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ABSTRACT

Fund families strategically shape their member funds' behavior to target specific groups of investors with varying performance and service needs. In this paper I introduce a new measure to identify performance-oriented and service-oriented funds. Matching theories from the industrial organization literature, I suggest that funds whose families outsource the execution of services unrelated to portfolio management to external specialists are the same funds with an emphasis on their core business portfolio management. I find an outperformance of service-outsourced funds that is robust to a range of alternative explanations. Moreover, I show evidence that service-outsourced funds indeed possess superior investment skills.

JEL *classification:* G23; L22; L84

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1. Introduction

A stylized fact about mutual funds is that funds are separated into market segments based on their families' strategic decision to attract specific groups of investors. Specifically, fund families shape their member funds' behavior to exploit heterogeneity in investors' varying performance and service preferences (Massa, 2003). Accordingly, mutual funds can be distinguished into two groups: (1) Funds that emphasize the role of portfolio management because they target performance-oriented investors and (2) funds where portfolio management plays a subordinate role since they cater to investors who value advisory services (see, e.g., Del Guercio et al., 2010; Del Guercio and Reuter, 2014). Nevertheless, a caveat of this classification of mutual funds is that it takes place based on the group of investors that self-selects into the funds and thus could suffer from noise.

In particular, ample empirical evidence analyzes investor preferences that determine their investment decisions and confirms that the fund selection can be traced back to fund performance and advisory services unrelated to portfolio management (see, e.g., Sirri and Tufano, 1998; Cici et al., 2015). Still, a multitude of additional factors, e.g., risk taking (Kamstra et al., 2015), fund advertising (Jain and Wu, 2000, Gallaher et al., 2015) or the role of retirement plan sponsors and financial advisors (Sialm et al., 2015; Inderst and Ottaviani, 2009) shape investors' fund selections and hence introduce inaccuracies into the measurement of funds' focus on portfolio management.[1]

In this paper I propose an alternative measure to distinguish between funds with varying emphasis on portfolio management by looking directly at their families' management strategies. In particular, the literature on industrial organization suggests that firms which channel their efforts on their core business simultaneously reduce resource consumption in

[1] For a comprehensive review on the determinants of mutual fund flows see Christoffersen et al. (2014).

non-core areas through outsourcing (Prahalad and Hamel, 1990).[2] Applied to the mutual fund context, one would expect that funds with an emphasis on portfolio management are the same funds whose families delegate the execution of activities unrelated to portfolio management to external specialists and vice versa.

In this spirit, I hypothesize that funds whose families source non-portfolio management services externally (hereafter, service-outsourced funds) pursue a strong portfolio management policy and thus generate superior performance relative to funds of families that administer non-portfolio management services internally (hereafter, service-inhouse funds). I determine whether a fund is a service-outsourced fund based on the outsourcing status of its shareholder services and argue that this classification of funds' portfolio management focus allows for an accurate measurement for two reasons:

First, shareholder services encompass a vast range of individual services that are necessary for funds' daily operations but that do not add to their investment ability. For instance, shareholder services include the creation and recordkeeping of shareholder accounts, the transmission of distributions to investors or shareholder communications such as the processing of investor transactions and complaints. Hence, tangible benefits from shareholder services are small for performance-oriented funds while service-oriented funds could be reluctant to lose this link to their shareholders.[3] Second, shareholder services strongly matter for mutual funds on a monetary basis. Gremillion (2005) describes shareholder services as the largest component

[2] The industrial organization literature proposes a multitude of theories for 'make-or-buy' decisions that essentially aims to show when a company is best advised to outsource part of its value chain. For instance, sourcing services from external specialists can be preferable to inhouse solutions if the contractor renders the service more efficiently and thus at lower costs or clients' reservation price increases because the service is provided by a prestigious contractor. Lafontaine and Slade (2007) provide a review on firms' suitability for 'make-or-buy' decisions.

