Fund Flow Diversification: Implications for Fee-Setting and Performance

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ABSTRACT

We provide new evidence on the economic benefits to fund families from having a diversified fund flow base. We show that during periods of economic distress diversified fund families with below-median fund flow correlation experience significantly lower net cash outflows, and enjoy greater fee-revenue stability. We also show that fund families with lower cross-fund or cross-style flow correlations are able to price their product offerings more competitively, thereby leading to lower total operating expenses and advisory fees paid by mutual fund shareholders. Our findings indicate that the diversification of fund families' asset flows is an important source of net performance gains for fund shareholders. These performance gains arise mostly in the more competitive industry segments where diversified fund families are better incentivized to lower their advisory fees by leveraging their greater fee-revenue stability, and better protection against downside liquidity risk.

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"Any collective investment vehicle offering unrestricted redemption rights could face the risk of large redemption requests in a stressed market if investors believe that they will gain an economic advantage by being the first to redeem. .... Heightened redemptions from an asset manager's funds could increase market risks if there is a perception that the asset management firm itself is at risk of failure. (Source: Report on "Asset Management and Financial Stability" prepared by the Office of Financial Research (OFR), U.S. Dept. of Treasury, September 2013)

Breadth and diversification of a firm's products and services contribute to growth and sustainability of fee revenue. A company with limited diversification in terms of a specific fund, type of fund (equity or fixed income) or investment style or manager risks losing AUM when such focused investments are less favored by the market. A diversified product offering, therefore, allows for product switching rather than outright redemptions and maintenance of AUM. (Source: Report prepared by the credit rating agency, DBRS, titled "Rating Companies in the Asset Management Industry," December 2015)

It is well documented that investor flows into and out of open-end mutual funds can be costly for individual fund performance (see, e.g., Edelen (1999); Coval and Stafford (2007); Chen et al. (2008); Shive and Yun (2013)). What is being increasingly recognized, especially in the wake of the recent global financial crisis of 2008, is that such investor flows also contribute to the volatility of fee income accruing to mutual fund families. One advantage enjoyed by a mutual fund family with a diversified portfolio of funds relative to comparable collections of stand-alone funds, is that any imperfect cross-fund correlations in investor flows can add value by stabilizing the family-level fee income flows. Essentially, the diversification of investor flows provides a degree of co-insurance in regards to the aggregate redemption risk faced by a fund family. As a result, mutual fund families will be better off, and increasingly so, as correlations among the investor flows to its funds decrease.[1]

Should investors pay attention to the level of flow co-insurance enjoyed by a fund family when making their fund selection decisions? And, what are the performance implications of the diversification or lack thereof, of fund flows accruing to a fund family? In this study we provide novel evidence on these questions which are of considerable interest to both academics and fund investors.

There is a large literature that addresses the individual mutual fund choices made by fund investors. By comparison, relatively little attention has been paid to investor decisions involving the choice of a fund family. The latter decision is important however, as there is evidence to suggest that investors often first identify a fund family and then choose from among the mutual funds offered by that family.

[1]Intuitively, the concavity of fund family fee schedules with respect to the size of assets under management, implies that annual fee revenue is on average higher, when the asset volatility is reduced.

For example, based on their 1991 survey of mutual fund investors in the U.S., Capon, Fitzsimons, and Prince (1996) report that the average number of mutual fund families in which these respondents invest is one. Similarly, based on data obtained from 78,000 households during 1991 to 1996, Gerken, Starks, and Yates (2014) report a similar degree of concentration in the households' fund family memberships.[2] Not only do the households holding only a few mutual funds show a tendency to invest in the same fund family, but also more than 60% of households with at least ten mutual funds reported having 4-5 funds from the same fund family.

The fact that many investors first identify a fund family and then restrict themselves to fund choices within that family suggests that the investors' choices may be characterized as being the result of a constrained optimization process. What are the key factors that investors should take into account when choosing a fund family? In this paper we provide evidence on the importance of the diversity of investor fund flows experienced by a fund family for investor welfare. The diversification, or lack thereof, of family fund flows is important for two reasons. First, flow diversification is an indicator of the product diversification offered by the fund family. If investors concentrate their investment into one fund family, the choice of the fund family will inevitably affect their *value-weighted* performance across the mutual funds offered by that fund family. This is an important aspect that investors should not underestimate for several reasons. As shown by Elton, Gruber, and Green (2007) a high degree of fund family focus in a particular fund product or investment style would result into fewer benefits of portfolio diversification for investors with significant exposure to a single fund family.

Second, fund flow diversification is important for ensuring that the fund family enjoys a more stable revenue stream. As we subsequently show, a stable revenue stream is associated with, on average, improved net performance for fund investors, largely due to lower proportional management fees and

[2] There are several explanations for what could be responsible for the degree of investor concentration in one fund family. A potential explanation is based on search or switching costs. Hortacsu and Syverson (2004) show that even relatively small search costs can account for much of the proliferation of S&P 500 index funds. The design of retirement plans can be another factor. About 62% of U.S. households in 2013 identified an employer-sponsored retirement plan as the source of their first mutual fund (and the trend has been increasing). The retirement plans often appear to contribute to such concentration by restricting the employer's menu of fund choices within a single fund family. Elton, Gruber, and Blake (2006) find that 186 out of 417 401k plans restrict fund choices of participants to just one fund family. Additionally, Massa (2003) argues that policies such as waiving of load fees when switching funds within the same fund family can promote consumer loyalty, leading to higher mutual fund family concentration by the consumers.

operating expenses. Interestingly, there is no clear consensus in the literature on the relation between the diversity of product offerings by a fund management firm and the performance of its funds. de Figueiredo and Rawley (2011) argue that fund families diversify across a multitude of fund products when they possess greater investment skill as market forces would constraint the horizontal expansion options of unskilled fund families. Using a sample of hedge funds, they find that funds of diversified hedge fund families outperform (gross of fees) those of focused fund families by in excess of 2% per annum. By contrast, Siggelkow (2003) shows that having a focused product line-up may allow a fund family to specialize on particular products, with resulting high product quality. Consistent with this argument he shows that mutual funds belonging to a focused fund family have higher returns than similar funds belonging to more diversified fund families. In their theoretical model, Mamaysky and Spiegel (2002) suggest that fund families should diversify across investment styles to enhance investor wealth by imposing fewer restrictions on investors in terms of their ability to adjust their assets allocation over time. Massa (2003) argues that a fund family opt for fund and style proliferation to attract investors' flows, and that fund family's product proliferation "should be higher in the very cases in which performance is lower".

We begin our analysis by documenting the significant benefits to fund families from having a diversified fund flow base, particularly during periods of economic distress. Specifically, we use several proxies to measure the degree of fund flow coinsurance experienced by fund families with less than perfectly correlated investor flows. We then track the style-adjusted net cash flows experienced by fund families during the two years before, and the two years after the Lehman Brothers bankruptcy filing in September, 2008. We find that families with above median level of flow correlations (or below median level of flow co-insurance) experience cumulative style-adjusted net cash outflows that are 8% greater than that of fund families with below-median flow correlation (or above-median level of flow coinsurance) in the 12 months after the September 2008 shock. We also show that cash flow coinsurance is typically associated with fund families with more stable fee revenue, fewer assets under management, lower style concentration, higher number of styles or portfolios offered, and lower portfolio turnover.

Next, we evaluate whether the benefits of cross-fund flow coinsurance, and the resulting stability of fee-revenue stream, at the fund family level translate into improved net-of-fee performance enjoyed by

shareholders. To address this issue we examine the net performance of fund families based on a number of benchmark models. These include the CAPM, and the Carhart 4-factor model, as well as models with additional factors. Since our sample includes fund families that offer balanced and international funds in addition to equity funds, we also consider a six factor model that extends the Carhart 4-factor model to include the MSCI index and the Barclays US Aggregate Bond Index as additional factors. To benchmark the performance of fixed income funds, following Blake, Elton, and Gruber (1993), we employ a 10-factor model that includes six bond indices as additional factors. Our portfolio analysis indicates that the most coinsured fund family portfolio outperforms the least coinsured fund family portfolio by about 1% per month. In a multivariate setting, we find that value-weighted after-fee alphas of fund families are positively related to our proxy measures for the degree of fund flow coinsurance, after controlling for several fund family characteristics. This suggests that fund flow coinsurance is an important source of net performance gains for shareholders. By contrast, we do not find any relationship between gross performance and coinsurance measures of fund families.

To examine the source of the positive link between net performance and flow coinsurance we study the relationship between operating expenses and advisory fees charged by fund families and the coinsurance measures. Using the various proxies for the degree of fund flow coinsurance experienced by fund families with less than perfectly correlated investor flows, we show that there is a consistently negative relation between the flow coinsurance effect and style adjusted family-level operating expenses and advisory fees during the period 1993 to 2015. This effect is not simply due to the economies of scale enjoyed by fund families with large market shares. In particular, we show that increasing levels of net cash flow coinsurance translates into lower style-adjusted fees within each quintile portfolio of fund family size (and age), and after controlling for interaction variables between coinsurance and family size. The favorable impact of fund flow correlation on fees is also not explained by fund- or style-proliferation strategies of fund families, the quality of fund family's product offerings, and the volatility of net cash flows. Furthermore, we show that fund families operating across multiple business segments have stronger incentives to diversify their flow-related liquidity risk and compete on advisory fees when they derive most of their total revenue from the mutual fund business.

Our results are consistent with strategic pricing behavior on the part of fund families that operate in a competitive environment. Importantly, we show that the negative relationship between flow coinsurance and advisory fees exists mostly among fund families operating under stiffer price competition. The evidence is robust to controlling for other confounding factors including the degree of investor redemption risk reflected in exit fees and the percentage of new fund openings by other fund families with an initial below-average advisory fee in the same investment style. To address potential endogeneity concerns due to the voluntary nature of fund families' decisions to offer a diversified mix of funds across several investment styles, we adopt a 2-stage least squares instrumental variable (IV) framework with family fixed effects. Following Campa and Kedia (2002), we use a set of instrumental variables for the family's decision to diversify its product offering. The analysis confirms our earlier findings. In particular, fund families with a diversified product mix tend to charge significantly lower style-adjusted advisory fees. Interestingly, we show that fund families tend to charge below-average style-adjusted fees when they are better protected against *downside* – rather than upside – liquidity risk due to the diversification of redemption flows. Next, we conduct a "placebo" test based on a sample of simulated fund families that does not benefit from any cash flow coinsurance by construction. As expected, we find no relation between the measures of fund flow coinsurance and family-level fees.

Our analysis complements and extends the literature related to the motives of fund families to offer a wide range of fund products and investment objectives to investors. On the supply side, fund proliferation has been interpreted as a strategic attempt by fund families to increase the likelihood of generating star funds (Nanda, Wang, and Zheng (2004)), expand market coverage (Massa (2003)), or attenuate price competition in the industry (Khorana and Servaes (2012)). Other motivations include the desire to hedge family total risk by shifting the aggregate portfolio composition towards the market portfolio (Massa (2000)), influence fund performance (Siggelkow (2003)), or transfer this performance across different funds through strategic IPO allocations and cross trading activities (Gaspar, Massa, and Matos (2006)).

On the demand side, a number of studies have investigated the potential benefits of fund proliferation accruing to mutual fund investors. Examples of the benefits include lower search costs (e.g., Huang, Wei, and Yan (2007)), better hedging opportunities resulting from multiple investment styles

(Mamaysky and Spiegel (2001)), simplified recordkeeping (Elton, Gruber, and Green (2007)), and the elimination of switching costs (i.e., load fees) across multiple funds offered by the same fund family (Massa (2003)).

Our study contributes to this literature by highlighting an important benefit, namely fund flow coinsurance, resulting from the decision to offer a diverse mix of funds offered to investors. In contrast to much of the previous literature, our focus is on fund diversity and the resultant potential for flow *diversification* rather than *fund proliferation* per se. In terms of the latter, Massa (2003) explains fund proliferation as an attempt by fund families to exploit the heterogeneity in fund investors in terms of their investment horizons. By offering a "free" option to switch among the various family-affiliated funds, the fund family may be able to attract investors even if it is not competitive in terms of fund performance. Consistent with this intuition he documents a negative relation between product differentiation based on non-performance-related fund characteristics and fund performance. By contrast, our study focuses on the diversification of a family's product/fund mix and the resulting coinsurance effect on fund flows. Our evidence suggests that the coinsurance effect leads to significant economic benefits in terms of reduced advisory fees and expenses and improved net fund performance realized by shareholders.

I. Data and Methodology

A. Data

We obtain mutual fund data from the Center for Research in Security Prices (CRSP) Survivorship Bias Free Mutual Fund database. Since mutual fund family names are available in CRSP only since 1993, our sample covers the period from January 1993 to March 2015. Our final sample consists of a (time series cross sectional) total number of 2,137 distinct fund families, and includes 6,766 funds covering all investment objectives. Specifically, our sample includes 4,892 equity funds, 781 income funds, and 1,093 funds belonging to other style categories. The sample includes domestic and international funds and covers retail and institutional share classes of both actively managed funds and index funds. Fund investment objectives are identified using CRSP ICDI codes which combine

information from three different sources, including Weisenberger (1962-1993), Strategic Insight (1993-1998), and Lipper (1998-2015) over our entire sample period.

We follow several steps to identify CRSP mutual fund families. First, we carefully check fund family names to account for minor variations in the names (e.g., Deutsche Asset Mgmt versus Deutsche Asset Management, Inc.), and to account for different divisions of the same company (e.g., BNY Mellon Asset Management versus Dreyfus Corp). Following Chen et al. (2013), we then searched each fund family's name on the Investment Adviser Public Disclosure (IAPD) website administered by the Securities and Exchange Commission (SEC), and collected all of the previously registered names of that fund family. The IAPD website provides accurate historical information on all previously registered names. We also recorded all names of control entities of a fund family using the information contained in Item 10 and in Schedule D of form ADV (indicating the name of the entity where books and records are kept). This allows us to account for the possibility that entities with different names may represent the same ownership structure of the fund family. To increase the reliability of our matching procedure, we also use the management company codes available in CRSP after 2000 to identify a fund family. Thus, if two distinct fund family names in CRSP belong to the same family according to the IAPD historical information and, at the same time, the CRSP management code has remained unchanged, we conclude that these two distinct fund family names attached to a particular fund portfolio reflect the same fund family. To improve the accuracy of the fund family identification procedure, we also conducted a detailed search of all fund family names using SEC action letters (which provide information on fund family re-organizations following fund families' mergers), FACTIVA, and general information available on fund families' website.

Mutual fund performance figures, total net assets (TNA), and net cash flows are available on a monthly basis. Fund fees are available at an annual frequency, although they are accrued on a daily basis. Mutual fund fees include total operating expenses expressed as a percentage of assets under management during the year, and fund advisory (or management) fees which are computed as the difference between total operating expenses and distribution (or 12b-1) fees. For robustness, we consider data at a monthly and yearly frequency both at the fund family level and at the fund share class

level.[3]. Since fund families compete in different investment objectives for investors' flows, we calculate objective-adjusted fund family characteristics as the TNA-weighted average of the individual funds' objective-adjusted characteristics.

B. Empirical Methodology

The main variable of interest in this study is the degree of cash flow coinsurance experienced by fund families. We measure this variable using different proxies. Our first proxy is the dummy variable *FAMDIV* which is equal to 1 if a fund family operates in more than 1 investment objective, and 0 otherwise. A family offering multiple investment styles is more likely to experience some level of product diversification and cash–flow coinsurance across these styles, *ceteris paribus*.

Following Duchin (2010), we estimate our second coinsurance proxy as the absolute value of the difference between the total volatility of a fund family's net cash flows (*FAMVOLCF*) and the total volatility of net cash flows assuming a pairwise correlation of 1 between the net cash flows of funds within a family (*FAMCFVOLPC*). Specifically, we calculate our second measure of coinsurance as:

$$CNRSHR_t = \left| \sqrt{\sum_{i=1}^{N}\sum_{j=1}^{N} w_{i,t} w_{j,t} \rho_{i,j,t,k} \sigma_{i,t,k} \sigma_{j,t,k}} - \sqrt{\sum_{i=1}^{N}\sum_{j=1}^{N} w_{i,t} w_{j,t} \sigma_{i,t,k} \sigma_{j,t,k}} \right| , \quad (1)$$

where $\rho_{i,j,t}$ is the pairwise correlation of net cash flows estimated over the period *t-k+1* to *t* between share class *i* and share class *j* at time *t*, $w_{i,t}$ is the weight of share class *i* in the fund family's portfolio, and $\sigma_{i,t,k}$ is the volatility of share class *i*'s net cash flows during the period *t-k+1* to *t*. Cash flow volatilities are estimated using data covering the prior 36 months ($k = 36$), with a minimum requirement of 12 months of valid observations within the 36-month window.[4] The fund-level percentage net cash flows employed in Equation (1) are computed as: $(TNA_t - TNA_{t-1}(1 + r_t))/TNA_{t-1}$.[5] Following Huang et al. (2007), we also filter out the top and bottom 2.5% tails of the distribution of net cash flows

[3] We use the Mutual Fund Links (MFLINKS) tables to identify mutual fund portfolios.
[4] Our findings are qualitatively unchanged with alternative values of *k* equal to 12, 24, 48 and 60 months.
[5] We reached similar conclusions when we estimate Equation (1) using alternative definitions of net cash flows. First, we computed net cash flows as $\frac{TNA_t - TNA_{t-1}(1+r_t)}{TNA_{t-1}(1+r_t)}$ in order to account for possible distortions due to very large negative returns that could result from fund liquidations (Berk and Green (2004)). Second, we computed net cash flows as $\frac{TNA_t - TNA_{t-1}(1+r_t) - MERGER_t}{TNA_{t-1}}$, where $MERGER_t$ represents the increase in fund's total net assets following the merger in month *t* (Sapp and Tiwari (2004)). The results of such tests can be obtained from the authors upon request.

to guard against possible errors due to fund mergers and splits. We also repeat the estimation in Equation (1) based on aggregate net cash flows to funds in the various investment styles within the family. This allows us to compute our third proxy for the fund family level coinsurance as the TNA-weighted style-based coinsurance variable, $CNRSTL_t$.

One limitation of the coinsurance proxy as estimated in Equation (1) is that it does not account for the possible cross-sectional variation in the total volatility of a fund family's net cash flows under the assumption of perfect correlation among the constituent funds' cash flows (*FAMCFVOLPC*). Accordingly, we construct a more precise estimate of a fund family's coinsurance level based on the *percentage* reduction in total cash-flow volatility, *CNRSHRPT*, which is calculated as the ratio between *CNRSHR* and *FAMCFVOLPC*. Similarly, we divide the style-based coinsurance proxy of *CNRSTL* by the total net cash flows volatility (assuming a pairwise correlation of 1 between all net cash flows of different styles of the fund family), and obtain the corresponding percentage style-based coinsurance variable, *CNRSTLPT*.

