0.3285***	0.2918***
	(<.0001)	(<.0001)	(<.0001)	(<.0001)
Lag(Outside investor flow)	0.0071***	0.0066***	0.0064***	0.0006
	(0.0001)	(0.0003)	(0.0006)	(0.7802)
Fund *j*'s cash position		0.0045**	0.0062***	0.0069**
		(0.0320)	(0.0044)	(0.0120)
I*Fund *j*'s cash position			-0.0147***	-0.0127*
			(0.0056)	(0.0590)
Other fund characteristics:				
Fund j's pervious performance	0.0002*	0.0001	0.0001	0.0004
	(0.0735)	(0.4891)	(0.5522)	(0.2309)
Fund j's exp ratio	-0.1579***	-0.1530***	-0.1513***	-0.1552***
	(<.0001)	(<.0001)	(<.0001)	(0.0001)
Fund *j*'s size	-0.0005***	-0.0004***	-0.0004***	-0.0004***
	(<.0001)	(<.0001)	(<.0001)	(<.0001)
N	20,623	19,500	19,500	13,202
Adj. R-Sqr	0.277	0.281	0.281	0.240

Table V.1. Do AFoMFs Favor Particular Types of Distressed Funds? (Pooled Regressions)

The table shows the results of the models estimated in Table V of the main paper using pooled OLS with time and family level fix ed effects. Statistical significance at the 1, 5, and 10% levels is denoted by `***`, `**`, and '*', respectively. The number of observations is denoted by *N*, and p-values are in parentheses.

	(1)	(2)	(3)	(4)	(5)	(6)
Outside Investor flow (β_1)	0.0089	0.0010	0.0241***	0.0046***	0.0096***	0.0094***
	(0.1855)	(0.8526)	(0.0021)	(<.0001)	(0.0001)	(0.0001)
I*outside investor flow (β_2)	-0.0124	-0.0532***	-0.0559***	-0.0021	-0.0880***	-0.0944***
	(0.4806)	(0.0001)	(0.0003)	(0.1668)	(<.0001)	(<.0001)
I^{ILLIQ}* I*outside investor flow (β_3)					-0.0211**	
					(0.0206)	
I^{SYST}* I*outside investor flow (β_3)						-0.0188*
						(0.0910)
Measures of AFoMF liquidity:						
Flow to AFoMF (budget const)	0.0323**	0.0785	0.0146**	-0.0002	0.0181***	0.0181***
	(0.0216)	(0.2279)	(0.0319)	(0.7859)	(<.0001)	(<.0001)
Lag(Flow to AFoMF)	-0.0050	0.0134***	-0.0070	-0.0007	-0.0056***	-0.0056***
	(0.5883)	(0.0056)	(0.1339)	(0.1855)	(0.0004)	(0.0004)
Measures of fund *j*'s liquidity:						
Lag(Flow from AFoMF)	0.3308***	0.2975***	0.3585***	0.2787***	0.3345***	0.3339***
	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)
Lag(Outside investor flow)	0.0001	0.0137***	0.0047	-0.0020***	0.0075***	0.0078***
	(0.9840)	(0.0007)	(0.4444)	(<.0001)	(0.0001)	(0.0001)
Fund *j*'s cash position	-0.0089	0.0069	0.0265***	-0.0000	0.0066***	0.0067***
	(0.5154)	(0.1172)	(0.0054)	(0.9179)	(0.0035)	(0.0035)
I*Fund *j*'s cash position	-0.0277	-0.0041	-0.0292**	0.0002	-0.0208***	-0.0184***
	(0.2995)	(0.6744)	(0.0236)	(0.6269)	(0.0002)	(0.0011)
Other fund characteristics:						
Fund j's pervious performance	-0.0001	0.0000	0.0022*	-0.0002**	0.0001	0.0001
	(0.8795)	(0.8731)	(0.0752)	(0.0259)	(0.7044)	(0.6327)
Fund j's exp ratio	0.3184	0.0145	-0.0005	-0.0131**	-0.1586***	-0.1638***
	(0.1877)	(0.7683)	(0.9953)	(0.0248)	(<.0001)	(<.0001)
Fund *j*'s size	-0.0003	-0.0003**	-0.0005*	-0.0001***	-0.0004***	-0.0004***
	(0.2517)	(0.0361)	(0.0637)	(<.0001)	(<.0001)	(<.0001)
N	1139	1806	1754	4286	18361	18302
Adj. R-Sqr	0.431	0.276	0.266	0.585	0.291	0.291