[3] Moreover, despite their extent, the tasks executed by funds' shareholder services are highly standardized (Gremillion, 2005). Therefore, performance-oriented funds could outsource their shareholder services while avoiding some of the major impediments that complicate 'make-or-buy' decisions (Del Guercio et al., 2007), for instance, the 'hold-up' problem where components are built on exact specifications so that sourcing firms are exposed to a lack of alternatives and thus diminished bargaining power in contract negotiations (see, e.g., Grossman and Helpman, 2002).

of funds' expenses after investment management. Thus, outsourcing of shareholder services to external providers whose comparative advantages lies in rendering these services presents a considerable potential to reduce resource consumption in a non-core area for performance-oriented funds.

I begin my analysis by comparing the fund performance of service-outsourced funds with service-inhouse funds. Supporting the main hypothesis that service-outsourced funds put an emphasis on portfolio management, I find that service-outsourced funds outperform their inhouse peers. Specifically, I observe a performance difference that amounts up to 73 basis points per year.

In my second set of tests I account for the concern that the newly introduced measure for funds' varying focus on portfolio management captures similar proxies documented in the literature. In particular, I consider two alternative explanations for the outperformance of service-outsourced funds. First, referring to the investor based classification of funds, Del Guercio and Reuter (2014) analyze the distribution channel of funds and show evidence that is consistent with a market segmentation into performance-oriented direct-sold funds and service-oriented brokered funds. Thus a potential explanation for the outperformance of service-outsourced funds could be that service outsourcing simply proxies for the direct distribution channel. Second, it is possible that service outsourcing is simply the flip side of retaining all portfolio management responsibilities, i.e., to pass on the possibility to hire sub-advisors which is hardly an indication for a fund with an emphasis on active management. In this spirit, Chen et al. (2013) show that sub-advised funds underperform funds that manage their assets internally. Thus, the outperformance of service-outsourced funds could be driven by a prevalence of portfolio sub-advisors among service-inhouse funds. I rule out both possibilities by showing that the outperformance of service-outsourced funds remains robust after controlling for funds' distribution channels and use of sub-advisors.

In a more detailed exploration, I employ a set of empirical techniques to address potential endogeneity concerns. I start with panel regressions that include family fixed effects so that identification comes from changes in the outsourcing status of fund families. To further establish causality, I provide results from a matched sample analysis that is designed to eliminate heterogeneity between service-outsourced funds and service-inhouse funds through a more narrow selection of the service-inhouse control group. Next, I employ a permutation test with randomized outsourcing status of funds' shareholder services that rejects the hypothesis of a reliable performance difference if a sufficiently large number of arbitrary iterations yield similar results to the ones originally observed. Lastly, I implement an instrumental variable approach. As an instrument I use the number of external service providers that offer shareholder services in the state of the management company. The idea is that fund families' use of service outsourcing is more prevalent if the competition among external providers is high. All approaches to establish causality yield significant results and confirm an outperformance of service-outsourced funds. In fact, the outperformance becomes even larger when controlled for endogeneity giving further support to the notion that service-outsourced funds are more concerned with portfolio management than service-inhouse funds.

In the second part of the paper, I explore potential channels through which the outsourcing status of mutual funds and the associated portfolio management focus affects performance. As outlined above, for both reasons of portfolio management concentration and cost reduction potentials performance-oriented funds outsource shareholder services. Hence, I hypothesize that service-outsourced funds outperform service-inhouse funds if service outsourcing results in lower fees and is related to superior investment skills. To examine the first channel I investigate the influence of service outsourcing on funds' service fees and total expenses that reduce their after-cost performance. As expected, I observe that service-outsourced funds have service and total expenses that are about 32 and 10 percent lower, respectively. For the second

channel I explore the link between funds' outsourcing status and four measures for investment skill: active share (Cremers and Petajisto, 2009; Petajisto, 2013), return gap (Kacperczyk et al., 2008), industry concentration (Kacperczyk et al., 2005) and the R^2 measure (Amihud and Goyenko, 2013). Giving further support to the notion that funds' varying portfolio management focus can be classified through their outsourcing status, I find that service-outsourced funds exhibit higher values for all performance-predicting skill measures.