Our next proxy for the family-level coinsurance is the correlation between idiosyncratic net cash flows of different investment styles offered by the fund family. This measure is estimated in two steps (see Hann et al. (2013)). In the first step, for each investment style g at time t, we compute the idiosyncratic net cash flows of style g over the previous k=36 months (with a minimum of 12 months of valid observations) as the residual from a regression of average style net cash flows on average industry-wide net cash flows. Second, in each month t, we estimate the pairwise style correlation, $\gamma_{g,q,t}$, between idiosyncratic cash flows of investment styles g and q. Finally, we compute the inverse measure of family coinsurance as the TNA-weighted investment-style correlation of idiosyncratic cash flows:

$$CORRSTL_t = \sum_{g=1}^{G} \sum_{q=1}^{Q} w_{g,t} w_{q,t} \gamma_{g,q,[t-k+1,t]} \tag{2}$$

Our last proxy measure of a fund family's level of cash flow coinsurance, $CORRSHR_t$, is the correlation among net cash flows of different share classes offered by the fund family. To calculate this measure, we first estimate the pairwise correlations, $\gamma_{i,j,[t-k+1:t]}$, among net cash flows of share classes i and j over the previous k (= 36) months. We then compute the inverse measure of family-level

coinsurance as the TNA-weighted cash-flow correlation $\sum_{i=1}^{N}\sum_{j=1}^{N} w_{i,t}w_{j,t}\gamma_{i,j,[t-k+1:t]}$, where $w_{i,t}$ is the weight of share class *i* in the fund family's portfolio.

Since our prediction is concerned with the cross sectional relationship between fund family's cash-flow coinsurance and advisory fees, our discussion will focus on the estimated coefficients from Fama-Macbeth cross sectional regressions with heteroskedasticity and autocorrelation consistent (HAC) standard errors. We do however test the robustness of the family-level findings to the introduction of year, family, and style fixed effects with standard errors clustered by fund family..

II. Summary Statistics

Table 1 contains the summary statistics of our sample of mutual fund families over the period January 1993 to March 2015. The average fund family has an industry market share of 0.16%, corresponding to a family total TNA of $12.1 billion. On average, fund families have been in operation for about 16 years since the first fund's inception, manage 8 fund portfolios, and invest across 5 investment objectives. The average correlation in net cash flows across different investment styles within the fund family (*CORRSTL*) is about 0.68, with this number varying between 0.10 for highly diversified fund families and 1.0 for undiversified (e.g., single-fund) families. In addition, by diversifying their product offerings, fund families are able to significantly reduce the total volatility of net cash flows across different fund portfolios by about 3% (*CNRSHR*). This fund family coinsurance level increases to 4% when computed across the sample of diversified-only (i.e., *FAMDIV=1*) fund families, as single-fund families (*SFF*) experience a coinsurance level of zero, by definition. In order to assess the economic significance of the value of coinsurance, consider that the average yearly volatility of net cash flows experienced by a fund family, assuming a pairwise correlation of one among the constituent funds' flows is equal to 14%. Thus, by diversifying their product offerings, fund families are able to reduce the volatility of their aggregate fund flows by almost 30%, on average, relative to a comparable (hypothetical) undiversified fund family.

Using TNA-weighted variables, the family-level turnover, *TURNR*, of 0.80 translates into average total operating expenses, *OPEX*, of 1.17%, and an advisory fees, *ADVFEE*, of 1.06%. Importantly, as much as 18% (29%) of fund family product offering comprises index (institutional) fund products. Also,

fund families are heavily concentrated (64%) in equity style products, with fixed income products representing only 23% of the total product offerings (the remaining 13% is represented instead by hybrid funds in the ICDI categories of mixed/others mutual funds).

In Table 2 we report the descriptive statistics of the sample of mutual fund families over different two-year intervals from 1995 to 2015 to assess time series changes in fund and fund family characteristics. Mutual fund industry assets have grown from $2.6 trillion in 1995 to about $17.3 trillion by the end of 2015. Over the same period the average fund family TNA has grown from $4.5 billion to over $21.3 billion. Although the average market share of fund families has remained quite stable over the sample period, the industry concentration has increased dramatically. The 5 largest fund families based on TNA now control almost $8 trillion of assets under management, up from less than a trillion in 1995. This translates into an average market share of about 44% in 2015, or a 10% increase since 1995. Further, the number of fund families in our sample increased from 507 in 1995 to about 780 in 2014, with the percentage (out of the total number of families) of single fund families varying between 20% and 25%. The number of fund families and their summary statistics are very similar to those documented by Khorana and Servaes (2012) over their sample period from 1976 to 2009.[6]

As of 2015, fund families offered 10 fund portfolios (or almost 40 fund share classes) on average across 5 different investment objectives. In Table 2 we also document the family-level volatility of cash flows before and after controlling for the coinsurance effect. The yearly total volatility of cash flows assuming a pairwise correlation of one (perfect correlation) between fund portfolios in the family (*FAMCFVOLPC*) has averaged at 15% compared to the 10% cash flow volatility after accounting for the family-level diversification (*FAMCFVOL*). Interestingly, the percentage of total (i.e., without any coinsurance) family-level volatility explained by coinsurance (*CNRSHPT*) has increased almost monotonically from 19% to 24%, and from 42% to 58% when expressed in value-weighted terms. In

[6] The only difference entails the number of fund portfolios. As of 2009, our number of fund portfolios offered by a fund family (11) is different from that (19) reported by Khorana and Servaes (2012). A possible explanation for this difference is that we aggregate fund shares into portfolios using the information provided in the MFLink tables while Khorana and Servaes (2012) combine the CRSP database with the Morningstar Principia tables.

other words, families have been able to reduce their exposure to fund product risk to a remarkable degree by not only expanding their fund offerings but also reducing the cross-fund cash flow correlation.

III. Coinsurance Measures and Fund Family Characteristics

A. Product Diversity and Coinsurance Benefits

By increasing the total number of funds or the total number of categories, fund families can expand their industry coverage and offer mutual fund investors the option of moving in and out of different funds within the fund family at very low (switching) cost. To the extent that net cash flows of multiple fund products or multiple investment styles are less than perfectly correlated at the family level, fund families can achieve considerable net cash flow diversification and significantly reduce their exposure to the overall cash flow volatility. Figure 1 illustrates this point clearly by showing the time-series-cross-section relationship between the number of styles offered by fund families and the associated level of cash-flow coinsurance.

Panel A of Figure 1 shows that cash flow coinsurance increases – but at a marginally decreasing rate – as a function of the number of fund categories offered by a fund family. For instance, fund families offering only one investment category of funds experience a 3.33% reduction in total volatility, on average, with this coinsurance benefit varying between 0 (5-th percentile) and 34% (95-th percentile) depending exclusively on the level of cash flow correlation among multiple funds within that category. By contrast, a fund family offering an average number (5) of investment styles can lower the cash flow correlation by as much as 52%, with this coinsurance ranging between 7% (5-th percentile) and 79% (95-th percentile) depending on the cash flow correlation between multiple funds within each category or across multiple categories. As illustrated by Panel B of Figure 1, fund families can reduce their yearly fee revenue volatility from 15.1% to 10% by simply increasing the number of fund categories offered from 1 to 5.

B. Determinants of Family Cash Flow Correlation: A Multivariate Analysis

We now investigate what fund family characteristics are likely to be associated with family-level cash-flow coinsurance. For this purpose, we estimate generalized linear models (GLM) with logit link

and binomial family in model (i) and (ii) as some of our coinsurance variables range between 0 and 1. In models (iii) and (v) we estimate Fama-Macbeth (1973) cross sectional regressions with heteroskedasticity and autocorrelation consistent (HAC) standard errors. For robustness, we also report the findings of panel regressions with time fixed effects and family-level clustered standard errors. Lagged fund family characteristics include: the logarithm of fund family TNA (*LFAMTNA*); the logarithm of the number of years since the launch of the oldest fund portfolio offered by the family (*LFAMAGE*); the fund family's style concentration index, *STYLEFOCUS*, computed as $\sum_{g=1}^{G}\left(w_{g,t} - \bar{w}_{g,t}\right)^2$, where $w_{g,t}$ is the (TNA-) weight of a fund family in investment style *g* at time *t* and $\bar{w}_{g,t}$ is the average weight of industry-wide investment in style *g* at time *t*; the logarithm of the number of fund portfolios of the fund family (*LNPFOLIOS*); the logarithm of the number of investment objectives of the fund family (*LNINVOBJ*); the value-weighted net percentage cash flows (*FAMFLOWS*); the value-weighted objective-adjusted returns (*FAMRET*); the value-weighted portfolio turnover (*FAMTURNR*); a dummy variable which is equal to 1 if more than 75% of fund family assets are issued to institutional share (*FAMINSTN*) (see Chen, Goldstein, Jiang, 2010); and a dummy variable which is equal to 1 if more than 75% of fund family assets are represented by index fund products (*FAMINDEX*). We also control for the logarithm of the total assets under the management of the five largest fund families (by market share) in the mutual fund industry (*LTOP5FAM*) as they control about 40% of the total industry market share, on average.

The findings of these tests are presented in Table 3. We start by examining whether coinsurance differences are sensitive to fund family size. One could argue that smaller fund families are more likely to concentrate their fund product offerings into a limited number of investment styles because of limited research resources. Alternatively, smaller fund families could make more of an effort to diversify their product offering so as to boost their access to investor demand. Consistent with the findings of Elton, Gruber and Green (2007), our findings indicate that larger fund families (or families with greater industry market share) are less likely to diversify their product offerings across imperfectly correlated investment styles or fund portfolios. This is further confirmed by the significant estimated coefficients of the independent variable *LTOP5FAM*. By contrast, fund families offering multiple investment

objectives or fund portfolios are more likely to hedge their exposure to (idiosyncratic) cash-flow risk. Unsurprisingly, families with greater concentration in an investment style (*STYLEFOCUS*) enjoy lower coinsurance benefits. Our findings also indicate that fund families with heavy concentration (in excess of 75%) of their assets in index products (*FAMINDEX*) are less diversified fund complexes, and that those offering more institutional share classes, *FAMINSTN*, seem to experience lower cash flow correlation, on average.

IV. Flow-related Liquidity Risk and Family-level Coinsurance Benefits

In this section we bring unique evidence to the study of the benefits of coinsurance by estimating the cross-sectional variation in net cash flows of fund families with different levels of coinsurance before and after the flow-related liquidity shock associated with the bankruptcy of Lehman Brothers on September 2008. Figure 2 provides descriptive evidence of such benefits by documenting the difference in the cumulative objective-adjusted net cash flows between fund families with above- and below-median coinsurance.[7] We use the following two representative proxies of coinsurance: (a) the absolute percentage coinsurance of share-class cash flows (*CNRSHRPT*) and, (b) the correlation of idiosyncratic net cash flows estimated at the style level (*CORRSTL*). The graph tracks the difference in the cumulative style-adjusted net cash flows in the two years before and the two years after the crisis of September 2008. The evidence of Figure 2 suggests that fund families with below-median *CNRSHRPT* suffer from an 8% greater cumulative style-adjusted net cash outflows than fund families with above-median *CNRSHRPT* in the two years after the event (*Low-High CNRSHRPT*). Similarly, fund families with above-median *CORRSTL* experience a cumulative style-adjusted net cash outflows which is 5% greater than that of fund families with below-median *CORRSTL (High-Low CORRSTL)*. There seems to be no difference instead in the net cash flows of high and low coinsured fund families in the 2 years preceding the September 2008 event.

Next, we test the effect of the change in coinsurance levels of fund families on flow-related liquidity risk in a multivariate framework by estimating a cross-sectional regression using two liquidity proxies.

[7] Fund families are sorted by coinsurance proxies on September 2007 (i.e., one year before the flow-related shock) to reduce the risk that the liquidity shock might contaminate the sorting of the coinsurance variables.

Our first liquidity proxy is the change in the annual style-adjusted net cash flow averages computed in the 12 months after September 2008 (inclusive) and the 12 months before September 2008, $\Delta\overline{NETFLOWS}$. Our second liquidity proxy is the change in the annual style-adjusted asset volatilities computed in the 12 months after September 2008 (inclusive) and the 12 months before September 2008, $\Delta\overline{ASSETVOL}$. Our estimation model is as follows:

$$\Delta y_{i,t} = \alpha + \beta\ COINSURANCE_{i,t-1} + \gamma y_{i,t-1} + \Theta' X_{i,t-1} + \varepsilon_i\ , \tag{3}$$

where *i* indicates the fund family, *t* is the year after September 2008, $\Delta y_{i,t}$ is the change in flow-related liquidity risk as measured by $\Delta\overline{NETFLOWS}$ or $\Delta\overline{ASSETVOL}$ from the one year before to the one year after September 2008, $y_{i,t-1}$is the lagged liquidity variable, and $X_{i,t-1}$ is the vector of lagged fund family characteristics including: $\overline{NETFLOWS}$; the logarithm of the number of fund portfolios (*LNPFOLIO*) and investment styles (*LNINVOBJ*); the logarithm of family total net assets (*LFAMTNA*); the logarithm fund family age since inception (*LFAMAGE*); percentage net cash flows (*FAMFLOWS*); style-adjusted after-fee realized returns (*FAMRET*); total volatility of net cash flows (*FAMCFVOL*); style-adjusted redemption fees (*LOCKINFEE*); and style-adjusted portfolio turnover (*FAMTURNR*). All independent variables are the averages of the variables in the year prior to September 2008.

Table 4 reports the estimation results of Equation (3). The findings show that, for both our flow-related liquidity proxies, greater fund family coinsurance reduces the flow-related liquidity risk of fund families. High *CNRSHRPT* families experienced lower average net cash outflows ($\Delta\overline{NETFLOWS}$) and lower average asset-based volatility ($\Delta\overline{ASSETVOL}$) then low *CNRSHRPT* families in the 12 months after September 2008 (relative to the pre-crisis period). These findings are both statistically and economically significant. On average, diversified fund families (*FAMDIV*=1) experienced a 7.9% higher style-adjusted net cash flows than undiversified fund families (*FAMDIV*=0) in the 12 months after September 2008. We obtain similar results when we consider the variable *CORRSTL*. Overall, this evidence is consistent with our prediction that greater cash-flow diversification across funds of a family will be associated with a sizeable reduction in family-level flow-related liquidity risk.

VI. Family-level Coinsurance and Fee-Setting Policies

In this section, we examine the implication of family-level coinsurance on the advisory fee-setting policy of fund families using a portfolio approach. We test the robustness of our findings to the use of different multivariate regression models.

A. Family-level Diversification and Style-Adjusted Fees: A Portfolio Approach

We begin our analysis by illustrating the relationship between fees and coinsurance using a portfolio approach. We report the average fund family style-adjusted fees across quintile portfolios of several fund family characteristics and coinsurance proxies in Table 5. We first sort fund families into quintile portfolios of the following lagged characteristics: the number of investment styles offered by the fund family (*NINVOBJ*) in Panel A of Table 5; the total size (TNA) of the fund complex (*FAMTNA*) in Panel B of Table 5; and the total volatility of net cash flows experienced by the fund family (*FAMCFVOL*) in Panel C of Table 5. For each of these quintile portfolios of family characteristics, we then rank fund families into quintile portfolios based on the lagged absolute value of our representative coinsurance proxy *CNRSHRPT*. For each of the resulting 25 cross-tabulated portfolios, we compute the average value-weighted and style-adjusted fees.

Over the entire sample, we observe a monotonic increase in *FAMOPEX* from the lowest to the highest coinsurance quintile. Consistent with our prediction on the effect of cash flow coinsurance on fee-setting policies, the mean difference between *High* and *Low* cash flow coinsurance is a statistically significant 0.3%. Similarly, the mean difference over the entire sample between the highest and lowest quintile of *NINVOBJ* is a statistically significant 0.28% which confirms the existence of economies of scale at the fund family level.

Furthermore, the non-parametric relationship between *FAMOPEX* and *CNRSHRPT* remains positive and significant even after controlling for *NINVOBJ*. Specifically, the mean difference in *FAMOPEX* between the portfolios of high and low *CNRSHRPT* is always negative within each quintile portfolio of *NINVOBJ*. Thus, fee-setting policies are not simply reflecting style-proliferation strategies adopted by fund families.

Although our evidence in Table 3 shows that coinsurance is stronger among smaller fund families, we control for the fund family TNA (*FAMTNA*) in Panel B of Table 5. Unsurprisingly, fund families with greater market share are associated with below-average style-adjusted expenses, hence confirming the existence of significant economies of scale being passed to fund investors (see also Warner and Wu (2011)). Nonetheless, net cash flow coinsurance translates into lower style-adjusted fees within each quintile portfolio of fund family size. It follows that the economic benefits of cash flow coinsurance are unlikely to be driven by economies of scale - as indicated by the significant below-average operating expenses charged by smaller fund families characterized by *Low CNRSHRPT*. We also control for *FAMCFVOL* in Panel C of Table 5 and find that fund families facing lower cash-flow-related liquidity risk are more likely to charge lower fees as confirmed by the significant above-average style-adjusted fees charged by fund families experiencing high cash-flow volatility.[8] However, this relationship seems to be mostly a function of the negative effect of coinsurance on family-level cash-flow volatility.

We reach similar conclusions when we sort fund families by the alternative coinsurance proxies of *CNRSTLPT*, *CORRSTL*, and *CORRSHR*. Similarly, our results are robust to the use of the average style-adjusted advisory fees (*FAMADVFEE*) across quintile portfolios of fund family characteristics. These robustness tests are documented in the Internet Appendix, for brevity.