Table V1.1. Is it Liquidity Provision or Rebalancing due to Asset Allocation Targets? (Pooled Regressions)

The table lists the results of the regressions estimated in Table VI of the main paper using pooled OLS with time and family level fixed effects. Statistical significance at the 1, 5, and 10% levels is denoted by '***', '**', and '*', respectively. The number of observations is denoted by *N*, and p-values are in parentheses.

	(1)	(2)
Outside Investor flow (β_1)	0.0079***	0.0071***
	(0.0014)	(0.0039)
I*outside investor flow (β_2)	-0.0946***	-0.0694***
	(<.0001)	(<.0001)
Measures of AFoMF liquidity:		
Flow to AFoMF (budget constraint)	0.0183***	0.0220***
	(<.0001)	(<.0001)
Lag(Flow to AFoMF)	-0.0064***	-0.0093***
	(0.0001)	(<.0001)
Measures of fund *j*'s liquidity:		
Lag(Flow from AFoMF)	0.3307***	0.3246***
	(<.0001)	(<.0001)
Lag(Outside investor flow)	0.0093***	0.0092***
	(<.0001)	(<.0001)
Fund *j*'s cash position	0.0106***	0.0093***
	(0.0004)	(0.0017)
I*Fund *j*'s cash position	-0.0379***	-0.0280***
	(<.0001)	(0.0007)
Other fund characteristics:		
Fund j's pervious performance	0.0002	0.0002
	(0.3094)	(0.2472)
Fund j's exp ratio	-0.1815***	-0.1881***
	(<.0001)	(<.0001)
Fund *j*'s size	-0.0004***	-0.0004***
	(<.0001)	(<.0001)
Asset allocation	-0.0003***	-0.0001
	(0.0009)	(0.5312)
I^{TGT}*Asset allocation		-0.0006**
		(0.0108)
N	17486	17486
Adj. R-Sqr	0.279	0.235

Table VII.1. Does Liquidity Provision by AFoMFs Benefit the Underlying Funds? (Pooled Regressions)

This table examines whether liquidity provision benefits the funds that get the liquidity from the AFoMFs. We re-estimate Table VII of the main paper using pooled OLS with time and family level fixed effects. Statistical significance at the 1, 5, and 10% levels is denoted by '***', '**', and '*', respectively. The number of observations is denoted by *N*, and p-values are in parentheses.

	(1)
I	-0.0008***
	(0.0047)
I*AFoMF Flow	0.0524**
	(0.0208)
Total Flow	-0.0005
	(0.5480)
Total Flow Squared	-0.0002
	(0.7224)
Fund Fees	0.1528***
	(0.0001)
Fund Size	0.0000
	(0.9874)
Abnormal Return$_{t-1}$	0.1957***
	(<.0001)
Abnormal Return$_{t-2}$	0.1632***
	(<.0001)
Abnormal Return$_{t-3}$	0.0147***
	(0.0030)
Abnormal Return$_{t-4}$	-0.0018
	(0.7154)
Abnormal Return$_{t-5}$	-0.0535***
	(<.0001)
Abnormal Return$_{t-6}$	-0.0199***
	(0.0001)
N	20448
R-sqr	0.1298

Table VIII. Is it Liquidity Provision or a Star Protection Strategy?