Lastly, borrowing from the literature on industrial organization that business concentration facilitates corporate success (Prahalad and Hamel, 1990), I quantify the benefits accruing to service-outsourced funds by the increase in their assets under management (Khorana and Servaes, 2012). I find that before controlling for expenses and performance, service-outsourced funds exhibit substantially higher growth rates of up to 16 percentage points per year, whereas after controlling for both mechanisms, there is no statistically significant difference in flows between the two types of funds. This is consistent with investors preferring service-outsourced funds on the basis of their expenses as well as performance and provides service-outsourced funds with a sizeable comparative advantage to their market strength.

The analysis in this paper contributes to several strands of the literature. The most closely related literature studies the relation between fund families' strategic decisions to position themselves within the fund industry and their member funds' behavior. Massa (2003) shows that fund families exploit the heterogeneity of investors by differentiating themselves through non-performance-related characteristics. Del Guercio et al. (2010) and Del Guercio and Reuter (2014) find that fund families deliberately influence their funds' behavior to cater to the needs of specific groups of investors. This paper complements these studies by showing that funds' segmentation into groups with varying performance-orientation is observable through their families' decision to outsource services unrelated to portfolio management to external specialists.

This paper is also related to studies that investigate outsourcing activities of mutual funds. Specifically, funds that delegate their portfolio management to sub-advisors underperform internally managed funds (see, e.g., Chen et al., 2013; Debaere and Evans, 2014). The setting in this analysis is different from the one analyzed in the literature because it examines the implications from outsourcing of activities that are unrelated to portfolio management. To the best of my knowledge, this is the first paper to provide evidence for a relation between fund behavior and operations that are unrelated to portfolio management.

The remainder of this paper is organized as follows. In Section 2, I discuss the employed data set and sample summary statistics. Section 3 presents the findings on the relation between shareholder service outsourcing and performance. In Section 4, I present the results for a number of empirical techniques that are designed to rule out endogeneity concerns. Channels for the performance difference between service-outsourced funds and service-inhouse funds are presented in Section 5. Section 6 quantifies the comparative advantage that accrues to service-outsourced funds because of their focus on portfolio management. Section 7 concludes.

2. Data

2.1 SOURCES AND SAMPLE CONSTRUCTION

I obtain data on U.S. equity mutual funds between 1996 and 2010 from three sources: CRSP Survivor-Bias-Free U.S. Mutual Fund database, Thomson Mutual Fund Holdings database and funds' filings of SEC Form N-SAR.

From the CRSP Mutual Fund databases I obtain information on fund returns, total net assets under management (TNA), expense ratios, fund family identifier and other fund characteristics. Similar to the approach by Pástor and Stambaugh (2002) I assign a fund's investment objective based on the CRSP fund objective code. Since the focus is on actively managed U.S. domestic equity funds I take further steps to eliminate global, international,

balanced, fixed-income and index funds. If necessary, I aggregate data of share classes to the fund level by weighting the information with the TNA of the share classes.

The Thomson Mutual Fund Holdings database provides information about funds' portfolio holdings on each reporting date. In addition, the holdings data is supplemented with information from the CRSP Monthly and Daily Stock Files whereby databases are merged using MFLINKS from Wermers (2000).