B. Family-level Diversification and Style-Adjusted Fees: A Multivariate Analysis

We begin by reporting in Table 6 the results of a battery of tests on the relationship between the family-level fees and the fund flow diversification proxies. Since style characteristics could affect the value-weighted fees charged by a family across different products, our dependent variable is the TNA-weighted *style-adjusted* advisory fees (*FAMADVFEE*). The use of style-adjusted fees is equivalent to using fund style fixed effect estimators at the fund family level. In addition, as the individual fund-level fees are net of the average investment objective fees, the family-level fees are, by construction, not affected by changes in the product-mix policies adopted by the family.[9] To address concerns related to

[8] In an unreported test we also control for the age of the fund family (*FAMAGE*). Our findings indicate that younger fund families are likely to charge above-average style-adjusted fees.
[9] Our conclusions do not change when we use the median – rather than the mean – investment objective fees to adjust family-level fees.

the correlation between fund family fees and other observable fund family characteristics, we analyse the relationship between coinsurance and advisory fees in the regression framework proposed by Fama and Macbeth (1973) where we control for a host of fund family characteristics known to affect fees from prior literature. Specifically, we use the following regression specification:

$$FAMADVFEE_{i,t} = \theta + \gamma\ COINSURANCE_{i,t-1} + \boldsymbol{\delta}\ \boldsymbol{X}_{i,t-1} + \varepsilon_{i,t,} \tag{4}$$

where the independent variable $COINSURANCE_{i,t-1}$ is represented by one of the following fund family coinsurance proxies: (a) a dummy variable that equals 1 for diversified multi-fund families (*FAMDIV*) in column (i); (b) the absolute percentage value of the fund family's yearly coinsurance estimated using share-class net cash flows (*CNRSHRPT*) in columns (ii) and (iii); (c) the absolute percentage value of the fund family's yearly coinsurance estimated using style-level net cash flows (*CNRSTLPT*) in column (iv); (d) fund family's pairwise correlation in idiosyncratic style-level net cash flows (*CORRSTL*) in columns (v) and (vi); and fund family's pairwise correlation in share-class net cash flows (*CORRSHR*) in column (vii). Lagged control variables include: the volatility of net percentage cash flows (*FAMCFVOL*); the logarithm of total family TNA (*LFAMTNA*) to account for the decreasing marginal effect of family size on fees, consistent with Baumol et al. (1980); the logarithm of the number of years since the launch of the oldest fund portfolio offered by the family (*LFAMAGE*), to capture potential experience effects on fee-setting policies of the fund family; the logarithm of the number of fund portfolios (*LNPFOLIO*) and the logarithm of the number of investment objectives (*LNINVOBJ*); the value-weighted objective-adjusted net percentage cash flows (*FAMFLOWS*); the value-weighted objective-adjusted returns (*FAMRET*) to rule out the possibility that lower style-adjusted fees might be driven by lower style-adjusted family performance; the value-weighted objective-adjusted portfolio turnover (*FAMTURNR*); the percentage of assets under management invested in equity-oriented investment styles (*EQUITYPCT*); the percentage of assets under management invested in income-oriented investment styles (*INCOMEPCT*); a dummy variable which equals 1 if more than 75% of fund family assets are issued to institutional share (*INSTNPCT*); and a dummy variable which equals 1 if more than 75% of fund family assets are represented by index fund products (*INDEXPCT*). Importantly,

in all model specifications we also interact $COINSURANCE$ with *LFAMTNA* and *LFAMAGE*, to isolate the effect of firm size and years of operations on the fee-coinsurance relationship.

We also control for two additional factors which are likely to influence advisory fee-setting policies of mutual fund families. The first factor relates to investor redemption risk. Chordia (1996) argues that exit fees are highly successful at locking-in fund investors by increasing the cost borne upon redemption. We conjecture that if exit gates are effective at curbing redemption risk, they would significantly decrease the revenue uncertainty faced by load fund families. The lower redemption risk would then enable load fund families to compete more aggressively for investors by reducing advisory fees (see also Nanda, Narayanan, and Warther (2000)). We isolate the effect of redemption risk on advisory fees from that of cash flow coinsurance by using the variable *LOCKINFEE*, computed as the value-weighted style-adjusted redemption fee.

The second factor relates instead to the quality of a fund family's product offering as proxied by the number of star-performing funds within the family. It is reasonable to assume that "star"-producing fund complexes can charge above-average fees. Nanda, Wang, and Zheng (2004) argue that fund families can try to improve the odds of generating star funds by resorting to a fund proliferation strategy. Since this strategy of expanding the product mix in an attempt to produce more star funds could also lower intra-family cash flow correlation, the number of star funds within a fund family could affect the fee-coinsurance relationship. Our proxy of star-fund family is the number of star funds offered by the family, *FAMSTARNUM*. A star fund is then one whose performance ranks in the top 5 percent of monthly style-adjusted returns.

Consistent with the nonparametric evidence reported in Table 7, the estimated loadings of the dependent variable, *FAMADVFEE*, on the different diversification proxies in Table 6 are consistent with the coinsurance effect of imperfect correlation on fees. Specifically, fund families with higher cross-fund coinsurance charge significantly lower style-adjusted advisory fees to their shareholders. For instance, the estimated coefficient of -0.181 of the dummy variable *FAMDIV* in Panel A of Table 7 suggests that diversified families charge a style-adjusted fee that is about 18 basis points lower than that of single fund families. Since an average *diversified* fund family manages approximately $23 billion in assets spread across 13 fund portfolios and 8 investment styles, this 18 basis point reduction in fees

implies that fund investors could save about $41 million in style-adjusted advisory fees across the entire range of product offerings of the family, on average.

In model (iii) we estimate the loading of *FAMADVFEE* on the percentage reduction in total cash-flow volatility, *CNRSHRPT*. The cross sectional fee-coinsurance sensitivity remains negative and significant: An average diversified family charges a style-adjusted advisory fee which is 13 basis points less than that of an undiversified single-fund family. In models (ii) and (iii) we exclude the control variable *FAMCFVOL* as this variable is highly correlated with the two coinsurance proxies of *CNRSHRPT* and *CNRSTLPT*, by construction.

Importantly, the positive coefficients of *FAMCFVOL* confirm that fund families facing above-average cash flow volatility are more likely to protect their revenue by charging higher value-weighted style-adjusted advisory fees in an attempt to maximize their total fee income. After controlling for fund family characteristics, a one percent (0.031) reduction in the monthly cash flow volatility is associated with a reduction in style-adjusted advisory fees equal to 3 basis points (or $7 million) .

The evidence of Table 6 survives after controlling for a host of family characteristics known to affect fees from the prior literature. Explicitly, larger families (*LFAMTNA*) enjoy greater economies of scale which are then passed along to fund investors as lower (style-adjusted) fees (see e.g., Warner and Wu (2011)). After controlling for family size, bigger families offering multiple style products (*LNINVOBJ*) or multiple fund portfolios (*LNPFOLIO*) are associated with above-average style-adjusted total operating expenses and style-adjusted advisory fees. Further, the positive relationship between family-level fees and value-weighted style-adjusted fund portfolio turnover (*FAMTURNR*) is consistent with Chalmers, Edelen, and Kadlec (1999) who argue that portfolio turnover represents the largest component of fund trading costs which are usually transferred to investors via higher advisory fees.

The negative and significant loadings of *FAMADVFEE* on *LOCKINFEE* across all model specifications suggest that fund families experiencing lower liquidity risk and higher degree of income smoothing as a result of above-average style-adjusted exit fees, are more likely to charge lower style–adjusted advisory fees. Also, the positive coefficients attached to *FAMSTARNUM* confirm the existence of a premium for a high-quality product offering. As an example, for each additional star fund, a fund family would charge a 5 basis point higher value-weighted style-adjusted advisory fees , on average.

In an unreported table we obtained results qualitatively similar to those illustrated in Table 6 when we use *FAMOPEX* as the alternative dependent variable.[10]

Overall, the evidence in Table 6 confirms the existence of significant benefits associated with family-level cash flow diversification after controlling for a host of fund family characteristics. Consistent with our coinsurance hypothesis, fund families with lower cross-fund and/or cross-style flow correlation are able to more competitively price their product offerings, thereby leading to the lower advisory fees paid by mutual fund shareholders.

C. Incentives to Lower Fees: Price Competition and the Fee-Coinsurance Relationship

Consistent with Bertrand competition, Wahal and Wang (2011) show that incumbent funds lower their management fees in response to new entrant funds launched by competing fund families. In this section, we use the effect of competition forces to identify the incentives for more coinsured fund families to charge lower value-weighted advisory fees to their investors. Our expectation is that greater price competition from new peer funds should exert a significant downward pressure on fund family's style-adjusted advisory fees, particularly when these fund families experience lower asset volatility as a result of stronger cash flow coinsurance.

We use three proxies to quantify the intensity of within-style price competition. Khorana and Servaes (1999) and Wahal and Wang (2011) argue that mutual fund starts influence the way mutual funds and their fund families compete within the industry, and that fund openings are related to the ability of fund families to attract additional fee income. Accordingly, our first proxy is the within-style percentage of new fund products launched by other fund families, *NFSTARTS*. Consistent with the previous literature, we define a newly-launched fund product as a fund with less than one year of operations since inception. This measure does not consider however the level of advisory fees initially charged by new funds when first offered by other fund families in the same investment style. As such, a better proxy of price competition is the within-style percentage of newly-launched fund products offered by other fund

[10] Using the information contained in Item 053 of the NSAR-B form over the period 1995 to 2015, we also estimated a probit model of the relationship between fund family's decision to waive their marginal compensation rates. Our findings indicate that fund families are significant more likely to waive their fees when experiencing lower asset volatility from greater cash-flow coinsurance.

families with an *initial* advisory fee which is below the existing average fee in that style, *NFSTARTSLF*. We expect this proxy to quantify more directly the degree of price pressure exerted by newly-launched funds on advisory fee-setting policies of incumbent fund families.

Nanda, Narayanan, and Warther (2000) argue that in the presence of investor heterogeneity in liquidity needs, funds would compete by charging lower advisory fees to attract investors with low liquidity needs, while at the same time using exit gates to lock in those investors with greater liquidity needs. As such, our third proxy of fee-based competition among peer funds is the within-style average redemption fee, *AVGEXITGATE*. Our expectation is that fund families operating in investment styles characterized by higher average exit fees should face significant lower redemption risk, and be able to price their products more aggressively when experiencing lower asset volatility, equal conditions.

Table 9 reports the findings of such tests. The dependent variable is the fund family's value-weighted style-adjusted advisory fee, *FAMADVFEE*. The main independent variables of interest are the different cash-flow coinsurance proxies described previously. To quantify the effect of price competition on the fee-coinsurance relationship we interact each coinsurance measure with the following three proxies of price competition: *NFSTARTS* in Panel A of Table 9, *NFSTARTSLF* in Panel B of Table 9, and *AVGEXITGATE* in Panel C of Table 9. Other lagged control variables (untabulated for brevity) include fund family characteristics previously introduced in Table 7. In the internet appendix we report the findings when using *FAMOPEX* as the alternative dependent variable.

Consistent with Wahal and Wang (2011), the negative loadings of *FAMADVFEE* on the independent variable *NFSTARTS* in Panel A of Table 9 confirms that fund families competing in investment objectives characterized by an above-average percentage of new-fund openings tend to charge significantly lower style-adjusted advisory fees. Importantly, the negative fee-coinsurance relationship in models (ii) and (iii) is now restricted mostly to coinsured fund families facing incentives from strong within-segment competitive pressures, as indicated by the significant coefficient attached to the interaction term *COINSURANCE* x *NFSTARTS*. The economic magnitude of the coefficient on this interaction term increases markedly when we consider our second proxy of within-style fee competition, *NFSTARTSLF*, in Panel B of Table 9. As expected, *NFSTARTSLF* incorporates the additional dimension

of the aggressiveness of fee-setting policies of newly-launched funds in addition to the information already contained in the variable *NFSTARTS*.

Finally, the significant loadings of fees on the interaction term between *COINSURANCE* and *AVGEXITGATE* across all model specifications in Panel C of Table 9, confirm once again that fund families with lower asset volatility are those more likely to cut advisory fees when facing a more competitive landscape.

D. Upside/Downside Correlations and Advisory Fee-Setting Policies

The evidence in Table 6 indicates that the unconditional average correlation among a fund family's net cash flows is negatively related to the level of style-adjusted advisory fees. An interesting question at this stage is whether this relationship varies if a fund family experiences greater correlation of net cash outflows (downside correlation) as opposed to greater correlation of net cash inflows (upside correlation). One may contend that a fund family would face flow-related liquidity risk only when exposed to a high degree of downside cash flow correlation rather than upside cash flow correlation. It follows that a fund family's advisory fee-setting policies should be more "competitive" when the fund family has a better "hedge" against downside (rather than upside) cash-flow correlation. It is also interesting to examine whether fund families face, on average, asymmetric cash flow correlations. If all share classes (or styles) experience investor withdrawals at the same time, the value of a fund family's unconditional cash flow coinsurance may be significantly overstated.

To address these issues, we first estimate the cash-flow correlations $\gamma_{g,q,[t-k+1,t]}$ conditional on whether idiosyncratic net cash flows (*INCF*) of investment styles g and q are both positive (*UPSIDE*) or both negative (*DONWSIDE*) over the previous $k = 36$ months as follows:

$$\gamma(DONWSIDE)_{g,q,[t-k+1,t]} = corr\left(INCF_g, INCF_q \middle| INCF_g < 0, INCF_q < 0\right)$$

$$\gamma(UPSIDE)_{g,q,[t-k+1,t]} = corr\left(INCF_g, INCF_q \middle| INCF_g \geq 0, INCF_q \geq 0\right) \quad (5)$$

The conditional cash-flow correlations in Equation (5) are then aggregated (i.e., TNA-weighted) at the fund family level to obtain the two conditional correlation variables of *CORRSTL_UPSIDE* and *CORRSTL_DOWNSIDE*. We repeat the estimation of the conditional correlations in Equation (5) using

share-class-level net cash flows, and separate the unconditional correlation variable of *CORRSHR* into the two conditional variables of *CORRSHR_UPSIDE* and *CORRSHR_DOWNSIDE*.

Panel A of Table 10 provides the summary statistics of the conditional cash flow correlation measures as well as the *t*-statistics of the difference between upside and downside correlations to test for possible asymmetries. Although the difference in upside and downside correlation is statistically significant indicating that downside cash flow correlations are higher than upside cash flow correlations, the degree of asymmetry is trivial in economic terms.

In Panel B of Table 10 we estimate multivariate cross-sectional regressions of advisory fees on unconditional and conditional cash flow correlation proxies. The dependent variable in columns (i)-(iv) is *FAMADVFEE*. We also report the analysis on *FAMOPEX* as our dependent variable in models (v)-(viii) of Table 10. The main independent variables of interest are *CORRSTL* and *CORRSHR* and their decomposition into positive (*_UPSIDE*) and negative (*_DOWNSIDE*) net cash-flows. Additional control variables (untabulated for brevity) include all of the fund and fund family characteristics discussed in Table 6. We also include (but do not report for brevity) the interaction terms between *CORRSTL* and *CORRSHR*, and their conditional decompositions in *_UPSIDE* and *_DOWNSIDE*, with the fund family variables of *LFAMTNA* and *LFAMAGE*.

In model (i) of Table 10 we first repeat the analysis of model (vi) of Table 6. In model (ii) of Table 10 we then estimate the loadings of *FAMADVFEE* on the two conditional correlation variables of *CORRSTL_DOWNSIDE* and *CORRSTL_UPSIDE*. The estimated coefficients attached to these two variables confirm that advisory fees are sensitive mostly to downside correlation rather than to upside correlation (0.258 vs. 0.038). In other words, fund families tend to charge below-average style–adjusted fees when they are better protected against downside liquidity risk resulting from lower conditional net-cash flow correlation. The findings are qualitatively similar in model (iv) of Table 10 when we use the alternative conditional cash-flow correlation variables of *CORRSHR_UPSIDE* and *CORRSHR_DOWNSIDE*.

VI. The Relationship between Coinsurance and Fund Family Performance

In this section we evaluate the relationship between fund family performance and several coinsurance proxies to quantify the benefits accruing to mutual fund shareholders from investing in more diversified fund families. Since fund families offer products with different investment strategies, we estimate their after-fee performance using various benchmarks. In addition to the Sharpe-Lintner Capital Asset Pricing Model (*CAPM*), we also benchmark fund returns using the Carhart (1997) four-factor model (*4-factor*). Since our sample includes fund families offering balanced and international funds, we also employ a six-factor model (*6-factor*) that includes the excess returns on the Morgan Stanley Capital International (MSCI) index covering Europe, Australia, and the Far East, and the Barclays US Aggregate Bond Index (ex-Lehman US Aggregate Bond Index). In order to benchmark the performance of fixed income funds we follow Blake, Elton, and Gruber (1993) and augment the four factor model using the excess returns of the following six bond indices: Barclays U.S. Treasury Long, Barclays U.S. Treasury Intermediate, Barclay U.S. Treasury Bill 3–6m, Barclays U.S. Corp Investment Grade, Barclays U.S. High-Yield Composite, and Barclays GNMA 30-Year (*10-factor*). To mitigate concerns about possible look-ahead bias in the estimation of fund family performance, we estimate risk-adjusted returns as the monthly abnormal returns based on the various factor models, where the factor loadings are estimated over the previous 36 months (with a minimum of 30 months of available observations).

A. Fund Family Risk-Adjusted Performance and Coinsurance Proxies: Portfolio Evidence

To gauge the relative performance of fund families with different coinsurance levels, we sort all fund families into 5 portfolios according to their coinsurance values at the beginning of each month. For each quintile portfolio, we compute the equally-weighted average return for each month. The abnormal returns before (*Gross*) and after (*Net*) expenses are illustrated in Table 7. In Panel A, fund families are sorted on *CNRSHRPT*. The results indicate that the most coinsured fund family portfolio (*CNRSHRPT 5*) generates a net 4-factor alpha of -0.96% per month, while the least coinsured fund family portfolio (*CNRSHRPT 1*) generates an abnormal return of -1.89% per month. The Newey-West *t*-statistic (estimated with lags of order 3) of the difference in the monthly *after-fee* abnormal returns between the top and the bottom quintiles is 3.27. Our findings do not change when we consider the

CAPM, 6-factor, and 10-factor after-fee risk-adjusted returns. Hence, the evidence of Panel A of Table 7 indicates that more coinsured fund families perform better than less coinsurance fund families after deducting expenses. By contrast, we do not find any significant difference in the monthly *gross* abnormal returns between the top and the bottom quintiles of sorted *CNRSHRPT*. We reach similar conclusions when we consider the cash-flow correlation measure of *CORRSTL* in Panel B of Table 7, and the (unreported) findings on the alternative coinsurance proxies of *CNRSTLPT* and *CORRSHR*.

B. Fund Family Risk-Adjusted Performance and Coinsurance Proxies: Multivariate Analysis

In this section, we further extend our analysis using multivariate regressions. This approach differs from the portfolio approach because the quintile portfolio analysis does not control for fund family characteristics that are related to fund performance. Fund family control variables include all the variables discussed in Table 6. In addition, we also control for the degree of product differentiation within each investment objective (*PDTDIFF*) as Massa(2003) emphasize the importance of controlling for product differentiation when evaluating fund performance. This variable is computed as the standard deviation of the fees charged across all the funds active in the category standardized by their maximum value over the whole period. We estimate time series, cross section regressions with time fixed effects and standard errors (in parentheses) clustered by both family and time (*Family-Time*). We also report the estimated coefficients of the Fama-MacBeth cross-sectional regressions with *HAC* standard errors.

The estimated loadings on the different coinsurance measures are reported in Table 8. The dependent variable is either the net or the gross risk-adjusted return of the fund family. The loadings on our coinsurance proxies are all consistent with our empirical prediction that more diversified fund families offer, on average, better *after-fee* risk-adjusted performance as a result of their more aggressive fee-setting policies. For instance, the coefficient using the CAPM risk-adjusted returns on the variable *FAMDIV* is 0.074. This implies that on average a more coinsured family outperforms a less-coinsured family by about 90 basis points a year. The magnitudes are somewhat smaller when we use the 4-, 6-, and 10-factor models, with the outperformance decreasing to 0.041 in model (iv). So, more coinsured fund families outperform other fund families by between 50 and 90 basis points a year, which is

substantial in economic terms. The use of the other proxies of fund family coinsurance as main independent variables in models (v) to (xvi) yields similar results.