This table examines whether liquidity provision by AFoMFs is another star protection strategy. To do so, we sort member funds into deciles based on past performance. We use three alternative performance measures: 1) Sharpe ratios; 2) cumulative returns; and 3) style-adjusted returns calculated over the past 1 year return history of the underlying fund. Columns 1-3 list results of the regression specification given in Column 3 of Table IV separately for each performance decile. For each performance decile, we report the sum of the β_1 and β_2 coefficients, along with the p-value of the sum from the Fama-MacBeth (1973) estimation. Statistical significance at the 1, 5, and 10% levels is denoted by '***', '**', and '*', respectively.

	$(\beta_1+\beta_2)$		
Deciles	Past Sharpe ratio deciles	Past cumulative return deciles	Past style-adjusted return deciles
1 (worst performance)	-0.0425*	-0.0241	0.0288
	(0.0825)	(0.3406)	(0.4427)
2	-0.0165	-0.0356	-0.0254
	(0.5286)	(0.1948)	(0.3370)
3	-0.0378	-0.031	-0.0922***
	(0.2100)	(0.2975)	(0.0077)
4	-0.0001	-0.0918***	-0.0619
	(0.9987)	(0.0002)	(0.3096)
5	-0.0263	-0.0605***	-0.1381***
	(0.2622)	(0.0081)	(0.0069)
6	-0.1681***	-0.0147	-0.1408***
	(<.0001)	(0.5073)	(<.0001)
7	-0.0655***	-0.0701***	-0.0659***
	(0.0016)	(0.0001)	(0.0001)
8	-0.0502*	-0.0367*	-0.0730***
	(0.0988)	(0.0807)	(0.0002)
9	-0.0811*	-0.0923***	0.0034
	(0.0789)	(0.0002)	(0.9158)
10 (best performance)	-0.0847***	-0.1398***	-0.0375
	(0.0008)	(<.0001)	(0.1708)

Table VIII.1. Is it Liquidity Provision or a Star Protection Strategy? (Pooled Regressions)

This table examines whether liquidity provision by AFoMFs is another star protection strategy. To do so, we reproduce Table VIII above using pooled OLS estimation with time and family level fixed effects. As in Table VII, for each performance decile, we report the sum of the β_1 and β_2 coefficients, along with the p-value of the sum. Statistical significance at the 1, 5, and 10% levels is denoted by '***', '**', and '*', respectively.

	$(\beta_1+\beta_2)$		
Deciles	Past Sharpe ratio deciles	Past cumulative return deciles	Past style-adjusted return deciles
1 (worst performance)	-0.0707***	0.0048	-0.0507
	(0.0051)	(0.8361)	(0.1822)
2	-0.0348	-0.1160***	-0.0698**
	(0.1317)	(0.0001)	(0.0225)
3	-0.0487**	-0.0386	-0.1122***
	(0.0329)	(0.2088)	(0.0001)
4	-0.1132***	-0.1213***	-0.1287***
	(<.0001)	(<.0001)	(<.0001)
5	-0.0989***	-0.1635***	-0.1005***
	(<.0001)	(<.0001)	(<.0001)
6	-0.0755***	-0.0899***	-0.0580***
	(0.0046)	(<.0001)	(0.0007)
7	-0.0704***	-0.0605***	-0.0856***
	(0.0030)	(0.0041)	(0.0001)
8	-0.1485***	-0.1091***	-0.0723***
	(<.0001)	(<.0001)	(0.0002)
9	-0.0593***	-0.1550***	-0.0948***
	(0.0015)	(<.0001)	(<.0001)
10 (best performance)	-0.1581***	-0.0655***	-0.0024
	(<.0001)	(0.0001)	(0.8922)

Table IX. Is it Liquidity Provision or Information-Based Trades?