In accordance to the Investment Company Act of 1940 management companies need to file semi-annual N-SAR reports with the SEC that contain information on a variety of fund characteristics and their operations.[4] I merge the N-SAR database to CRSP similar to Christoffersen et al. (2013). Among the N-SAR information mutual funds report the name of their shareholder servicing agent during the period (Question 12A on N-SAR, i.e., Q12A).[5] I determine the outsourcing status of a mutual fund's shareholder service by manually checking whether the service provider in N-SAR is affiliated with the fund's management company reported in CRSP.[6] In some instances, mutual funds have more than one service provider. In that case, I classify a fund's shareholder service as outsourced if all service providers are unaffiliated to the management company. In addition, I obtain the funds' total dollar value spent on the shareholder servicing agent(s) (Q72I), the number of months that the expense information applies to (Q72A), and the average monthly net assets during the period (Q75B) from N-SAR. I calculate funds' monthly service fees by dividing the (monthly) dollar value spent on the servicing agent(s) (Q72I / Q72A) by the average monthly net assets during the

[4] Starting in 1996 it became mandatory for mutual funds to file N-SAR reports with the SEC. Thus, to mitigate any selection bias, the sample period begins with the year 1996.

[5] Shareholder service providers are often labeled as 'Transfer Agent' or 'Shareholder Servicing Agent'. For ease of exposition I refer to them as service provider.

[6] Specifically, the classification of a fund's service outsourcing status is based on a two-step procedure: First, CRSP assigns fund family identifier based on the investment management company that manages the fund. Thus, before determining the service status, I manually cross-check whether the management company reported in CRSP is identical to the advisor reported in N-SAR (Q8A). If the provided information diverge I adjust the CRSP family identifier in accordance to the advisor in N-SAR. In a second step, I compare the name of the service provider in N-SAR with the management company in CRSP and screen for affiliations between both entities using information from the funds' 485APOS and 485BPOS SEC filings as well as LexisNexis.

period. Then I annualize the monthly estimate to obtain funds' annual shareholder servicing fees.

The final sample includes 697 fund families, 2,740 actively managed U.S. domestic equity funds and 19,871 fund-year observations.

2.2 SAMPLE CHARACTERISTICS

Table I presents summary statistics on family and fund characteristics for the sample. Since the outsourcing decision is presumed to be a strategic decision at the family level I report the family statistics for the total sample and for both fund families that entirely consist of service-outsourced funds and fund families with no or partially outsourced shareholder services. All other information are at the fund level.

– Insert Table I approximately here –

On aggregate service-outsourced funds constitute about 57 percent of the sample. In addition, consistent with the view of outsourcing as a strategic decision of management companies, outsourcing is highly concentrated within fund families, i.e., among families that do not entirely consist of service-outsourced funds only 1.85 percent of the funds receive shareholder services from unaffiliated service providers. Looking at fund family size, I observe that families with outsourced shareholder services are much smaller. In addition, the typical fund family in our sample consists of roughly 4 actively managed U.S. domestic equity funds. However, consistent with the difference in size, fund families with unaffiliated service providers consist of a smaller number of funds. Likewise service-outsourced funds are smaller ($0.5 billion vs. $1.5 billion) and younger (7.1 years vs. 9.3 years) than service-inhouse funds. Looking at shareholder servicing costs, service-inhouse funds exhibit expenses that amount to 25 basis points per year and are about 9 basis points higher than for service-outsourced funds.

3. Main Result

In this section I explore the main hypothesis that service-outsourced funds perform better than service-inhouse funds because they pursue a stronger portfolio management-oriented policy. I test this relation in Section 3.1. Section 3.2 provides additional robustness checks for measures documented in the literature that proxy for funds' focus on portfolio management.

3.1 SERVICE OUTSOURCING AND FUND PERFORMANCE

In this section I study the relation between funds' service outsourcing status and fund performance. To analyze the impact of service outsourcing on mutual fund performance, I run a panel regression model:

$$\begin{aligned} Performance_{i,t} = {} & \alpha_0 + \beta Service\ outsourced_{i,t} + \gamma_1 Ln\ TNA\ family_{i,t-1} \\ & + \gamma_2 Family\ focus_{i,t-1} + \gamma_3 Ln\ TNA_{i,t-1} + \gamma_4 Ln\ age_{i,t} \\ & + \gamma_5 Expense\ ratio_{i,t} + \gamma_6 Turnover\ ratio_{i,t} \\ & + \alpha_s + \alpha_t + \varepsilon_{i,t}, \end{aligned} \tag{1}$$