The table reports also the relationship between the fund family gross performance and the coinsurance proxies. Consistent with the portfolio evidence illustrated in Table 7, the loadings of gross risk-adjusted returns are both statistically and economically insignificant indicating the lack of any relationship between coinsurance and gross performance. Thus, more coinsured families are unable to generate better gross risk-adjusted returns after controlling for the effects of other fund family characteristics on gross performance.

In Table 8 we also report the estimated coefficients on *LFMATNA* and *PDTDIFF*. Chen at al. (2004) find a negative relationship between scale and returns of mutual funds which the authors attribute to liquidity and price impact. Unsurprisingly, this negative association exists also in our sample since family-level performance and size are computed as value-weighted fund-level characteristics. The negative loadings on *PDTDIFF* is consistent with Massa (2003) who provides evidence of fund families' strategic behaviour: Fund families who are able to differentiate themselves in terms of non-performance-related characteristics (e.g., a higher degree of fee differentiation) have less need to compete in terms of performance.

Overall, the positive link between net (but not gross) fund family performance and coinsurance proxies illustrated in Table 8 confirms that below-average style-adjusted fund advisory fees are associated with more coinsured fund families.

VII. Robustness Tests

E. "Mirror" Fund Families and Fee-Coinsurance Sensitivity

We now test whether value-weighted style-adjusted advisory fees are associated with measures of cash flow correlation even in the absence of any real coinsurance benefit accruing to the fund family. For this purpose, we construct a sample of simulated fund families by replacing each constituent fund share class of a fund family with a "mirror" fund share class belonging to one of the other fund families. A "mirror" fund class in month *t* is defined as one that: (1) operates in the same investment style as the constituent fund class offered by the fund family; (2) belongs to the same quintile portfolio of sorted

fund class TNA; and (3) has the highest cash flow correlation with the original fund class offered by the fund family.

Next, we compute the relevant value-weighted family characteristics for the simulated fund families and estimate the various measures of cash flow coinsurance. Note that by construction, the simulated fund families are not expected to experience any genuine cash flow coinsurance benefits based on the fund flows of the constituent "mirror" funds. Hence, we should not expect any significant relationship to exist between advisory fees and coinsurance proxies in our sample of simulated fund families.

Table 11 reports the estimated fee-coinsurance sensitivities for the sample of simulated fund families. The dependent variable in models (i), (iii), (v), (vii), and (ix) is the value-weighted style-adjusted advisory fee, *FAMADVFEE*. In all other models we repeat the analysis using *FAMOPEX* as an alternative dependent variable. The main independent variable of interest is one of our family coinsurance proxies. We also include the independent variable *FAMCFVOL* to control for the sensitivity of advisory fees to fund family's fee revenue volatility. Additional control variables (untabulated for brevity) include all of the fund and fund family characteristics discussed in Table 6.

Consistent with our prior expectation and irrespective of the coinsurance proxy used in Table 11, none of the estimated loadings is now statistically significant at the conventional levels. This conclusion extends to the estimated coefficients on the variable *FAMCFVOL*. In summary, the evidence from this "placebo" test confirms that the advisory fee-coinsurance relationship documented in Table 6 is not spurious. Rather, our results reflect genuine coinsurance benefits from less-than-perfectly-correlated fund flows of the constituent funds of a fund family.

G. The Effect of Total Revenue Concentration in the Mutual Fund Business on Fund Family's Cash-Flow Coinsurance and Advisory Fees.

Mutual fund families tend to operate across multiple business segments such as security brokerage, investment banking, fund management, sales and trading, and annuity and insurance products. As such, for some of them the mutual fund business represents only a small fraction of the total revenue. For instance, Prudential (NYSE:PRU), one of the largest fund families, is active in 6 distinct three-digit SIC codes, and derives most of its revenue (net of reinsurance) from insurance operations, with asset

management accounting for about 6% of total revenue. It is reasonable to believe that the incentive of a fund family to diversify its flow-related liquidity risk or compete on advisory fees would vary depending on the extent of concentration of the total revenue of the fund family in the mutual fund business. Specifically, fund families deriving most of their revenue from the mutual fund segment should be associated with greater cash-flow coinsurance and compete more aggressively for market share by lowering their advisory fees, equal conditions.

In this section, we examine whether, and if so to what extent, the relevance of the mutual fund business – expressed as a percentage of total revenue of a public fund family – affects advisory fees, flow-related liquidity risk, and fee-coinsurance sensitivity. To this purpose, we first restrict our sample to the top 100 fund families by industry market share. As of 2015, the top 100 fund families controlled in excess of 95% of the total industry market share. To obtain data on the business segments of a fund family, we distinguish between private fund families (e.g., Vanguard or Fidelity) and public fund families (e.g., T. Rowe Price) by matching fund family names available in the CRSP mutual fund database with those available in SDC Platinum M&A database, fund family website, Bloomberg, Forbes, Morningstar, and Baron Funds. Next, we match the names of publicly-listed-only fund families with those available in COMPUSTAT, and retrieve fund families' total assets (*TOTASSETS*), total revenue (*TOTREV*) as well as fund families' CIK, SIC, NAICS, and GVKEY codes. To quantify the relevance of the mutual fund business of a public fund family, we divide the monthly revenue generated by the mutual fund segment – computed as the product of value-weighted total operating expenses and total assets under the management of the fund family – by the total revenue of the listed fund family.

Panel A of Table 12 provides the descriptive statistics of the top 100 fund families. Specifically, 48% of mutual fund families are publicly listed entities. They control an average market share of 0.6%, and offer an average of 24 distinct fund portfolios across 12 different investment styles. The average total assets (revenue) of public fund families are $307 billion ($19 billion), with this value ranging between $286 ($221) million and $1.6 trillion ($83 billion). Importantly, an average public fund family derives about 12% of total revenue from the mutual-fund business (*MFSEGREV*), and are diversified across 3.3 distinct three-digit SIC codes (*NUMSIC3DIG*).

In panel B of Table 12 we evaluate the cross sectional relationship between fund family fees and *MFSEGREV*. The dependent variable is the fund family's value-weighted and style-adjusted advisory fee, *FAMADVFEE*. Our findings indicate clearly that fund families deriving a greater percentage of their total revenue from the mutual fund segment are likely to charge below-average value-weighted advisory fees. For instance, a one standard deviation increase in *MFSEGREV* (19.4%) is associated with a 12 basis point decrease in value-weighted style-adjusted advisory fees. Importantly, the interaction term *MFSEGREV*COINSURANCE* suggests that fund families with a greater fraction of their aggregate revenue represented by the mutual fund business reduce advisory fees more aggressively when their flow-related liquidity risk is lower. We yield qualitatively similar results when we consider value-weighted and style-adjusted total operating expenses, *FAMOPEX,* in an unreported test.

H. The Effect of Coinsurance on Yearly Changes in Fund Family Advisory Fees

In this section we estimate the effect of different lagged coinsurance variables and lagged fund family characteristics on yearly changes in value-weighted style-adjusted advisory fees. A possible fund family policy could involve active dynamic fee management where fund families alter the level of advisory fees from year *t-1* to year *t* in response to a host of fund family characteristics at time *t-1*. If fund families with greater cash-flow coinsurance change advisory contracts to reflect lower flow-related fee-income risk, we should then observe subsequent decreases in style-adjusted advisory fees. To address this possibility, we first estimate pooled OLS regressions with time fixed effects where the dependent variable is the year-on-year change in value-weighted style-adjusted advisory fees, Δfee_t. We then construct the variable $I_{\Delta fee>0}$ (a dummy variable that takes value of 1 if there is a positive change in value-weighted style-adjusted advisory fees, and zero otherwise) and estimate logit regressions with year fixed effects.

Table 13 reports the findings of these regressions. Lagged independent variables include the coinsurance proxies and fund family characteristics described in Table 6. Robust standard errors are clustered by fund family. The estimated loading of the dependent variable Δfee_t on the standardized coinsurance proxy $CNRSHRPT_{t-1}$ in model (i) confirms that more (less) coinsured fund families tend to decrease (increase) advisory fees in the next year. Similarly, the estimated coefficient of the logit

regression in model (ii) suggests that fund families with above- (below-) average cash-flow coinsurance are more likely to decrease (increase) fees in the following year. The findings obtained with the alternative coinsurance proxies in all other models are similar to those documented in models (i) and (ii). Consistent with the findings documented in previous tables, the loadings on the independent variable FAMCFVOL in models (v) to (viii) confirms that fund families experiencing greater cash-flow volatility are more likely to increase fees in the following year.

I. Endogeneity of the Fund Family Decision to Diversify

If fund families voluntarily choose to diversify their product offerings, their diversification decision may not be random but rather a deliberate choice based on information obtained by the family. In this context, assuming that a family's status can be treated as exogenous in the estimation procedure could be misleading. Indeed, if the decision of a fund family to diversify is correlated with its advisory-fee-setting policy, the estimated coefficient in Equation (4) on our coinsurance proxy will be biased. In this section, we try to address this issue in two ways. First, we estimate the relationship between family-level fees and fund family's decision to diversify, *FAMDIV*, using family fixed effects. Second, we estimate a two-stage-least-square instrumental variable (2SLS-IV) regression with family fixed effects using a set of instruments to predict the decision of a fund family to diversify while leaving family-level fees unaffected.[11]

Following Campa and Kedia (2002), our first set of instrumental variables (IV) include the total number of other fund families in each investment objective that are diversified in the previous year (*PNUMDIV*), and the percentage of total assets managed by other diversified fund families in each investment objective in the previous year (*PTNADIV)*. The second set of IV includes the total number of mutual fund mergers in the previous year (*MGRNUM*), and the total dollar volume of mutual fund mergers in the previous year (*MGRVOL*).[12] Importantly, since total operating expenses (*FAMOPEX*)

[11] We test for endogeneity of family diversification decisions using the Hausman specification test. We could reject the null hypothesis of no endogeneity at the one percent level for *FAMDIV*.

[12] We believe that our IV satisfy the validity criterion as fund families operating in investment objectives populated by more diversified fund families (i.e., higher *PNUMDIV* or *PTNADIV*) should have greater incentives from competition to diversify their product offering. At the same time, our IV should also satisfy the exclusion criterion since the decision of other fund families to diversify should not affect directly the attributes of an unaffiliated fund in the second stage except through the diversification decision of its fund family.

and advisory fees (*FAMADVFEE*) are style-adjusted, they are orthogonal, by construction, to any unobservable style characteristics that could affect fund-family fee-setting policies.

Table 14 illustrates the results of family and time fixed effect regressions in models (i), (iii), (v), and (vii), with standard errors clustered by fund family. To test the robustness of our findings to different time frequencies, we also repeat the analysis using yearly observations of style-adjusted operating expenses and advisory fees in all other models.

The estimated coefficients in models (i) and (iii) confirm the prediction that diversified families, *FAMDIV*, tend to charge between 5 and 7 basis points significantly lower *style-adjusted* advisory fees in the monthly and yearly regressions of columns (i) and (iii), respectively. We reach very similar conclusions when we use family-level style-adjusted operating expenses as the dependent variable in the monthly and yearly regressions of columns (v) and (vii) of Table 14. The loadings on all other control variables are consistent with those documented in Table 6.

Next, we report the findings of the second stage of the 2SLS-IV regressions with family fixed effects at both monthly and yearly frequencies in models (ii), (iv), (vi), and (viii).[13] In all models, the estimated parameters of the IV regression are negative and different from zero at the 1% level of statistical significance. Importantly, although the statistical significance of the coefficients remains particularly high with a *t*-statistics of about 12 in column (ii), the loading of style-adjusted advisory fees on *FAMDIV* decreases in economic magnitude, confirming the importance of accounting for the endogeneity of a fund family's decision to diversify its product offerings.

VI. Concluding Remarks

In this study we provide novel evidence on the diversification benefits to fund families and their investors from a more diversified mutual fund product offering. Using several proxies for the fund flow coinsurance effect experienced by fund families with less-than-perfectly correlated investor flows, we show that cash flow coinsurance mitigates the flow-related liquidity risk and fee-income risk faced by fund families. Importantly, we show that cash flow coinsurance results in significant economic benefits

[13] In the first stage, we use all of the exogenous family variables along with the previous instrumental variables as explanatory variables in the decision to diversify.

to mutual fund shareholders as more diversified fund families offer improved after-fee performance to investors. By contrast, we do not find any relationship between gross performance and coinsurance measures of fund families.

Our results indicate that the positive link between cash flow coinsurance and after-fee performance is consistent with strategic pricing behavior on the part of fund families operating in investment styles characterized by stiffer price competition. Consistently, we document that fund families with lower cross-fund or cross-style flow correlation are able to price more competitively their product offerings, thereby leading to lower total operating expenses and advisory fees paid by mutual fund shareholders. Finally, we show that fund families are more likely to charge below-average style-adjusted advisory fees when they are better protected against downside liquidity risk due to the diversification of redemption flows.

REFERENCES

Baumol, William, Stephen Goldfeld, Lilli Gordon, and Michael Koehn. 1980. The economics of mutual fund markets: Competition versus regulation. Boston, MA: Kluwer.

Berk, J.B., Green, R.C., 2004. Mutual Fund flows and performance in rational markets. Journal of Political Economy 112, 1269–1295.

Blake, Christopher R., Elton, Edwin J. and Gruber, Martin J. 1993. The performance of bond mutual funds. Journal of Business 66 (July): 371-403.

Campa, José Manuel, and Simi Kedia, 2002, Explaining the diversification discount, Journal of Finance 57, 1731-1762.

Carhart, Mark M., 1997, On persistence in mutual fund performance, Journal of Finance 52, 57–82.

Chalmers, John, Roger M. Edelen, and Gregory B. Kadlec, 1999, An analysis of mutual fund trading costs, working paper, University of Oregon.

Chen, Qi, Itay Goldstein, and Wei Jiang, 2010, Payoff complementarities and financial fragility: Evidence from mutual fund outflows, Journal of Financial Economics 97, 239–262.

Chen, Joseph, Samuel Hanson, Harrison Hong, and Jeremy C. Stein, 2008, Do hedge funds profit from mutual-fund distress? Working paper, Harvard University

Chen, Joseph, Harrison Hong, Ming Huang, and Jeffrey D. Kubik, 2004, Does Fund Size Erode Mutual Fund Performance? The Role of Liquidity and Organization, American Economic Review 94, 1276–1302.

Chen, Joseph, Harrison Hong, Wenxi Jiang, and Jeffrey D. Kubik, 2013, Outsourcing mutual fund management: Firm boundaries, incentives, and performance, Journal of Finance 68, 523–558.

Chordia, Tarun, 1996, The structure of mutual fund charges, Journal of Financial Economics, 41: 3-39.

Coval, Joshua, and Erik Stafford, 2007, Asset fire sales (and purchases) in equity markets, Journal of Financial Economics, 86, 479-512.

de Figueiredo, Rui J.P. and Evan Rawley, 2011, Skill, luck, and the multiproduct firm: Evidence from hedge funds, Management Science, 57, 1963-1978.

Duchin, Ran, 2010, Cash holdings and corporate diversification, Journal of Finance 65, 955-992.

Edelen, Roger, M., 1999, Investor flows and the assessed performance of open-end mutual funds, Journal of Financial Economics, 53, 439-466.

Elton, Edwin J., Martin, J.,, Gruber, and Clifton, T., Green, 2007, The impact of mutual fund family membership on investor risk, Journal of Financial and Quantitative Analysis, 42, 257-277.

Froot, Kenneth A., David S. Scharfstein and Jeremy C. Stein, 1993, Risk management: Coordinating corporate investment and financing policies, Journal of Finance 48, 1629-1658.

Gaspar, José-Miguel, Massimo Massa, and Pedro Matos. 2006. Favoritism in mutual fund families? Evidence on strategic cross-fund subsidization. Journal of Finance 61, 73–104.

Gerken, William C., Laura T. Starks and Michael Yates, 2014, The importance of family: The role mutual fund family reputation in investment decisions, working paper, University of Kentucky.

Hann, Rebecca N., Maria Ogneva, and Oguzhan Ozbas, 2013, Corporate diversification and the cost of capital, Journal of Finance 68, 1961-1999.

Hortaçsu, Ali, and Chad Syverson, 2004, Product differentiation, search costs, and competition in the mutual fund industry: A Case study of S&P 500 index funds, Quarterly Journal of Economics, 119, 403-456.

Huang, Jennifer, Kelsey D. Wei and Hong Yan, 2007. Participation costs and the sensitivity of fund flows to past performance. Journal of Finance 62, 1273–1311.

Khorana, Ajay and Henri Servaes, 1999, The determinants of mutual fund starts, The Review of Financial Studies 12, 1043-1074.

Khorana, Ajay, and Henri Servaes, 2012, What drives market share in the mutual fund industry? Review of Finance 16, 81-113.

Khorana, Ajay, Henri Servaes, and Peter Tufano, 2008, Mutual fund fees around the world, Review of Financial Studies 22, 1279-1309.

Mamaysky, Harry, and Matthew Spiegel, 2001, A theory of mutual funds: Optimal fund objectives and industry organization, working paper, Yale School of Management.

Massa, Massimo, 2000, Why So many mutual funds? Mutual fund families, market segmentation and financial performance, working paper, INSEAD.

Massa, Massimo, 2003, How do family strategies affect fund performance? When performance-maximization is not the only game in town, Journal of Financial Economics 67(2), 249-304..

Nanda, Vikram, M.P. Narayanan, and Vincent A. Warther, 2000, Liquidity, investment ability, and mutual fund structure, Journal of Financial Economics, 57, 417-443.

Nanda, Vikram, Z Jay Wang, and Lu Zheng, 2004, Family values and the star phenomenon: Strategies of mutual fund families, Review of Financial Studies 17, 667-698.

Sapp, Travis, and Ashish Tiwari, 2004, Does stock return momentum explain the "smart money" effect? Journal of Finance 59, 2605–2622.

Shive, Sophie, and Hayong Yun, 2013, Are mutual funds sitting ducks? Journal of Financial Economics, 107, 220-237.

Siggelkow, Nicolaj, 2003, Why focus? A study of intra-industry focus effects, Journal of Industrial Economics, 51, 121-150.

Wahal Sunil, and Albert (Yan) Wang, 2011, Competition among mutual funds, Journal of Financial Economics 99, 40-59.

Warner, Jerold B., and Joanna S. Wu, 2011, Why do mutual fund advisory contracts change? Performance, growth, and spillover effects, Journal of Finance 66, 271-306.