This table reports the investment performance of the AFoMF trades. We form portfolios based on whether the AFoMF bought or sold the underlying fund, respectively. Underlying funds that are bought comprise the positive flow portfolio, while those that are sold are placed in the negative flow portfolio. Within the positive and negative flow portfolios, two additional sub-groups are created. The first group includes funds experiencing distress, and the second contains all non-distressed funds. For each group, we calculate the flow weighted return for each of the three months immediately following the end of the reporting period and rebalance our portfolios every three months. To evaluate performance, we estimate seven-factor alphas using the following model:

$$r_{p,t} = \alpha_p + \beta_{1,p}RMRF_t + \beta_{2,p}SMB_t + \beta_{3,p}HML + \beta_{4,p}UMD_t + \beta_{5,p}D10YR_t + \beta_{6,p}DSPR_t + \beta_{7,p}MSCI_t + \varepsilon_{p,t}$$

where r_p is the monthly excess return on a portfolio of funds; *RMRF* is the excess return on the market portfolio; and *SMB*, *HML*, and *UMD* are returns on zero-investment mimicking portfolios for common size, book-to-market, and momentum factors. We use two bond-oriented factors (the monthly change in the 10-year treasury yield (D10YR) and the monthly change in the credit spread between the Moody's Baa yield and the 10 year treasury yield) and an international factor represented by the MSCI market index return. Statistical significance at the 1, 5, and 10% levels is denoted by '***', '**', and '*', respectively. The number of observations is denoted by *N*, and p-values are in parentheses.

	Positive Flow Portfolios			Negative Flow Portfolios		
	All buys portfolio	Distressed fund portfolio	Portfolio of all other funds	All sells portfolio	Distressed fund portfolio	Portfolio of all other funds
Alpha	0.0007	-0.0033*	0.0040***	-0.0009	-0.0004	-0.0012
	(0.3408)	(0.0611)	(0.0021)	(0.5376)	(0.8501)	(0.3932)
MKTX	0.6904***	0.6780***	0.6364***	0.7502***	0.9002***	0.7591***
	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)
SMB	-0.0002	-0.0381	0.0109	-0.0517	0.1133	-0.0805
	(0.9998)	(0.6544)	(0.8656)	(0.5246)	(0.3270)	(0.2933)
HML	-0.0104	-0.0227	-0.0437	0.112	-0.0239	0.1066
	(0.8421)	(0.8112)	(0.4866)	(0.2506)	(0.8579)	(0.2671)
MOM	-0.0910***	-0.1232**	-0.0562**	0.2315***	-0.1013	0.2438***
	(0.0008)	(0.0106)	(0.0220)	(0.0004)	(0.1033)	(0.0002)
D10YR	-0.6484*	-1.1884*	-1.0670***	-1.6632*	0.4929	-1.9691**
	(0.0706)	(0.0926)	(0.0090)	(0.0570)	(0.5579)	(0.0102)
DSPR	0.4731	-2.2515	0.0510	-3.9958*	-2.6050	-4.0064*
	(0.4928)	(0.1855)	(0.9603)	(0.0635)	(0.2724)	(0.0570)
MSCI	0.0049	0.0062	-0.0463**	0.0046	0.0388	0.0043
	(0.7053)	(0.8344)	(0.0215)	(0.8656)	(0.2477)	(0.8734)
N	69	66	69	69	57	69
Rsqr	0.9293	0.7787	0.9003	0.8196	0.8387	0.8274

Table IX.1. Is Liquidity Provision by AFoMFs Costly for the AFoMFs? (4-factor results)

This table reports the investment performance of the AFoMF trades. We re-estimate our results in Table IX above using four-factor alphas. The four-factor model follows Carhart (1997) and is given by:

$$r_{p,t} = \alpha_p + \beta_{1,p}RMRF_t + \beta_{2,p}SMB_t + \beta_{3,p}HML + \beta_{4,p}UMD_t + \varepsilon_{p,t}$$

where r_p is the monthly excess return on a portfolio of funds; *RMRF* is the excess return on the market portfolio; and *SMB*, *HML*, and *UMD* are returns on zero-investment mimicking portfolios for common size, book-to-market, and momentum factors. Statistical significance at the 1, 5, and 10% levels is denoted by '***', '**', and '*', respectively. The number of observations is denoted by *N*, and p-values are in parentheses.