where the dependent variable, *Performance*, is the performance of fund *i* in year *t* measured as a fund's net-of-fee return, Khorana (1996) objective-adjusted return, Jensen (1968) alpha, and Carhart (1997) 4-factor alpha. Alpha estimations are based on 12-month window regressions of funds' net-of-fee excess returns on the market excess return and, as required, the long-short portfolio returns of the benchmark mimicking portfolios. The main independent variable, *Service outsourced*, is a binary variable that equals one if the service provider of fund *i* is unaffiliated to its management company in year *t* and zero otherwise. To control for potential family and fund influences I include the logarithm of the fund family's total net assets under management (*Ln TNA family*), the investment concentration of a fund family across investment segments defined as in Siggelkow (2003) (*Family focus*), the logarithm of the fund's total net assets under management (*Ln TNA*), the logarithm of the fund's age in years (*Ln age*), the expense ratio of a fund (*Expense ratio*), and the fund's yearly turnover ratio

(*Turnover ratio*). In addition, I add investment segment and year fixed effects, denoted by α_s and α_t respectively, to control for any unobservable segment and time effects. Furthermore, because service outsourcing is a strategic fund family decision, I cluster standard errors at the family level to account for possible correlations within family groups.

– Insert Table II approximately here –

Results reported in Table II confirm the main hypothesis that service-outsourced funds exhibit superior performance relative to their inhouse peers independent of the employed performance benchmark. In particular, the performance difference is most pronounced for fund returns and Khorana (1996) objective-adjusted returns with, respectively, 70 basis points and 73 basis points per year. Using alpha performance metrics the difference declines to 62 basis points for the Jensen (1968) alpha and 39 basis points for the Carhart (1997) 4-factor alpha, however, all coefficients are significant at the conventional levels of statistical significance.

Regarding the control variables, the results are consistent with the existing literature. Confirming the findings of Chen et al. (2004) and Siggelkow (2003) I find a positive impact of fund family size and family focus on fund performance. On the contrary, fund size and turnover ratio impact negatively on performance as described in Berk and Green (2004) and Carhart (1997), respectively.

3.2 SERVICE OUTSOURCING AND ALTERNATIVE MEASURES FOR FUNDS' PORTFOLIO MANAGEMENT FOCUS

In this section I explore the possibility that funds' service-outsourcing status accidentally captures the effect of an alternative measure for an emphasis on portfolio management documented in the literature.

First, a growing number of studies examine the distribution channel of mutual funds and show that funds that are marketed directly to fund investors outperform funds that are sold through financial advisors (see, e.g., Bergstresser et al., 2009; Chalmers and Reuter, 2014). Del

Guercio and Reuter (2014) suggest that this performance difference is attributable to the market segmentation of fund families that cater to sophisticated do-it-yourself investors who purely value portfolio management, i.e. the direct channel of mutual funds, and those families that attract investors who demand advisory services, i.e. the brokered distribution channel of mutual funds. Thus, service-outsourcing could capture this kind of market segmentation. For example, fund families that decide to compete for performance-oriented direct channel investors could use service outsourcing as a means to achieve their goals, while families of the brokered channel that cater to investors' service needs are also the ones that decide against service outsourcing. Second, mutual funds can opt to complement their portfolio management expertise by hiring portfolio sub-advisors. However, Chen et al. (2013) show that sub-advised funds underperform internally managed funds. Moreover, since service-inhouse funds are presumed to put less emphasis on portfolio management they are prone to employ portfolio sub-advisors. Thus, service outsourcing potentially captures the performance difference of this sub-advisor effect.