Appendix A. Variable Definitions

Variable name	Definition
FAMDIV	Dummy variable for diversified Multi-Fund Families (*MFF*). This variable is equal to 1 if a fund family offers multiple funds across more than 1 investment objective, and 0 otherwise.
CNRSHR	The coinsurance effect across fund share classes offered by a fund family is computed as the difference between the family-level total volatility of share-class net cash flows (*FAMCFVOL*) and the family-level volatility of net cash flows assuming a pairwise correlation of one between all share-class cash flows within the family (*FAMCFVOLPC*). Family-level total volatility of net cash flows, *FAMCFVOL*, is computed as $\sqrt{\sum_{i=1}^{N}\sum_{j=1}^{N} w_{i,t}w_{j,t}\rho_{i,j,t}\sigma_{i,t,k}\sigma_{j,t,k}}$ where $\rho_{i,j,t}$ is the pairwise correlation of net cash flows between share classes *i* and *j* estimated over the period *t-k+1* to *t*, $w_{i,t}$ is the weight of share class *i* in the fund family's portfolio, and $\sigma_{i,t,k}$ is the volatility of share class *i*'s net cash flows over the period *t-k+1* to *t*. Volatilities are estimated over the previous *k* = 36 months, with a minimum requirement of 12 months of valid observations within the 36-month window. To facilitate the interpretation of our results, *CNRSHR* is the absolute value of family-level coinsurance.
CNRSTL	The coinsurance effect across investment styles offered by a fund family is computed as the difference between the family-level total volatility of style-level net cash flows and the family-level volatility of net cash flows assuming a pairwise correlation of one between all style cash flows within the family. Family-level total volatility of style cash flows is computed as $\sqrt{\sum_{g=1}^{G}\sum_{q=1}^{Q} w_{g,t}w_{q,t}\rho_{g,q,t}\sigma_{g,t,k}\sigma_{q,t,k}}$ where $\rho_{g,q,t}$ is the pairwise correlation of net cash flows between style *g* and style *q* estimated over the period *t-k+1* to *t*, $w_{g,t}$ is the weight of style *g* in the fund family's portfolio, and $\sigma_{g,t,k}$ is the volatility of style *g*'s net cash flows over the period *t-k+1* to *t*. Volatilities are estimated over the previous *k* = 36 months, with a minimum requirement of 12 months of valid observations within the 36-month window. To facilitate the interpretation of our results, *CNRSTL* is the absolute value of family-level coinsurance.
CNRSHRPT CNRSTLPT	The variable *CNRSHRPT* (*CNRSTLPT*) is computed as the ratio between the fund family coinsurance at the share-class (or style) level, i.e., *CNRSHR* (*CNRSTLPT*), and the volatility of share-class (or style) net cash flows assuming perfect correlation in cash flows (i.e., zero coinsurance). It represents the percentage reduction in the total volatility experienced by the fund family as a result of imperfectly correlated share-class (or style) net cash flows.
CORRSTL	The correlation of cash flows of the fund family is estimated in two steps. In the first stage, for each investment style in period *t*, we compute the idiosyncratic style cash flows over the previous *k* = 36 months as the residual from a regression of average style net cash flows on average industry-wide net cash flows. Second, in each month *t*, we estimate the pairwise investment style correlations, $\gamma_{g,q,[t-k+1:t]}$, of idiosyncratic cash flows of styles *g* and *q*. We then compute the inverse measure of family-level coinsurance as the family-level TNA-weighted investment style correlation: $\sum_{g=1}^{G}\sum_{q=1}^{Q} w_{g,t}w_{q,t}\gamma_{g,q,[t-k+1:t]}$ (see Hann et al., 2013).
CORRSHR	The correlation of share-class cash flows of the fund family is estimated as the pairwise correlation of cash flows of share classes *i* and *j* over the previous *k* = 36 months, $\gamma_{i,j,[t-k+1:t]}$. We then compute the inverse measure of family-level coinsurance as the family-level TNA-weighted share-class correlation: $\sum_{i=1}^{N}\sum_{j=1}^{N} w_{i,t}w_{j,t}\gamma_{i,j,[t-k+1:t]}$, where $w_{i,t}$ is the weight of share class *i* in the fund family's portfolio.
LFAMTNA	Logarithm of fund family TNA. We employ a log specification because the marginal effect of family size on fees is expected to decline, consistent Baumol et al. (1980).
LFAMAGE	Logarithm of fund family age, computed as the number of years since inception of the oldest fund portfolio offered by the fund family.
LNPFOLIO	Logarithm of the number of fund portfolios offered by a fund family.
LNINVOBJ	Logarithm of the number of investment objectives (styles) offered by a fund family.
FAMINSTN	Dummy variable which is equal to 1 if the fund family manages more than 75% of AUM of institutional funds, and 0 otherwise (see Chen, Goldstein, and Jiang (2010)).
FAMINDEX	Dummy variable which is equal to 1 if the fund family manages more than 75% of AUM of index funds, and 0 otherwise (see Chen, Goldstein, and Jiang, 2010).
EQUITYPCT	Percentage of fund family TNA (out of the total family TNA) allocated to Equity investment objectives.
INCOMEPCT	Percentage of fund family TNA (out of the total family TNA) allocated to Fixed Income investment objectives.
FAMOPEX	Family-level TNA-weighted fund objective -adjusted total operating expenses
FAMADVFEE	Family-level TNA-weighted fund objective -adjusted advisory fees.
FAMRET	Family-level TNA-weighted fund objective-adjusted realized returns.
FAMFLOWS	Percentage net cash flows of the fund family computed as the TNA-weighted percentage of fund-level objective-adjusted net cash flows.

FAMTURNR	Family-level TNA-weighted fund objective-adjusted portfolio turnover.
PNUMDIV	Average fraction of diversified mutual fund families (*FAMDIV*) operating in investment style *g* in the previous year. This instrumental variable captures the incentives of a fund family to diversify in an investment style where there is a higher concentration of diversified fund families (see Campa and Kedia (2002)).
PTNADIV	Average fraction of total industry-wide TNA accounted for by diversified mutual fund families (*FAMDIV*) operating in investment style *g* in the previous year. This instrumental variable captures the incentives of a fund family to diversify in an investment style where there is a higher concentration of assets under the management of diversified fund families (see Campa and Kedia (2002)).
MGRNUM	Total number of mutual fund mergers in the previous year. This instrumental variable captures the incentives of a fund family to diversify following a more active market for fund mergers (see Campa and Kedia (2002)).
MGRVOL	Total dollar volume of mutual fund mergers in the previous year. This instrumental variable captures the incentives of a fund family to diversify following a more active (by dollar volume) market for fund mergers (see Campa and Kedia (2002)).
FAMNSTAR	Number of star funds offered by the fund family. The top 5 percent funds with the highest monthly average objective-adjusted returns are defined as the star funds for that month (Nanda, Wand, and Zheng (2004)).
LOCKINFEE	Family-level TNA-weighted objective-adjusted redemption fees. Consistent with the industry terminology, we refer to fund families with exit fees as load fund families. In our sample, load fund families charge a value-weighted redemption fees of 1%, with these charges not exceeding the limit of 2% imposed by the SEC. Our redemption fees exclude contingent deferred sales charges (CDSC) which are intended to meet the sales and service related costs rather than to cover liquidity costs related to investor redemptions.
NFSTARTS	Family-level value-weighted (TNA-weighted) exposure to the percentage of newly-launched fund products offered by other fund families in each investment style where the fund family competes.
NFSTARTSLF	Family-level value-weighted (TNA-weighted) exposure to the percentage of newly-launched fund products offered *with an initial below-average advisory fee* by other fund families in each investment style where the fund family competes.
AVGEXITFEE	Family-level value-weighted (TNA-weighted) exposure to the average redemption fee charged by the mutual funds offered by other fund families in each style where the fund family competes.
PDTDIFF	Degree of product differentiation within the investment objective (*PDTDIFF*), computed as the standard deviation of the fees charged across all the funds active in the category standardized by their maximum value over the whole period. The family-specific index of product differentiation is then constructed by weighting the indexes of all the categories in which the fund family is operating by the total net assets of the funds the family is managing in such categories (see Massa (2003) for more details on the construction of this variable)
STYLEFOCUS	The fund family's style concentration index is computed as $\sum_{g=1}^{G}\left(w_{g,t}-\overline{w}_{g,t}\right)^2$, where $w_{g,t}$ is the (TNA-) weight of a fund family in investment style g at time t and $\overline{w}_{g,t}$ is the average weight of industry-wide investment in style g at time t.

Table 1
Descriptive Statistics

In this table we present the summary statistics for our sample of U.S. mutual funds during the period January 1993 to March 2015. The following fund family characteristics are described: Number of fund portfolios (*NPFOLIO*) and number of investment objectives (*NINVOBJ*) offered by a fund family; total assets under the management (*FAMSIZE*), in $M; monthly volatility of net cash flows (*FAMCFVOL*); style-adjusted after-fee returns (*FAMRET*); monthly percentage objective-adjusted net cash flows (*FAMFLOWS*); time since inception of the oldest fund offered by the fund family (*FAMAGE*), in years; fund family's value-weighted portfolio turnover (*TURNR*); fund family's value-weighted annual operating expense (*OPEX*); fund family's value-weighted annual advisory fee (*ADVFEE*); percentage of asset under management represented by index fund products (*INDEXPCT*); percentage of asset under management in institutional fund products (*INSTNPCT*); percentage of asset under management in equity fund products (*EQUITYPCT*); percentage of asset under management in income fund products (*INCOMEPCT*); a dummy variable equal to 1 if a fund family offers more than 1 investment objective (*FAMDIV*); the absolute value of family coinsurance based on share-class cash flows (*CNRSHR*); the absolute value of family coinsurance based on investment style cash flows (*CNRSTL*); the correlation of net cash flows of share classes estimated over a 36-month window (with a minimum of 12 months of valid observations) (*CORRSHR*); and the correlation of idiosyncratic net cash flows at the style level estimated over a 36-month window (with a minimum of 12 months of valid observations) (*CORRSTL*).

	N	mean	Percentiles				
			p5	p25	p50	p75	p95
FAMNPFOLIO	144685	8.45	1.0	1.0	3.0	8.0	38.0
FAMNINVOBJ	172525	4.84	1.0	1.0	2.0	6.0	18.0
FAMSIZE ($M)	171951	12,187.9	3.3	37.2	290.4	2,615.7	45,799.9
FAMFLOWS	169131	1.16%	-3.89%	-0.87%	0.22%	1.95%	9.35%
FAMAGE	172300	16.27	0.83	4.00	10.25	20.50	62.25
TURNR	148222	0.800	0.070	0.259	0.504	0.937	2.510
OPEX	153905	1.17%	0.40%	0.83%	1.13%	1.48%	2.04%
ADVFEE	153924	1.06%	0.35%	0.74%	1.01%	1.32%	1.94%
FAMRET	160710	-0.03%	-3.10%	-0.62%	0.00%	0.57%	2.94%
EQUITYPCT	160946	64.08%	0.00%	29.88%	76.33%	100.00%	100.00%
INCOMEPCT	160946	22.62%	0.00%	0.00%	0.00%	37.42%	100.00%
INDEXPCT	172525	17.79%	0.00%	0.00%	0.00%	20.56%	100.00%
INSTNPCT	172525	29.12%	0.00%	0.00%	0.00%	64.33%	100.00%
CORRSHR	159370	0.601	0.102	0.284	0.600	1.000	1.000
CORRSTL	163503	0.683	0.122	0.369	0.797	1.000	1.000
CNRSHR	135919	2.69%	0.00%	0.00%	1.71%	4.31%	8.89%
CNRSTL	163503	0.58%	0.00%	0.00%	0.24%	1.03%	2.00%
FAMCFVOL	135919	3.34%	0.65%	1.40%	2.42%	4.38%	9.25%

Table 2
Time Series Statistics of Industry and Fund Family Characteristics

In this table we present the time series average statistics for our sample of U.S. mutual funds at different two-year intervals over the period January 1993 to March 2015. The following industry and fund family characteristics are described: Total size of the mutual fund industry (*Industry Size*), in $M; total number of fund families (*Num Families*); total number of Single-Fund Families (*Num SFF*); total number of distinct fund portfolios offered (*Num Funds Offered*); total number of distinct investment styles offered (*Num Styles Offered*); average and maximum number of fund portfolios offered by a fund family (*NPFOLIO*); average number of investment objectives offered by a fund family (*NINVOBJ*); fund family's average industry market share (*FAMMKTSHR*); total market share controlled by the top 5 fund families (*Largest 5 Families: TOTMKTSHR*); average total assets under the management (*FAMSIZE*), in $M; total assets under management controlled by the top 5 fund families (*Largest 5 Families: TOTSIZE*). Additional industry statistics include the following *value-weighted* average characteristics computed across all mutual fund families: portfolio turnover (*TURNR*); annual operating expense (*OPEX*); annual advisory fee (*ADVFEE*); total volatility of family net cash flows (*FAMCFVOL*); total volatility of family net cash flows assuming perfect correlation (*FAMCFVOLPC*); absolute value of family coinsurance based on share-class cash flows (*CNRSHR*); absolute value of family coinsurance based on investment style cash flows (*CNRSTL*); correlation of net cash flows of share classes estimated over a 36-month window (*CORRSHR*); and the correlation of idiosyncratic net cash flows at the style level estimated over a 36-month window (*CORRSTL*).

	1995	1997	1999	2001	2003	2005	2007	2009	2011	2013	2015
Industry Size ($M)	2,617,428	3,981,198	5,932,215	6,287,439	6,823,417	8,434,996	11,691,852	10,952,027	12,139,583	16,089,222	17,258,435
Num Families	507	601	771	700	676	639	605	589	703	765	780
Num SFF	131	156	207	183	187	176	160	160	161	157	158
FAMSIZE ($M)	4,518.3	5,888.6	6,834.1	7,332.4	9,009.7	11,534.6	15,992.0	17,312.9	18,301.8	18,640.9	21,278.8
FAMMKTSHR	0.21%	0.18%	0.14%	0.13%	0.15%	0.16%	0.16%	0.16%	0.16%	0.13%	0.13%
NPFOLIO	5.91	6.71	6.90	7.30	8.06	8.70	9.88	10.58	10.52	10.26	10.24
NINVOBJ	5.22	5.01	4.67	4.53	4.97	4.84	4.78	5.27	5.06	4.65	4.57
Largest 5 Families: TOTAUM ($M)	898,195	1,401,505	2,096,819	2,014,904	2,362,651	3,232,995	4,617,868	4,525,731	5,028,351	6,881,781	7,570,180
Largest 5 Families: TOTMKTSHR	34.32%	35.20%	35.35%	32.05%	34.63%	38.33%	39.50%	41.32%	41.42%	42.77%	43.86%
Num Funds Offered	2,832	3,826	4,628	4,940	5,149	5,483	6,153	5,447	5,044	4,640	4,521
Num Styles Offered	42.00	43.00	43.00	36.00	36.00	36.00	36.00	45.00	46.00	47.00	46.00
TURNR	0.691	0.686	0.730	0.871	0.821	0.770	0.764	0.856	0.864	0.880	0.828
OPEX	1.15%	1.17%	1.15%	1.16%	1.18%	1.18%	1.17%	1.18%	1.19%	1.18%	1.18%
ADVFEE	1.02%	1.04%	1.02%	1.04%	1.06%	1.07%	1.07%	1.07%	1.09%	1.09%	1.09%
STYLEFOCUS	44.4%	43.9%	47.4%	50.6%	48.7%	47.9%	49.2%	55.1%	56.7%	60.9%	61.8%
FAMCFVOLPC	15.47%	15.00%	16.20%	16.20%	15.83%	14.64%	13.59%	13.97%	12.79%	11.04%	10.12%
FAMCFVOL	12.74%	12.20%	13.35%	13.26%	12.94%	11.86%	11.11%	11.39%	10.09%	8.61%	7.74%
CNRSHRPT	19.34%	21.58%	20.98%	22.14%	22.53%	22.75%	22.05%	21.46%	22.95%	23.71%	24.13%
CNRSTLPT	18.87%	19.92%	20.75%	21.02%	22.90%	22.45%	21.85%	20.49%	21.19%	19.28%	18.64%
CORRSHR	0.602	0.594	0.608	0.613	0.591	0.586	0.608	0.615	0.590	0.598	0.602
CORRSTL	0.700	0.690	0.673	0.677	0.652	0.677	0.661	0.677	0.674	0.707	0.722

Table 3

Determinants of Fund Family-level Coinsurance Measures

This table presents the estimated coefficients of multivariate regressions of several coinsurance proxies on selected fund family characteristics over the period 1993 to 2015. The dependent variable is the fund family coinsurance level as proxied by: (a) the percentage coinsurance of share-class cash flows (*CNRSHRPT*); (b) the percentage coinsurance of style cash flows (*CNRSTLPT*) (c) the correlation of net cash flows at the share class level (*CORRSHR*); and (d) the correlation of idiosyncratic net cash flows at the style level (*CORRSTL*). Lagged control variables include the following fund family characteristics: the logarithm of the number of fund portfolios (*LNPFOLIO*); the logarithm of the number of investment objectives (*LNINVOBJ*); the logarithm of the total assets under the management (*LFAMTNA*); the logarithm of the total assets under the management of the 5 largest fund families (*LTOP5FAM*); fund family's style concentration index (*STYLEFOCUS*); the logarithm of the number of years since inception of the oldest fund (*LFAMAGE*); percentage net cash flows (*FAMFLOWS*); the style-adjusted net realized returns (*FAMRET*); the value-weighted style-adjusted portfolio turnover (*FAMTURNR*); the percentage of fund family TNA represented by index fund products (*FAMINDEX*); and the percentage of fund family TNA represented by institutional fund products (*FAMINSTN*). All models include untabulated control variables for share classes and investment objectives. We estimate generalized linear models (GLM) with logit link and binomial family in models (i) and (ii) as our coinsurance variables range between 0 and 1. In models (iii) and (v) we estimate Fama-Macbeth (1973) cross sectional regressions with heteroskedasticity and autocorrelation consistent (HAC) standard errors. In all other models, we estimate panel regressions with time fixed effects and family-level clustered standard errors. One, two, and three asterisks indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	CNRSHRPT	CNRSTLPT	CORRSHR	CORRSHR	CORRSTL	CORRSTL
	(i)	(ii)	(iii)	(iv)	(v)	(vi)
LFAMTNA	-0.059***	-0.050***	0.000	0.001	0.013***	0.014***
	(0.016)	(0.015)	(0.001)	(0.003)	(0.000)	(0.002)
LTOP5FAM	-0.048***	-0.007	0.010***	0.011***	0.004***	0.005**
	(0.013)	(0.009)	(0.000)	(0.002)	(0.000)	(0.002)
LFAMAGE	0.029	0.036	0.002	0.000	-0.000	-0.003
	(0.025)	(0.028)	(0.002)	(0.005)	(0.001)	(0.005)
STYLEFOCUS	-1.727***	-4.400***	0.343***	0.327***	0.490***	0.507***
	(0.105)	(0.127)	(0.005)	(0.016)	(0.013)	(0.018)
LNPFOLIO	0.931***	0.144***	-0.064***	-0.058***	-0.024***	-0.014
	(0.045)	(0.054)	(0.002)	(0.009)	(0.003)	(0.009)
LNINVOBJ	0.241***	0.775***	-0.119***	-0.135***	-0.239***	-0.226***
	(0.075)	(0.094)	(0.005)	(0.015)	(0.006)	(0.015)
FAMFLOWS	-0.738***	0.088	-0.052***	0.003	0.032**	0.075**
	(0.255)	(0.249)	(0.020)	(0.034)	(0.014)	(0.031)
FAMRET	0.360**	0.063	-0.042	0.009	-0.009	-0.001
	(0.166)	(0.176)	(0.030)	(0.023)	(0.027)	(0.022)
FAMTURNR	-0.040*	-0.065***	0.004***	0.003	0.008***	0.010***
	(0.023)	(0.025)	(0.001)	(0.003)	(0.001)	(0.003)
FAMINSTN	0.338***	0.302***	-0.050**	-0.018	-0.104***	-0.092***
	(0.104)	(0.113)	(0.020)	(0.021)	(0.005)	(0.021)
FAMINDEX	-0.072	-0.223	0.024***	0.036	0.028***	0.038*
	(0.178)	(0.139)	(0.005)	(0.025)	(0.004)	(0.023)
Time Fixed	Yes	Yes	No	Yes	No	Yes
Std Error	Family	Family	HAC	Family	HAC	Family
N	98,024	98,975	98,480	98,480	98,975	98,975