	Positive Flow Portfolios			Negative Flow Portfolios		
	All buys portfolio	Distressed fund portfolio	Portfolio of all other funds	All sells portfolio	Distressed fund portfolio	Portfolio of all other funds
Alpha	0.0011	-0.0030*	0.0035***	-0.0010	-0.0007	-0.0012
	(0.1533)	(0.0673)	(0.0063)	(0.5593)	(0.7511)	(0.4813)
MKTX	0.6630***	0.6876***	0.5821***	0.8000***	1.0051***	0.8003***
	(<.0001)	(<.0001)	(<.0.001)	(<.0.0001)	(<.0001)	(<.0001)
SMB	-0.0141	-0.0393	0.0288	-0.0549	0.0644	-0.0873
	(0.7270)	(0.6442)	(0.7126)	(0.5261)	(0.6593)	(0.2730)
HML	-0.0051	0.0127	-0.0360	0.1569	0.0146	0.1551
	(0.9255)	(0.8879)	(0.6037)	(0.1562)	(0.9169)	(0.1543)
MOM	-0.0917***	-0.1450***	-0.0573**	0.2083***	-0.1088*	0.2194***
	(0.0010)	(0.0021)	(0.0200)	(0.0029)	(0.0880)	(0.0016)
N	69	66	69	69	57	69
Rsqr	0.9259	0.7811	0.8763	0.8007	0.8327	0.8042

Table IV.2. Do AFoMFs Favor Distressed Funds? (2008-2009 period)

The table lists the results of the regression specification given in Table IV of the main paper for the 2008-2009 period. We estimate the above model by using the Fama-MacBeth (1973) method. Statistical significance at the 1, 5, and 10% levels is denoted by '***', '**', and '*', respectively. The number of observations is denoted by *N*, and p-values are in parentheses.

	(1)	(2)	(3)	(4)	(5)
Outside Investor flow (β_1)	0.0141***	0.0144***	0.0145***	0.0149***	0.0150***
	(0.0001)	(0.0002)	(0.0001)	(0.0001)	(0.0001)
I*outside investor flow (β_2)	-0.0212***	-0.0221***	-0.0215***	-0.0230***	-0.0223***
	(0.0018)	(0.0009)	(0.0018)	(0.0007)	(0.0014)
Measures of AFoMF liquidity:					
Flow to AFoMF (budget constraint)	0.0238***	0.0232***	0.0233***	0.0249***	0.0250***
	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)
Lag(Flow to AFoMF)	-0.0011	-0.0008	-0.0009	-0.0016	-0.0017
	(0.7418)	(0.7899)	(0.7793)	(0.6098)	(0.6000)
AFoMF's cash position				-0.0071*	-0.0071*
				(0.0555)	(0.0567)
Measures of fund *j*'s liquidity:					
Lag(Flow from AFoMF)	0.2986***	0.3043***	0.3046***	0.3029***	0.3032***
	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)
Lag(Outside investor flow)	-0.0002	-0.0004	-0.0004	-0.0004	-0.0005
	(0.9271)	(0.8411)	(0.8306)	(0.8231)	(0.8183)
Fund *j*'s cash position		0.0023	0.0021	0.0036	0.0034
		(0.3728)	(0.3827)	(0.2090)	(0.2198)
I*Fund *j*'s cash position			0.0015		0.0018
			(0.8483)		(0.8122)
Other fund characteristics:					
Fund j's pervious performance	0.0000	-0.0002	-0.0002	-0.0002	-0.0002
	(0.9714)	(0.7999)	(0.7863)	(0.8114)	(0.7991)
Fund j's exp ratio	-0.0523	-0.0569	-0.0553	-0.0516	-0.0500
	(0.1190)	(0.1481)	(0.1594)	(0.1780)	(0.1901)
Fund *j*'s size	-0.0002***	-0.0002**	-0.0002**	-0.0002**	-0.0002**
	(0.0093)	(0.0159)	(0.0167)	(0.0197)	(0.0205)
N	25755	24946	24946	24844	24844
Adj. R-Sqr	0.1344	0.1416	0.1429	0.1455	0.1468