Table 4

Flow-related Liquidity Risk and Fund Family Coinsurance Around September 2008

This table reports the regression results of changes in the flow-related liquidity risk proxies in the 12 months before and after September 2008 on fund family coinsurance. The dependent variable is the flow-related liquidity risk of a fund family as measured by one of the following two variables: a) the change in the annual style-adjusted net cash flow averages computed in the 12 months after September 2008 (inclusive) and the 12 months before September 2008, $\Delta\overline{NETFLOWS}$; and (b) the change in the annual style-adjusted asset-based volatilities computed in the 12 months after September 2008 (inclusive) and the 12 months before September 2008, $\Delta\overline{ASSETVOL}$. Lagged fund family coinsurance proxies include: (i) a dichotomous variable for multi-fund family offering more than 1 investment objective (*FAMDIV*); (ii) the total percentage coinsurance of share-class net cash flows (*CNRSHRPT*); (iii) the total percentage coinsurance of investment style net cash flows (*CNRSTLPT*); (iv) the correlation of net cash flows at the share class level (*CORRSHR*); and (v) the correlation of idiosyncratic net cash flows at the style level (*CORRSTL*). Other lagged control variables (untabulated for brevity) include: $\overline{NETFLOWS}$; the logarithm of the number of fund portfolios (*LNPFOLIO*) and investment styles (*LNINVOBJ*); the logarithm of family total net assets (*LFAMTNA*); the logarithm fund family age since inception (*LFAMAGE*); percentage net cash flows (*FAMFLOWS*); style-adjusted after-fee realized returns (*FAMRET*); total volatility of net cash flows (*FAMCFVOL*); style-adjusted redemption fees (*LOCKINFEE*); and style-adjusted portfolio turnover (*FAMTURNR*). All independent variables are the averages of the variables in the year prior to September 2008. Standard errors are adjusted for heteroskedasticity and clustered at the fund family level (*H/Family*), and are reported below the coefficients in parentheses. One, two, and three asterisks indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	Dep. Variable	Proxy	COINSURANCE	Family Controls	Std.Err.	Obs.
(i)	$\Delta\overline{NETFLOWS}$	FAMDIV	0.079**	Yes	H/Family	536
			(0.034)			
(ii)	$\Delta\overline{ASSETVOL}$	FAMDIV	-0.206	Yes	H/Family	540
			(0.139)			
(iii)	$\Delta\overline{NETFLOWS}$	CNRSHRPT	0.381*	Yes	H/Family	536
			(0.229)			
(iv)	$\Delta\overline{ASSETVOL}$	CNRSHRPT	-0.088***	Yes	H/Family	540
			(0.030)			
(v)	$\Delta\overline{NETFLOWS}$	CNRSTLPT	0.011**	Yes	H/Family	536
			(0.005)			
(vi)	$\Delta\overline{ASSETVOL}$	CNRSTLPT	-0.061**	Yes	H/Family	540
			(0.028)			
(vii)	$\Delta\overline{NETFLOWS}$	CORRSHR	-0.025***	Yes	H/Family	536
			(0.004)			
(viii)	$\Delta\overline{ASSETVOL}$	CORRSHR	0.046**	Yes	H/Family	540
			(0.020)			
(ix)	$\Delta\overline{NETFLOWS}$	CORRSTL	-0.024***	Yes	H/Family	536
			(0.003)			
(x)	$\Delta\overline{ASSETVOL}$	CORRSTL	0.044**	Yes	H/Family	540
			(0.019)			

Table 5

The Effect of Product Offerings, Family Size and Cash-Flow Correlation on Fund Family Fees

This table presents average value-weighted style-adjusted fees for quintile portfolios of lagged fund family coinsurance and selected fund family characteristics, for the period from 1993 to 2015. We first sort fund families into quintile portfolios of the following lagged fund family characteristics: the number of investment styles offered by the fund family (*NINVOBJ*) in Panel A; the total size (TNA) of the fund complex (*FAMTNA*) in Panel B; and the total volatility of net cash flows experienced by the fund family (*FAMCFVOL*) in Panel C. For each of these quintile portfolios of selected fund family characteristics, we then sort families into quintile portfolios based on the lagged absolute value of fund family coinsurance of share-class cash flows, *CNRSHR*. For each of the 25 cross-tabulated portfolios, we then compute the average style-adjusted total operating expenses (*FAMOPEX*). For each panel, we also report the difference between the two extreme quintile portfolios (*High-Low*) of each fund family characteristic within quintile portfolios and across the entire sample. The *t*-statistics are adjusted for serial correlation using the Newey-West (1987) lags of order 3. One, two, and three asterisks indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Fund family fees by number of investment styles (*NINVOBJ*) and cash-flow coinsurance (*CNRSHR*)

	All Sample	NINVOBJ					High - Low
		Low	q2	q3	q4	**High**	
All Sample	-	0.09%	0.13%	-0.02%	-0.10%	-0.20%	-0.28%***
Low CNRSHRPT	0.11%	0.22%	0.14%	0.10%	0.03%	-0.03%	-0.25%***
q2	0.08%	0.06%	0.21%	0.25%	0.06%	-0.04%	-0.16%***
q3	-0.08%	0.01%	-0.02%	-0.11%	-0.09%	-0.14%	-0.17%***
q4	-0.13%	-0.10%	-0.11%	-0.14%	-0.16%	-0.16%	-0.14%***
High CNRSHRPT	-0.19%	-0.05%	-0.22%	-0.22%	-0.18%	-0.27%	-0.20%*
High - Low	-0.30%***	-0.27%***	-0.36%***	-0.33%***	-0.20%***	-0.24%***	

Panel B: Fund family fees by number of family size (*FAMTNA*) and cash-flow coinsurance (*CNRSHR*)

	All Sample	FAMTNA					High - Low
		Low	q2	q3	q4	**High**	
All Sample	-	0.28%	0.12%	-0.06%	-0.17%	-0.23%	-0.51%***
Low CNRSHRPT	0.11%	0.36%	0.20%	0.11%	-0.01%	-0.10%	-0.54%***
q2	0.08%	0.39%	0.29%	0.13%	-0.05%	-0.19%	-0.63%***
q3	-0.08%	0.17%	0.00%	-0.07%	-0.19%	-0.25%	-0.51%***
q4	-0.13%	0.04%	-0.13%	-0.17%	-0.18%	-0.22%	-0.33%***
High CNRSHRPT	-0.19%	-0.02%	-0.17%	-0.24%	-0.22%	-0.30%	-0.36%***
High - Low	-0.30%***	-0.38%***	-0.37%***	-0.35%***	-0.21%***	-0.19%***	

Panel C: Fund family fees by cash-flow volatility (*FAMCFVOL*) and cash-flow coinsurance (*CNRSHR*)

	All Sample	FAMCFVOL					High - Low
		Low	q2	q3	q4	**High**	
All Sample	-	-0.13%	-0.07%	-0.05%	-0.02%	0.06%	0.20%***
Low CNRSHRPT	0.11%	0.00%	0.11%	0.09%	0.09%	0.11%	0.11%
q2	0.08%	0.18%	0.11%	0.06%	0.07%	0.11%	-0.07%
q3	-0.08%	-0.09%	-0.10%	-0.09%	-0.07%	-0.02%	0.07%
q4	-0.13%	-0.17%	-0.12%	-0.13%	-0.11%	-0.14%	0.04%
High CNRSHRPT	-0.19%	-0.25%	-0.20%	-0.14%	-0.16%	-0.19%	0.06%
High - Low	-0.30%***	-0.25%***	-0.31%***	-0.23%***	-0.26%***	-0.30%***	

Table 6
Multivariate Analysis: Coinsurance Proxies and Fund Family Advisory Fees

This table presents the estimated coefficients of fund family fees on selected characteristics for the period 1993 to 2015. The dependent variable (in percentage terms) is the value-weighted style-adjusted advisory fee (*FAMADVFEE*). Lagged coinsurance proxies include: (a) a dichotomous variable for multi-fund family offering more than 1 investment objective (*FAMDIV*); (b) the percentage coinsurance of share-class cash flows (*CNRSHRPT*); (c) the percentage coinsurance of style cash flows (*CNRSTLPT*) (d) the correlation of net cash flows at the share class level (*CORRSHR*); and (e) the correlation of idiosyncratic net cash flows at the style level (*CORRSTL*). Lagged control variables include: the logarithm of the number of fund portfolios (*LNPFOLIO*) and investment styles (*LNINVOBJ*); the logarithm of family total net assets (*LFAMTNA*); the logarithm fund family age since inception (*LFAMAGE*); percentage net cash flows (*FAMFLOWS*); style-adjusted after-fee realized returns (*FAMRET*); total volatility of net cash flows (*FAMCFVOL*); style-adjusted redemption fees (*LOCKINFEE*); number of star funds offered by the fund family (*FAMNSTAR*); style-adjusted portfolio turnover (*FAMTURNR*). We isolate the effect of fund family's size and age on the fee-coinsurance relationship by interacting *COINSURANCE* with the variables *LFAMTNA* and *LFAMAGE*. Additional (untabulated) control variables include: the percentage of family TNA in index shares (*INDEXPCT*); percentage of family TNA in institutional shares (*INSTNPCT*); the percentage of family TNA in equity products (*EQUITYPCT*) and the percentage of family TNA in income products (*INCOMEPCT*). We estimate Fama and MacBeth (1973) regressions with *HAC* standard errors (in parentheses). One, two, and three asterisks indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	FAMDIV	CNRSHRPT		CNRSTLPT	CORRSTL		CORRSHR
	(i)	(ii)	(iii)	(iv)	(v)	(vi)	(vii)
COINSURANCE	-0.181***	-0.147***	-0.433***	-0.419***	0.107***	0.329***	0.371***
	(0.012)	(0.006)	(0.023)	(0.036)	(0.005)	(0.027)	(0.015)
x LFAMTNA	0.046***		0.067***	0.062***		-0.049***	-0.050***
	(0.003)		(0.004)	(0.005)		(0.004)	(0.003)
x LFAMAGE	-0.033***		-0.013	-0.040***		0.019***	-0.003
	(0.004)		(0.009)	(0.007)		(0.006)	(0.006)
LFAMTNA	-0.128***	-0.100***	-0.110***	-0.110***	-0.102***	-0.064***	-0.066***
	(0.003)	(0.001)	(0.001)	(0.001)	(0.001)	(0.003)	(0.002)
LFAMAGE	0.033***	0.012***	0.014***	0.020***	0.012***	0.001	0.013***
	(0.004)	(0.002)	(0.002)	(0.003)	(0.002)	(0.003)	(0.003)
LNPFOLIO	0.017***	0.024***	0.016***	0.011***	0.013***	0.012***	0.020***
	(0.002)	(0.003)	(0.003)	(0.002)	(0.002)	(0.002)	(0.002)
LNINVOBJ	0.024***	0.025***	0.022***	0.060***	0.074***	0.053***	0.027***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
FAMFLOWS	-0.052	-0.028	-0.030	-0.019	-0.048	-0.047	-0.055
	(0.041)	(0.043)	(0.043)	(0.043)	(0.043)	(0.042)	(0.042)
FAMRET	0.036	-0.002	0.006	0.008	0.011	0.020	0.022
	(0.107)	(0.110)	(0.109)	(0.108)	(0.110)	(0.107)	(0.107)
FAMTURNR	0.060***	0.062***	0.061***	0.061***	0.060***	0.059***	0.059***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
LOCKINFEE	-5.736***	-4.507***	-3.905***	-3.896***	-3.705***	-3.581***	-3.674***
	(1.527)	(1.324)	(1.300)	(1.325)	(1.264)	(1.251)	(1.305)
FAMNSTAR	0.015***	0.021***	0.015***	0.015***	0.018***	0.013***	0.013***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
FAMCFVOL	0.261**				0.382***	0.536***	0.469***
	(0.104)				(0.103)	(0.113)	(0.112)
Instn/Index	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Equity/Income	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-sq	45.2%	41.8%	44.3%	44.3%	42.3%	44.9%	45.1%
N	96,155	96,155	96,155	97,077	96,041	96,041	96,155

Table 7

Fund Family Performance across Quintile Portfolios of Fund Family Coinsurance

This table summarizes abnormal returns and the factor loadings using the Carhart (1997) four-factor model for different portfolios of mutual funds for the period 1993 to 2015. We use several measures of fund family after- (*Net*) and before- (*Gross*) fee performance: (a) fund family objective adjusted returns; (b) the CAPM model (*CAPM*); (c) the Carhart (1997) four-factor model (*4-Factor*); (d) the four-factor model augmented with the excess returns of the MSCI (inclusive of Europe, Australia, and the Far East) and the Lehman US Aggregate Bond Index (*6-Factor*); and (e) the four-factor model augmented with the excess returns of the following six bond indices: Barclays U.S. Treasury Long, Barclays U.S. Treasury Intermediate, Barclay U.S. Treasury Bill 3–6m, Barclays U.S. Corp Investment Grade, Barclays U.S. High-Yield Composite, and Barclays GNMA 30-Year (*10-Factor*). We divide the sample into quintile portfolio of lagged coinsurance proxies. In panel A, portfolios are formed on sorted percentage coinsurance of share-class cash flows (*CNRSHRPT*); In Panel B, we form portfolios of sorted correlation of idiosyncratic net cash flows at the style level (*CORRSTL*). In the Internet Appendix we report the findings for all the other coinsurance measures. The table includes the differences in the abnormal returns along with their *t*-statistics which are adjusted for serial correlation using the Newey-West (1987) lags of order 3. One, two, and three asterisks indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Panel A. Quintile portfolios of coinsurance (*CNRSHRPT*) and fund family-level performance

	Obj.-adj. returns		CAPM		4-factor		6-factor		10-factor	
	Net	Gross	Net	Gross	Net	Gross	Net	Gross	Net	Gross
CNRSHRPT 1	-0.81%	-0.73%	-1.64%	-0.25%	-1.89%	-0.10%	-1.49%	0.01%	-1.68%	0.14%
Q2	-0.57%	-0.07%	-1.37%	-0.09%	-1.63%	-0.12%	-0.90%	-0.02%	-1.56%	-0.08%
Q3	-0.08%	0.16%	-0.59%	0.29%	-1.27%	0.19%	-0.72%	0.25%	-1.23%	0.25%
Q4	0.07%	-0.11%	-0.60%	0.14%	-1.32%	0.07%	-0.67%	0.12%	-0.85%	0.11%
CNRSHRPT 5	0.15%	0.08%	-0.35%	0.24%	-0.96%	0.21%	-0.48%	0.23%	-0.75%	0.20%
5 - 1	0.96%	0.81%	1.29%	0.49%	0.93%	0.31%	1.01%	0.22%	0.93%	0.06%
t-stat	2.537	1.396	3.298	0.352	3.274	0.176	4.267	0.165	2.818	1.453

Panel B. Quintile portfolios of coinsurance (*CORRSTL*) and fund family-level performance

CORRSTL 1	-0.09%	-0.05%	-0.28%	0.16%	-0.56%	0.14%	-0.58%	0.17%	-0.65%	0.15%
Q2	-0.04%	-0.03%	-0.28%	0.21%	-0.60%	0.16%	-0.57%	0.20%	-0.58%	0.18%
Q3	-0.09%	0.01%	-0.34%	0.14%	-0.63%	0.07%	-0.62%	0.16%	-0.71%	0.15%
Q4	-0.74%	-0.60%	-1.20%	-0.15%	-1.49%	-0.13%	-1.58%	-0.07%	-1.62%	0.06%
CORRSTL 5	-0.82%	-0.30%	-1.37%	-0.43%	-1.59%	-0.46%	-1.53%	-0.34%	-1.62%	-0.36%
5 - 1	-0.73%	-0.25%	-1.09%	-0.59%	-1.04%	-0.59%	-0.94%	-0.51%	-0.96%	-0.51%
t-stat	-1.926	-0.573	-3.356	-1.699	-2.631	-1.357	-2.004	-0.709	-3.091	-1.001

Table 8

Fund Family Gross and Net Performance and Cash Flow Coinsurance Proxies

This table presents the loadings of monthly fund family risk-adjusted returns on family coinsurance measures for the period 1993 to 2015. The dependent variable is fund family before-fee (*Gross*) or after-fee (*Net*) returns adjusted using any of the following factor models: (a) the CAPM model (*CAPM*); (b) the Carhart (1997) four-factor model (*4-F*); (c) the four-factor model augmented with the excess returns of the MSCI (inclusive of Europe, Australia, and the Far East) and the Lehman US Aggregate Bond Index (*6-F*); and (d) the four-factor model augmented with the excess returns of the following six bond indices: Barclays U.S. Treasury Long, Barclays U.S. Treasury Intermediate, Barclay U.S. Treasury Bill 3–6m, Barclays U.S. Corp Investment Grade, Barclays U.S. High-Yield Composite, and Barclays GNMA 30-Year (*10-F*). To mitigate look-ahead bias, we estimate fund family risk-adjusted returns as a one-month abnormal return from the factor model, where the loadings on the various factors are estimated over the previous 36 months (with a minimum of 30 observations). We estimate the loadings of the dependent variable on different fund family's coinsurance proxies: (a) a dichotomous variable for multi-fund family offering more than 1 investment objective (*FAMDIV*); (b) the total percentage coinsurance of share-class net cash flows (*CNRSHRPT*); (c) the total percentage coinsurance of investment style net cash flows (*CNRSTLPT*); (d) the correlation of net cash flows at the share class level (*CORRSHR*); and (e) the correlation of idiosyncratic net cash flows at the style level (*CORRSTL*). We report the coefficients on the following two control variables (when our dependent variable is the fund family net performance): the logarithm of fund family total net assets (*LFAMTNA*); and the degree of product differentiation within the investment objective (*PDTDIFF*), computed as the standard deviation of the fees charged across all the funds active in the category standardized by their maximum value over the whole period. The family-specific index of product differentiation is then constructed by weighting the indexes of all the categories in which the fund family is operating by the total net assets of the funds the family is managing in such categories (see Massa (2003) for more details on the construction of this variable). Other lagged control variables (untabulated for brevity) include: the logarithm of the number of fund portfolios (*LNPFOLIO*) and investment styles (*LNINVOBJ*); the logarithm fund family age since inception (*LFAMAGE*); percentage net cash flows (*FAMFLOWS*); style-adjusted after-fee realized returns (*FAMRET*); total volatility of net cash flows (*FAMCFVOL*); style-adjusted redemption fees (*LOCKINFEE*); number of star funds offered by the fund family (*FAMNSTAR*); style-adjusted portfolio turnover (*FAMTURNR*); the percentage of family TNA in index shares (*INDEXPCT*); the percentage of family TNA in institutional shares (*INSTNPCT*); the percentage of family TNA in equity products (*EQUITYPCT*) and the percentage of family TNA in income products (*INCOMEPCT*). We estimate time series cross section regressions with time fixed effects and standard errors (in parentheses) clustered by family and time (*Family-Time*). We also illustrate the estimated coefficients of Fama-MacBeth cross-sectional regressions with *HAC* standard errors. One, two, and three asterisks indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	Coinsurance proxy	Factor model	Family-Time		HAC		Additional Controls	
			Net	Gross	Net	Gross	LFAMTNA	PDTDIFF
(i)	FAMDIV	CAPM	0.074***	0.023	0.109***	-0.001	-0.040***	-0.473***
			(0.023)	(0.025)	(0.027)	(0.041)	(0.005)	(0.137)
(ii)	FAMDIV	4-F	0.047**	0.017	0.072***	-0.005	-0.028***	-0.421***
			(0.022)	(0.023)	(0.026)	(0.037)	(0.004)	(0.130)
(iii)	FAMDIV	6-F	0.048**	0.022	0.084***	-0.003	-0.024***	-0.386***
			(0.020)	(0.024)	(0.026)	(0.032)	(0.004)	(0.119)
(iv)	FAMDIV	10 -F	0.041*	0.010	0.091***	0.005	-0.021***	-0.646***
			(0.023)	(0.030)	(0.031)	(0.045)	(0.005)	(0.163)
(v)	CNRSHRPT	CAPM	0.117**	0.061	0.243***	0.048	-0.038***	-0.410***
			(0.052)	(0.060)	(0.071)	(0.053)	(0.005)	(0.140)
(vi)	CNRSHRPT	4-F	0.117**	0.050	0.217***	0.065	-0.027***	-0.388***
			(0.046)	(0.058)	(0.067)	(0.048)	(0.005)	(0.132)
(vii)	CNRSHRPT	6-F	0.110**	0.049	0.181**	0.071*	-0.023***	-0.364***
			(0.050)	(0.049)	(0.081)	(0.041)	(0.004)	(0.121)
(viii)	CNRSHRPT	10 -F	0.137*	0.094	0.173**	0.096	-0.019***	-0.617***
			(0.072)	(0.068)	(0.072)	(0.062)	(0.005)	(0.163)
(ix)	CNRSTLPT	CAPM	0.136**	-0.006	0.201***	0.031	-0.037***	-0.506***
			(0.057)	(0.042)	(0.062)	(0.053)	(0.005)	(0.144)
(x)	CNRSTLPT	4-F	0.099**	-0.021	0.128***	-0.004	-0.026***	-0.450***
			(0.039)	(0.031)	(0.048)	(0.048)	(0.005)	(0.135)
(xi)	CNRSTLPT	6-F	0.093**	-0.035	0.170***	-0.008	-0.022***	-0.411***
			(0.041)	(0.034)	(0.055)	(0.041)	(0.004)	(0.124)
(xii)	CNRSTLPT	10 -F	0.121**	0.021	0.128**	0.038	-0.019***	-0.708***
			(0.048)	(0.040)	(0.050)	(0.057)	(0.005)	(0.165)
(xiii)	CORRSHR	CAPM	-0.107***	-0.061	-0.139***	-0.014	-0.038***	-0.427***
			(0.039)	(0.041)	(0.050)	(0.040)	(0.005)	(0.136)
(xiv)	CORRSHR	4-F	-0.075**	-0.049	-0.140***	-0.023	-0.027***	-0.388***
			(0.033)	(0.033)	(0.043)	(0.038)	(0.004)	(0.129)
(xv)	CORRSHR	6-F	-0.067**	-0.035	-0.088**	-0.006	-0.024***	-0.352***
			(0.030)	(0.032)	(0.038)	(0.036)	(0.004)	(0.117)
(xvi)	CORRSHR	10 -F	-0.082**	-0.076*	-0.070**	-0.057	-0.020***	-0.610***
			(0.037)	(0.039)	(0.030)	(0.042)	(0.005)	(0.160)
(xvii)	CORRSTL	CAPM	-0.102***	-0.017	-0.138***	-0.034	-0.036***	-0.485***
			(0.039)	(0.034)	(0.044)	(0.043)	(0.005)	(0.143)
(xviii)	CORRSTL	4-F	-0.073**	-0.008	-0.159***	-0.034	-0.025***	-0.433***
			(0.030)	(0.026)	(0.042)	(0.039)	(0.005)	(0.134)
(xix)	CORRSTL	6-F	-0.067**	0.004	-0.150***	-0.019	-0.022***	-0.395***
			(0.028)	(0.025)	(0.043)	(0.035)	(0.004)	(0.123)
(xx)	CORRSTL	10 -F	-0.079**	-0.044	-0.109***	-0.083*	-0.019***	-0.681***
			(0.033)	(0.033)	(0.032)	(0.046)	(0.005)	(0.163)

Table 9
Within-Style Price Competition and Fee-setting Policies

This table presents the estimated coefficients of multivariate regressions of fund family fees on selected fund family characteristics for the period 1993 to 2015. The dependent variable (in percentage terms) is the value-weighted style-adjusted advisory fee (*FAMADVFEE*). Main independent variables of interest are the fund family coinsurance proxies described in Table 5 (refer to Appendix A for more details on the construction of these variables). We use three different proxies to quantify the degree of fee competition in each investment style. In Panel A, our first proxy of fee competition is the family-level (TNA-weighted) exposure to the percentage of new fund openings by other fund families in each investment style, *NFSTARTS*. In Panel B, the second proxy of fee competition is the family-level (TNA-weighted) exposure to the percentage of newly-launched fund products that were offered by other fund families with an initial below-average advisory fee in each investment style, *NFSTARTSLF*. In Panel C, the third proxy of fee competition is the family-level (TNA-weighted) exposure to the average redemption fee charged by mutual funds in each style where the fund family competes, *AVGEXITGATE*. We also quantify the effect of the fee competition on the fee-coinsurance relationship by interacting each coinsurance variable with the competition proxy of *NFSTARTS* in Panel A, *NFSTARTSLF* in Panel B, and *AVGEXITGATE* in Panel C. Other lagged control variables (untabulated for brevity) include: *LNPFOLIO*, *LNINVOBJ*, LFAMTNA, *LFAMAGE*, *FAMFLOWS*, *FAMRET*, *FAMCFVOL*, *FAMTURNR*, *LOCKINFEE*, *FAMNSTAR*, *INDEXPCT*, *INSTNPCT*, *EQUITYPCT*, and *INCOMEPCT*. We run the two-step estimation procedure of Fama and MacBeth with heteroskedasticity and autocorrelation consistent (*HAC*) standard errors (in parentheses). One, two, and three asterisks indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Percentage of within-style new fund openings (*NFSTARTS*)

	FAMDIV	CNRSHRPT	CNRSTLPT	CORRSHR	CORRSTL
	(i)	(ii)	(iii)	(iv)	(v)
COINSURANCE	-0.062***	0.211***	-0.034	-0.019	0.012
	(0.012)	(0.023)	(0.021)	(0.016)	(0.012)
NFSTARTS	-0.609*	-0.772***	-0.429**	-2.245***	-2.060***
	(0.365)	(0.186)	(0.198)	(0.248)	(0.323)
COINSURANCE	-0.772**	-5.733***	-3.340***	3.167***	2.665***
x NFSTARTS	(0.315)	(0.643)	(0.611)	(0.417)	(0.466)
Family Controls	Yes	Yes	Yes	Yes	Yes
R-sq	44.6%	44.3%	44.4%	44.4%	44.7%
N	96,436	96,329	95,404	96,329	95,844

Panel B: Percentage of within-style new fund openings with below-average fees (*NFSTARTSLF*)

	FAMDIV	CNRSHRPT	CNRSTLPT	CORRSHR	CORRSTL
	(i)	(ii)	(iii)	(iv)	(v)
COINSURANCE	-0.083***	0.099***	-0.093***	0.055***	0.071***
	(0.010)	(0.019)	(0.019)	(0.014)	(0.011)
NFSTARTSLF	-2.531*	-3.647***	-4.997***	-3.358***	-7.973***
	(1.408)	(1.059)	(1.004)	(1.022)	(1.124)
COINSURANCE	-2.221	-23.918***	-10.861***	13.709***	9.437***
x NFSTARTSLF	(1.396)	(2.866)	(2.374)	(1.792)	(1.707)
Family Controls	Yes	Yes	Yes	Yes	Yes
R-sq	47.7%	47.2%	47.3%	47.4%	47.6%
N	96,436	96,329	95,404	96,329	95,844

Table 9 - Continued

Panel C: Average within style redemption fee (*AVGEXITGATE*)

	FAMDIV	CNRSHRPT	CNRSTLPT	CORRSHR	CORRSTL
	(i)	(ii)	(iii)	(iv)	(v)
COINSURANCE	-0.040	0.541***	-0.094	-0.219***	-0.038
	(0.045)	(0.054)	(0.086)	(0.048)	(0.048)
AVGEXITGATE	-4.445	-2.988	-3.044	-24.210***	-18.394***
	(3.614)	(2.001)	(2.610)	(1.660)	(1.713)
COINSURANCE	-5.166*	-47.397***	-14.389**	29.538***	16.813***
x AVGEXITGATE	(3.099)	(3.699)	(6.225)	(3.272)	(3.577)
Family Controls	Yes	Yes	Yes	Yes	Yes
R-sq	47.1%	46.9%	46.8%	47.2%	46.9%
N	96,436	96,329	95,404	96,329	95,844

Table 10
Conditional Cash-Flow Correlation and Fee-Coinsurance Sensitivity

This table examines the effect of conditional cash-flow correlations on fund family's advisory fees over the period from 1993 to 2015. Panel A reports the summary statistics of pairwise correlations of share-class-level (*CORRSHR*) and style-level net cash flows (*CORRSTL*) *conditional* on whether such net cash flows are positive (net cash in-flows) or negative (net cash out-flows) (refer to Appendix A for more details on the construction of these variables). In Panel B, we estimate a multivariate cross sectional regression of fund family's advisory fees on selected characteristics. The dependent variable (in percentage terms) is the value-weighted style-adjusted advisory fee (*FAMADVFEE*) in models (i) to (iii), and the value-weighted style-adjusted operating expenses (*FAMOPEX*) in models (iv) to (vi). Our main independent variables of interest are the following cash-flow correlation measures: the correlation of idiosyncratic net cash flows at the investment style level (*CORRSTL*); and the correlation of net cash flows at the share class level (*CORRSHR*). To test the sensitivity of the fee-coinsurance relationship to different fund family's net cash flow states, we estimate the two cash-flow correlation proxies of *CORRSTL* and *CORRSHR* conditional on net cash flows being positive (*_UPSIDE*) or negative (*_DOWNSIDE*). Other lagged control variables (untabulated for brevity) include: the logarithm of the number of fund portfolios (*LNPFOLIO*) and investment styles (*LNINVOBJ*); the logarithm of family total assets under the management (*LFAMTNA*); the logarithm of the number of years since family inception (*LFAMAGE*); percentage net cash flows (*FAMFLOWS*); style-adjusted after-fee realized returns (*FAMRET*); total volatility of net cash flows (*FAMCFVOL*); style-adjusted portfolio turnover (*FAMTURNR*); style-adjusted redemption fees (*LOCKINFEE*); number of star funds offered by the fund family (*FAMNSTAR*); percentage of family TNA in index products (*INDEXPCT*); percentage of family TNA in institutional products (*INSTNPCT*); percentage of family TNA in equity products (*EQUITYPCT*); and the percentage of fund family TNA in income products (*INCOMEPCT*). We also interact *CORRSTL* and *CORRSHR*, and their conditional decompositions, with the fund family variables of *LFAMTNA* and *LFAMAGE*. We run Fama and MacBeth (1973) cross sectional regressions with heteroskedasticity and autocorrelation consistent (*HAC*) standard errors (in parentheses). One, two, and three asterisks indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Descriptive statistics of the conditional pairwise cash-flow correlation measures

	N	mean	sd	Percentiles				
				p5	p25	p50	p75	p95
CORRSTL_UPSIDE	163,503	0.682	0.325	0.140	0.375	0.771	1.000	1.000
CORRSTL_DOWNSIDE	163,503	0.691	0.317	0.159	0.395	0.780	1.000	1.000
Diff		0.01						
t-stat		25.31						
CORRSHR_UPSIDE	159,370	0.547	0.365	0.023	0.199	0.516	1.000	1.000
CORRSHR_DOWNSIDE	159,370	0.575	0.358	0.051	0.231	0.568	1.000	1.000
Diff		0.03						
t-stat		43.62						

Panel B: Multivariate analysis of the relationship between advisory fees and conditional correlation measures

	(i)	(ii)	(iii)	(iv)	(v)	(vi)	(vii)	(viii)
CORRSTL	0.329***				0.352***			
	(0.027)				(0.023)			
CORRSTL_DOWNSIDE		0.258***				0.239***		
		(0.056)				(0.060)		
CORRSTL_UPSIDE		0.038				0.093		
		(0.060)				(0.064)		
CORRSHR			0.371***				0.367***	
			(0.015)				(0.016)	
CORRSHR_DOWNSIDE				0.345***				0.316***
				(0.023)				(0.022)
CORRSHR_UPSIDE				0.094***				0.090***
				(0.024)				(0.022)
Family controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-sq	43.9%	44.1%	44.1%	44.0%	44.9%	45.0%	45.1%	45.2%
N	96,041	96,041	96,155	96,155	96,041	96,041	96,155	96,155

Table 11
"Mirror" Fund Families: Fee-setting Policies and Cash-flow Correlation

This table presents the estimated coefficients of fund family fees on coinsurance proxies and cash-flow volatility for a sample of *simulated* fund families. We construct simulated fund families by replacing each constituent fund class with a "mirror" fund class. A "mirror" fund class in period *t* is one that: (1) operates in the same investment style of the constituent fund class of the fund family; (2) belongs to the same quintile portfolio of sorted fund TNA; and (3) has the highest cash-flow correlation with the constituent fund class of the fund family. We repeat this matching procedure for all family fund classes. The dependent variable (in percentage terms) is the value-weighted style-adjusted advisory fee (*FAMADVFEE*). For robustness, we also use the value-weighted style-adjusted total operating expenses (*FAMOPEX*). Lagged coinsurance proxies include: (a) a dichotomous variable for multi-fund family offering more than 1 investment objective (*FAMDIV*); (b) the total percentage coinsurance of share-class net cash flows (*CNRSHRPT*); (c) the total percentage coinsurance of investment style net cash flows (*CNRSTLPT*); (d) the correlation of net cash flows at the share class level (*CORRSHR*); and (e) the correlation of idiosyncratic net cash flows at the style level (*CORRSTL*). We also report the loading of fund family fees on the total volatility of net cash flows (*FAMCFVOL*). Other lagged control variables (untabulated for brevity) include: the logarithm of the number of fund portfolios (*LNPFOLIO*) and investment styles (*LNINVOBJ*); the logarithm of family total net assets (*LFAMTNA*); the logarithm fund family age since inception (*LFAMAGE*); percentage net cash flows (*FAMFLOWS*); style-adjusted after-fee realized returns (*FAMRET*); style-adjusted redemption fees (*LOCKINFEE*); number of star funds offered by the fund family (*FAMNSTAR*); style-adjusted portfolio turnover (*FAMTURNR*). We isolate the effect of fund family size and fund family age on the fee-coinsurance relationship by interacting *COINSURANCE* with fund family characteristics of *LFAMTNA* and *LFAMAG*, respectively. Additional (untabulated) control variables include: the percentage of family TNA in index shares (*INDEXPCT*); percentage of family TNA in institutional shares (*INSTNPCT*); the percentage of family TNA in equity products (*EQUITYPCT*) and the percentage of family TNA in income products (*INCOMEPCT*). We estimate Fama and MacBeth (1973) regressions with *HAC* standard errors (in parentheses). The sample period is from 1993 to 2015. One, two, and three asterisks indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	Dep. Variable	Proxy	COINSURANCE	FAMCFVOL	Family Controls	R^2	Obs.
(i)	FAMADVFEE	FAMDIV	0.005	-0.003	Yes	24.2%	84,107
			(0.016)	(0.020)			
(ii)	FAMOPEX	FAMDIV	-0.013	-0.023	Yes	51.2%	84,107
			(0.017)	(0.017)			
(iii)	FAMADVFEE	CNRSHRPT	0.006	-	Yes	22.4%	84,107
			(0.018)	-			
(iv)	FAMOPEX	CNRSHRPT	-0.020	-	Yes	50.2%	84,107
			(0.021)	-			
(v)	FAMADVFEE	CNRSTLPT	0.011	-	Yes	22.8%	84,107
			(0.024)	-			
(vi)	FAMOPEX	CNRSTLPT	-0.026	-	Yes	50.3%	84,107
			(0.022)	-			
(vii)	FAMADVFEE	CORRSHR	-0.004	-0.001	Yes	23.4%	84,107
			(0.012)	(0.019)			
(viii)	FAMOPEX	CORRSHR	-0.005	-0.021	Yes	50.9%	84,107
			(0.013)	(0.017)			
(ix)	FAMADVFEE	CORRSTL	0.009	-0.007	Yes	23.5%	84,034
			(0.016)	(0.019)			
(x)	FAMOPEX	CORRSTL	0.008	-0.026	Yes	51.0%	84,034
			(0.019)	(0.016)			