Table IV.3. Do AFoMFs Favor Distressed Funds? (Different Definitions of Investment Opportunity Set)

We re-estimate the regression in Column 3 of Table IV of the main paper using two extreme definitions of the AFoMFs' investment opportunity set. In Column 1, we redefine the investment opportunity set of the AFoMF as the group of target funds that the AFoMF invests in at least one quarter. In Column 2, the investment opportunity set of the AFoMF is *all* funds in the family. The models are estimated using the Fama-MacBeth (1973) method. Statistical significance at the 1, 5, and 10% levels is denoted by '***', '**', and '*', respectively. The number of observations is denoted by *N*, and p-values are in parentheses.

	(1)	(2)
Outside Investor flow (β_1)	0.0004	0.0032
	(0.9765)	(0.1195)
I*outside investor flow (β_2)	-0.1071***	-0.0246**
	(0.0024)	(0.0117)
Measures of AFoMF liquidity:		
Flow to AFoMF (budget constraint)	0.0683***	0.0083
	(<.0001)	(0.5766)
Lag(Flow to AFoMF)	-0.0109	0.0179
	(0.5561)	(0.3732)
Measures of fund *j*'s liquidity:		
Lag(Flow from AFoMF)	0.3215***	0.3769***
	(<.0001)	(<.0001)
Lag(Outside investor flow)	0.0139	0.0004
	(0.1476)	(0.8210)
Fund *j*'s cash position	0.0095*	0.0042***
	(0.0878)	(0.0012)
I*Fund *j*'s cash position	-0.0199	0.0002
	(0.3694)	(0.9746)
Other fund characteristics:		
Fund j's pervious performance	0.0009	0.0002
	(0.4768)	(0.1578)
Fund j's exp ratio	-0.1806**	-0.0075
	(0.0468)	(0.6547)
Fund *j*'s size	-0.0013***	-0.0001***
	(0.0001)	(0.0040)
N	10346	37508
Adj. R-Sqr	0.4577	0.3436

Table IV.4. Do AFoMFs Favor Distressed Funds? (Using only monthly data)

We re-estimate our main regression specification in Column 3 of Table IV of the main paper on the subsample of AFoMFs that report their holdings at a monthly frequency using the Fama-MacBeth (1973) method. Statistical significance at the 1, 5, and 10% levels is denoted by '***', '**', and '*', respectively. The number of observations is denoted by *N*, and p-values are in parentheses.

	(1)
Outside Investor flow (β_1)	-0.0215
	(0.3141)
I*outside investor flow (β_2)	-0.0365
	(0.3889)
Measures of AFoMF liquidity:	
Flow to AFoMF (budget constraint)	0.2683
	(0.1927)
Lag(Flow to AFoMF)	0.0182
	(0.5672)
Measures of fund *j*'s liquidity:	
Lag(Flow from AFoMF)	0.3129***
	(<.0001)
Lag(Outside investor flow)	0.0012
	(0.8425)
Fund *j*'s cash position	0.0082***
	(0.0042)
I*Fund *j*'s cash position	-0.0209
	(0.3744)
Other fund characteristics:	
Fund j's pervious performance	-0.0004
	(0.7164)
Fund j's exp ratio	0.2168
	(0.4696)
Fund *j*'s size	-0.0004***
	(0.0061)
N	8033
Adj. R-Sqr	0.4960

Table IV.5. Do AFoMFs Favor Distressed Funds? (Using Dividend Adjustment)

We re-estimate our main regression from Column 3 of Table IV of the main paper after adjusting the flow fund *j* receives from AFoMFs to accommodate dividend reinvestments. In particular, assuming *n* distribution events in the given portfolio period, the dollar dividend from the target fund is given by:

$$Dollar\ Dividends_t = \sum_{i=1}^{n} Shares_{t-1} * Distribution_Amount_{i,t}\ .$$