Table 12
Importance of the Mutual Fund Business (as a % of Total Revenue) to a Fund Family and the Fee-Coinsurance Sensitivity

The table examines the effect of the importance (to a fund family) of the mutual fund business – expressed as a percentage of fund family's total revenue – on the level of advisory fees, cash-flow coinsurance, and fee-coinsurance sensitivity of a mutual fund family. In Panel A we report the descriptive statistics of fund family characteristics for a representative sample of the top 100 fund families by industry market share. These families control, on average, in excess of 90% of total industry market share. For this sample of the top 100 fund families, fund family characteristics include: A dummy variable which is equal to 1 if a fund is a listed company, and 0 if it is a private company (*PUBLIC*); the average market share of a fund family (*FAMMKTSHR*); the number of fund portfolios (*NPFOLIO*); and the number of investment objectives (*NINVOBJ*). For the sample of listed-only fund families we also report the descriptive statistics of the following characteristics across all business divisions of a fund family: total assets (*TOTASSETS*); total revenue (*TOTREV*); the percentage of total revenue of a fund family derived from the mutual fund segment (*MFSEGREV*); and the number of distinct three-digit SIC codes of a fund family (*NUMSIC3DIG*). In Panel B, we repeat the analysis of Table 6 controlling for the variable *MFSEGREV* over the period 1993 to 2015. The dependent variable (in percentage terms) is the value-weighted style-adjusted advisory fee (*FAMADVFEE*). The main independent variable is *MFSEGREV*. We also include our fund family coinsurance proxies and their interaction with *MFSEGREV*. Other lagged control variables (untabulated for brevity) include all the fund family characteristics described in Table 6. We estimate Fama and MacBeth (1973) regressions with *HAC* standard errors (in parentheses). One, two, and three asterisks indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Panel A. Descriptive Statistics of top 100 fund families by AUM (> 95% of the industry market share)

	N	Mean	Std Dev	Percentiles				
				p5	p25	Median	p75	p95
PUBLIC	48,594	0.484	0.500	0.000	0.000	0.000	1.000	1.000
FAMMKTSHR	33,111	0.61%	1.61%	0.00%	0.06%	0.15%	0.45%	2.22%
NPFOLIO	31,881	24.11	26.79	2.00	6.00	16.00	33.00	72.00
NINVOBJ	33,174	11.99	8.93	0.00	4.00	11.00	17.00	29.00
TOTASSETS	12,780	307,119.2	547,321.2	286.3	2,678.0	67,340.1	320,900.7	1,588,785.0
TOTREV	12,537	19,424.5	26,787.5	221.0	1,036.4	6,645.7	27,582.0	83,120.1
MFSEGREV	8,531	11.6%	19.4%	0.0%	0.3%	1.9%	13.8%	57.0%
NUMSIC3DIG	9,345	3.3	2.4	1.0	1.0	3.0	4.0	8.0

Panel B. Mutual Fund Segment Revenue Percentage (*MFSEGREV*) and Advisory Fees (*FAMADVFEE*)

	(i)	(ii)	(iii)	(iv)	(v)	(vi)
MFSEGREV	-0.619***	-98.980***	-0.634***	-0.654***	-0.620***	-0.750***
	(0.065)	(25.128)	(0.088)	(0.125)	(0.110)	(0.136)
x COINSURANCE		-102.06***	-1.924***	-0.108	3.463***	1.855***
		(25.123)	(0.314)	(0.169)	(0.713)	(0.298)
COINSURANCE		-0.927***	-0.167***	-0.083***	0.206***	0.158***
		(0.227)	(0.017)	(0.020)	(0.015)	(0.012)
TOTASSETS	-0.000***	-0.000***	-0.000***	0.000	-0.000***	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
NUMSIC3DIG	0.016***	0.017***	0.011***	0.013***	0.014***	0.014***
	(0.001)	(0.001)	(0.003)	(0.002)	(0.002)	(0.002)
Coinsurance proxy	-	FAMDIV	CNRSHRPT	CNRSTLPT	CORRSTL	CORRSHR
Family controls	Yes	Yes	Yes	Yes	Yes	Yes
N	8,315	8,315	7,894	8,305	8,252	8,305

Table 13
The Effect of Flow Coinsurance on Changes in Fund Family Advisory Fees

This table presents the estimated coefficients for changes in advisory fees on selected fund family characteristics for the period 1993 to 2015. In models (i), (iv), (vii), and (x) we estimate pooled OLS regressions where the dependent variable is the year-on-year change in value-weighted style-adjusted advisory fees (Δfee_t). In models (ii), (v), (viii), and (xi) we estimate logit regressions where the dependent variable is, $I_{\Delta fee>0}$, a dummy variable that takes value of 1 if there is a positive change in value-weighted style-adjusted advisory fees, and zero otherwise. Lagged independent variables (untabulated) include the coinsurance proxies and fund family characteristics described in Table 6. All regressions include year fixed effects. The table also reports robust standard errors (in parentheses) clustered by fund family. One, two, and three asterisks indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Model	Dep. Variable	Proxy	COINSURANCE	FAMCFVOL	Family Controls	Std. Err.	Obs.
(i)	Δfee_t	CNRSHRPT	-0.047**	-	Yes	Family	7,094
			(0.021)	-			
(ii)	$I_{\Delta fee>0}$	CNRSHRPT	-0.566***	-	Yes	Family	7,127
			(0.171)	-			
(iii)	Δfee_t	CNRSTLPT	-0.041**	-	Yes	Family	7,225
			(0.018)	-			
(iv)	$I_{\Delta fee>0}$	CNRSTLPT	-0.808***	-	Yes	Family	7,218
			(0.196)	-			
(v)	Δfee_t	CORRSHR	0.050***	0.297***	Yes	Family	7,124
			(0.014)	(0.109)			
(vi)	$I_{\Delta fee>0}$	CORRSHR	0.367**	6.892***	Yes	Family	7,127
			(0.166)	(1.249)			
(vii)	Δfee_t	CORRSTL	0.035***	0.278**	Yes	Family	7,126
			(0.013)	(0.109)			
(viii)	$I_{\Delta fee>0}$	CORRSTL	0.718***	6.750***	Yes	Family	7,120
			(0.156)	(1.247)			

Table 14

Robustness Test: Fixed Effects and IV Regressions (Second Stage)

This table presents a series of robustness tests on the multivariate relationship between fund family fees and selected fund family characteristics for the period 1993 to 2015. In models (i) to (iv), the dependent variable (in percentage terms) is the value-weighted style-adjusted monthly (*FAMADVFEE*) or yearly (*YFAMADVFEE*) advisory fees. In models (v) to (viii), the dependent variable (in percentage terms) is the value-weighted style-adjusted monthly (*FAMOPEX*) or yearly (*YFAMOPEX*) total operating expenses. The main independent variable of interest is the dummy variable *FAMDIV*, which is equal to 1 if the fund family is a multi-fund family offering more than 1 investment objective, and 0 otherwise. Other lagged control variables include all the fund family characteristics described previously in Table 6. In models (ii), (iv), (vi) and (viii) we report the second-stage estimated coefficients of two-stage least square instrumental variable (2SLS–IV) regressions with fund family fixed effect. We use a set of instruments to predict a fund family's decision to diversify its product offerings. Following Campa and Kedia (2002), lagged instrumental variables include: (a) the total number of (other) diversified fund families operating in each investment objective (*PNUMDIV*); (b) the percentage of total assets managed by other diversified fund families operating in each investment objective (*PTNADIV)*; (c) the total number of fund mergers (*MGRNUM*); and (d) the total dollar volume of fund mergers (*MGRVOL*). In all other columns we illustrate the (monthly or yearly) estimated coefficients of time-series-cross-section regressions with family and time fixed effects, and with standard errors clustered by family (in parentheses). One, two, and three asterisks indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

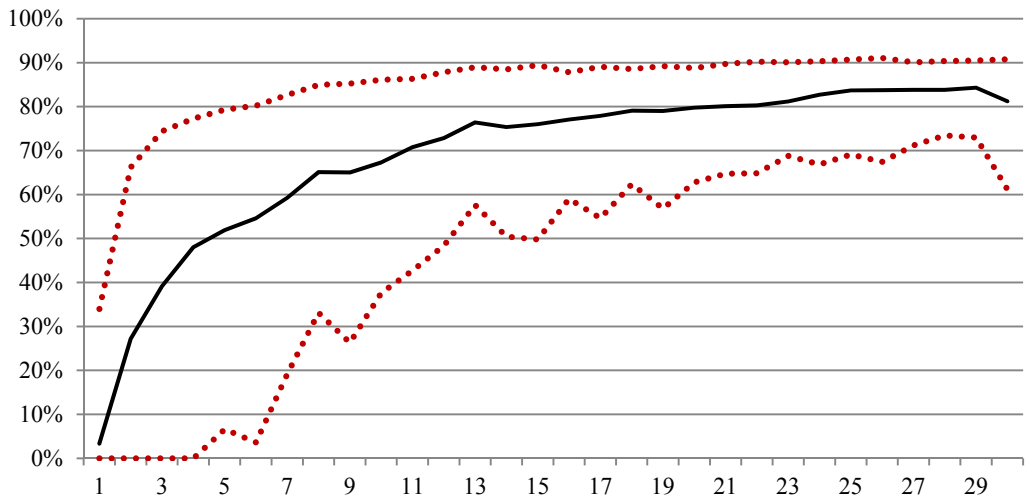
	FAMADVFEE		YFAMADVFEE		FAMOPEX		YFAMOPEX	
	(i)	(ii)	(iii)	(iv)	(v)	(vi)	(vii)	(viii)
FAMDIV	-0.052***	-0.012***	-0.068***	-0.017***	-0.055***	-0.014***	-0.076***	-0.020***
	(0.005)	(0.001)	(0.009)	(0.006)	(0.005)	(0.001)	(0.010)	(0.007)
LFAMTNA	-0.063***	-0.001***	-0.064***	-0.001***	-0.057***	-0.001***	-0.058***	-0.001***
	(0.002)	(0.000)	(0.005)	(0.000)	(0.003)	(0.000)	(0.006)	(0.000)
LFAMAGE	0.021***	0.000***	0.039***	0.000	0.032***	0.000***	0.049***	0.000
	(0.005)	(0.000)	(0.009)	(0.000)	(0.005)	(0.000)	(0.009)	(0.000)
LNPFOLIO	0.031***	-0.001***	0.035***	-0.000	0.037***	-0.001***	0.045***	-0.001***
	(0.006)	(0.000)	(0.012)	(0.000)	(0.007)	(0.000)	(0.013)	(0.000)
LNINVOBJ	0.019***	0.004***	0.028**	0.004***	-0.009	0.004***	0.000	0.005***
	(0.006)	(0.000)	(0.013)	(0.001)	(0.008)	(0.000)	(0.015)	(0.001)
FAMCFVOL	0.339***	0.006***	0.527***	0.007***	0.391***	0.008***	0.545***	0.008***
	(0.081)	(0.001)	(0.179)	(0.003)	(0.083)	(0.001)	(0.196)	(0.003)
FAMFLOWS	0.174***	0.002***	0.283***	0.003**	0.166***	0.002***	0.261***	0.003*
	(0.026)	(0.000)	(0.047)	(0.001)	(0.027)	(0.000)	(0.042)	(0.002)
FAMRET	0.063**	-0.000	-0.182***	-0.006**	0.042	-0.001**	-0.209***	-0.008**
	(0.029)	(0.000)	(0.066)	(0.003)	(0.026)	(0.000)	(0.067)	(0.003)
FAMTURNR	0.023***	0.000***	0.022***	0.000*	0.023***	0.000***	0.023***	0.000
	(0.002)	(0.000)	(0.004)	(0.000)	(0.002)	(0.000)	(0.004)	(0.000)
INSTNPCT	-0.055***	-0.001***	-0.061***	-0.001***	-0.112***	-0.002***	-0.117***	-0.002***
	(0.008)	(0.000)	(0.020)	(0.000)	(0.010)	(0.000)	(0.021)	(0.000)
INDEXPCT	-0.023***	-0.000***	-0.028	-0.001**	0.001	-0.000***	-0.011	-0.000
	(0.008)	(0.000)	(0.018)	(0.000)	(0.009)	(0.000)	(0.021)	(0.000)
EQUITYPCT	0.023**	0.000	0.045	0.001*	-0.029**	-0.000***	-0.021	0.001
	(0.010)	(0.000)	(0.028)	(0.000)	(0.014)	(0.000)	(0.042)	(0.001)
INCOMEPCT	0.010	0.000***	0.010	0.002**	-0.002	0.000***	-0.009	0.002**
	(0.010)	(0.000)	(0.018)	(0.001)	(0.015)	(0.000)	(0.031)	(0.001)
Family Fixed	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time Fixed	Yes	No	Yes	No	Yes	No	Yes	No
2SLS - IV	No	Yes	No	Yes	No	Yes	No	Yes
Frequency	Monthly	Monthly	Yearly	Yearly	Monthly	Monthly	Yearly	Yearly
Std Errors	Family	HAC	Family	HAC	Family	HAC	Family	HAC
R-sq	16.4%		17.6%		25.0%		27.1%	
F-stat (1st Stage)		106.61		5.09		122.28		5.86
N	123,827	80,146	9,988	6,653	123,827	80,146	9,988	6,653

Figure 1

Product Diversification and Fund Family's Cash flow Volatility and Coinsurance Level

This figure illustrates the time-series-cross-section relationship between the number of investment styles (*NINVOBJ*) offered by fund families and the associated levels of cash-flow volatility and flow coinsurance. In Panel B we plot the average standardized percentage coinsurance value, *CNRSHRPT*, computed as the ratio between the absolute coinsurance level (*CNRSHR*) and the total volatility of net cash flows assuming perfect-correlation (*FAMCFVOLPC*). In Panel B, we plot the average net-cash-flow volatility experienced by a fund family (*FAMCFVOL*). In both sub-plots we also illustrate the 5-th and 95-th percentiles of the distribution of the two variables. We report these statistics for fund families offering no more than thirty investment objectives to have a considerable within-group number of observations. The sample period of the analysis is from 1993 to 2015.

Panel A: *CNRSHRPT* by fund family *NINVOBJ*



Panel B: *FAMCFVOL* by fund family *NINVOBJ*

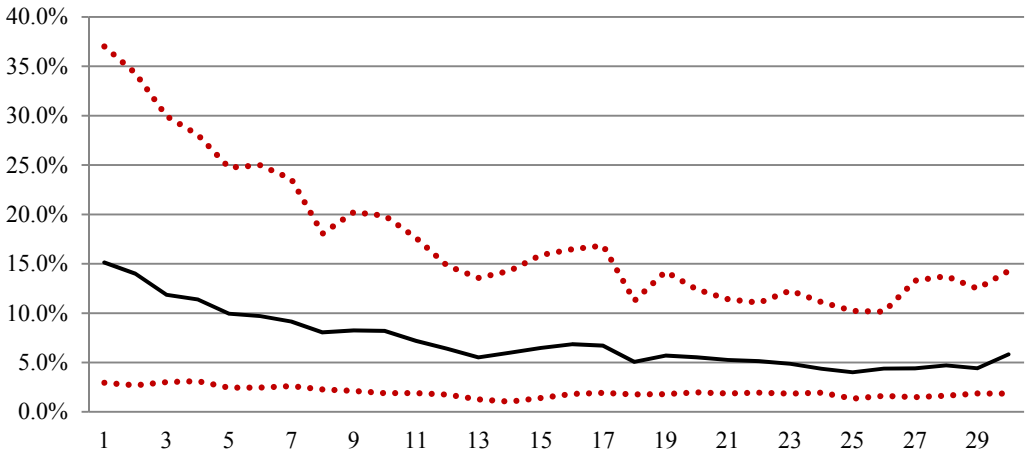
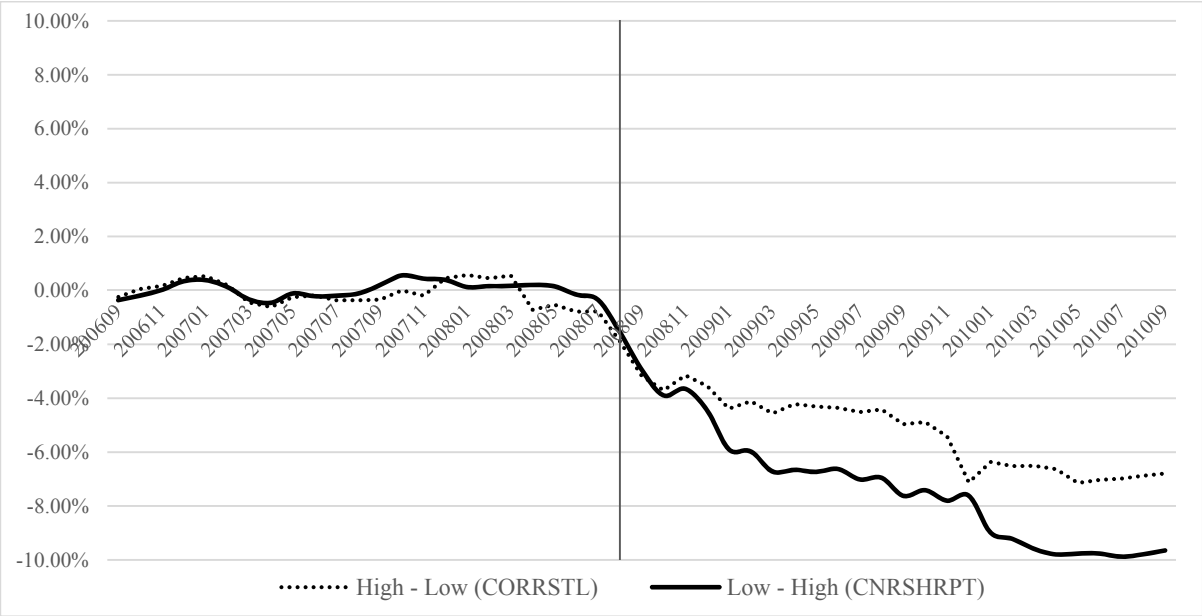


Figure 2
Cumulative Style-adjusted Net Cash Flows of Mutual Fund Families
Before/After the Flow-related Liquidity Shock of September 2008

This figure plots the difference in cumulative style-adjusted net cash flows experienced by fund families with high (above-median) and low (below-median) coinsurance levels in the two year before and the two years after the flow-related liquidity shock induced by the bankruptcy of Lehman Brothers on September 2008. We first separate fund families into above- and below-median coinsurance as of September 2007 (i.e., one year before the flow-related shock) to reduce the risk that the shock might contaminate fund family ranking. Our lagged coinsurance proxies include: (a) the correlation of idiosyncratic net cash flows estimated at the style level (*CORRSTL*); and (b) the absolute percentage coinsurance of share-class cash flows (*CNRSHRPT*). We then track the difference in cumulative net cash flows of fund families with above- and below-median coinsurance in the two years intervals around the crisis in September 2008.