In our original specification, the total flow by the AFoMF to the target fund is computed by:

$$\Delta\ Shares_t * NAV_t$$

where NAV_t stands for the fund's *NAV* on the portfolio report date. To adjust for dividend reinvestment, we decompose the additional shares the AFoMF owns at the end of the portfolio period into new shares that come from reinvesting the dividends and new shares that are purchased:

$$\Delta\ Shares_t = Shares_{reinvested,t} + Shares_{purchased,t},$$

and recalculate AFoMF flow as:

$$Shares_{purchased,t} * NA\ V_t.$$

We calculate the number of shares that come from reinvestment in target fund as:

$$\sum_{i=1}^{n} \frac{Shares_{t-1} * Distribution_Amount_{i,t}}{NAV_{i,t}}$$

In the above formula, $NAV_{i,t}$ for dividend reinvestment stands for the fund's *NAV on each dividend distribution date*. The estimation is based on the Fama-MacBeth (1973) method. Statistical significance at the 1, 5, and 10% levels is denoted by '***', '**', and '*', respectively. The number of observations is denoted by *N*, and p-values are in parentheses.

Table IV. 5. *(continued)*

	(1)
Outside Investor flow (β_1)	0.0346***
	(0.0030)
I*outside investor flow (β_2)	-0.1666**
	(0.0187)
Measures of AFoMF liquidity:	
Flow to AFoMF (budget constraint)	0.0849***
	(0.0008)
Lag(Flow to AFoMF)	0.0017
	(0.9322)
Measures of fund *j*'s liquidity:	
Lag(Flow from AFoMF)	0.3645***
	(0.0016)
Lag(Outside investor flow)	0.0063
	(0.4195)
Fund *j*'s cash position	0.0143
	(0.2279)
I*Fund *j*'s cash position	-0.0636
	(0.3295)
Other fund characteristics:	
Fund j's pervious performance	-0.0010
	(0.6525)
Fund j's exp ratio	-0.2033*
	(0.0898)
Fund *j*'s size	-0.0011***
	(<.0001)
N	19500
Adj. R-Sqr	0.3364

Figure 1.1 Do AFoMFs Favor Distressed Funds? (Scaling by $TNA_{AFoMF,t-1}$)

This graph reports average AFoMF's flow to the underlying funds by outside investor flow deciles. We divide total flow to ordinary mutual fund *j* in family *k* into AFoMF flow and non-AFoMF flow, that is, net flow by all other investors. Total dollar flow is estimated by

$$Flow^{Total}_{j,k,t} = TNA_{j,t} - TNA_{j,t-1} \cdot (1 + r_{j,t})$$

where TNA_j is the total assets under management of the jth fund and r_j is the net-of-fees return for the relevant time period. Flow from AFoMFs is determined by:

$$Flow^{AFoMF}_{j,k,t} = \sum_{i=1}^{n_k} \Delta shares_{i,j,t} \cdot NAV_{j,t}$$

where $\Delta shares_{i,j}$ is the change in the number of shares held by AFoMF *i* in fund *j*, n_k is the number of AFoMFs in family *k*, and NAV_j is the net asset value of fund *j*. Finally, non-AFoMF or outside investor flow is expressed as follows:

$$Flow^{Outside}_{j,k,t} = Flow^{Total}_{j,k,t} - Flow^{AFoMF}_{j,k,t}.$$

All three flow measures are normalized by $TNA_{AFoMF,t-1}$. Outside investor flow deciles are determined by sorting our sample into deciles based on normalized $Flow^{Outside}_{j,k,t}$. Decile 1 collects the underlying funds that receive the lowest percentage flow (highest outflow) from outside investors, while Decile 10 includes funds with the highest outside investor flow. The dashed line in the graph indicates the breakpoint between negative and positive average non-AFoMF flow. In the graph below, the X-axis denotes outside investor flow deciles, while the Y-axis denotes average percentage flow from AFoMFs.