To rule out the possibility that the observed performance effect of service-outsourced funds is attributable to both concerns, I repeat the analysis from Table II and explicitly control for funds' distribution channel and use of sub-advisors. In particular, I obtain data on the primary distribution channel of U.S. domestic equity fund shares from Thomson Reuters Lipper (Lipper). Lipper assigns each fund share class either to the direct, indirect, or institutional distribution channel. Since the Lipper classification is at the share class level I define a fund's distribution channel based on the share's channel that encompasses at least 50 percent of the fund's assets similar to Del Guercio et al. (2010) and Del Guercio and Reuter (2014). In addition, to ensure comparability to related studies, I eliminate all fund-year observations that belong to the institutional channel from this analysis.

Regarding funds' employment of portfolio sub-advisors I identify the existence and the name of mutual funds' sub-advisors using information from item Q8A and Q8B in the N-SAR reports filed with the SEC.[7] Since some mutual funds have multiple sub-advisors I follow the example by Chen et al. (2013) and consider a fund as sub-advised if the fund hires at least one sub-advisor.

– Insert Table III approximately here –

Results from Table III confirm the performance effects associated with the alternative measures for a varying portfolio management focus of funds. Consistent with the results of Bergstresser et al. (2009) and Del Guercio and Reuter (2014) I find a positive performance difference between funds that are direct-sold relative to those funds that are distributed via financial advisors. Furthermore, funds' use of sub-advisors impacts negatively on fund performance confirming the finding of Chen et al. (2013) and Debaere and Evans (2014). However, controlling for funds' distribution channel and use of sub-advisors does not dampen the outperformance of service-outsourced funds. In fact, the results gain in statistical and economic significance. The difference in net-of-fee returns between service-outsourced and service-inhouse funds amounts to 102 basis points per year. For risk-adjusted performance measures the difference is about 93 basis points for Khorana (1996) objective-adjusted returns, 80 basis points for the Jensen (1968) alpha, and 45 basis points for the Carhart (1997) 4-factor alpha.

Overall, the results of Section 3. support the main hypothesis that service-outsourced funds outperform service-inhouse funds. Thus, evidence is consistent with the notion that funds of families that delegate the execution of non-core tasks to external providers also put a stronger focus on their actual field of expertise and perform better.

[7] For earlier studies that follow the same approach see, e.g., Kuhnen (2009) and Debaere and Evans (2014).

4. Endogeneity Concerns

In this section I implement a number of empirical techniques to address potential endogeneity concerns for the outperformance of service-outsourced funds relative to service-inhouse funds. Specifically, in Section 4.1 I start with a panel regression model that includes family fixed effects to eliminate unobservable family influences. Section 4.2 provides evidence from a matched sample analysis that eliminates heterogeneity by selecting a more comparable control group of service-inhouse funds. Results in Section 4.3 are based on a permutation test and Section 4.4 presents results of an instrumental variable approach.

4.1 PANEL REGRESSION WITH FAMILY FIXED EFFECTS

I begin my analysis by running panel regressions for an impact of service outsourcing on fund performance and include fixed effects at the fund family level. In particular, since service outsourcing is a strategic decision at the fund family level it could be that unobservable differences between fund families that delegate shareholder services to external service providers and those that administer these services internally drive the performance difference between service-outsourced funds and service-inhouse funds. Hence, in a perfect experiment I would compare the performance of a fund which belongs to a fund family that sources shareholder services externally in a specific year to the performance of the fund in the same family in the same year but when shareholder services are administered internally. An empirical strategy that effectively allows to investigate the performance difference between service-outsourced funds and service-inhouse funds within the same fund family is to include family fixed effects.[8]

– Insert Table IV approximately here –

[8] Note that, in this and subsequent analyses I employ the (full) sample as in Table II. However, as additional check I repeat the analysis including all additional controls from the alternative explanations of Section 3.2, i.a. the sample is restricted to the observations that belong to funds that are marketed either directly to investors or brokered through financial advisors. The results (not reported) are qualitatively the same.

Results from Table IV clearly support the main finding of the earlier tests. Independent of the performance benchmark service-outsourced funds outperform service-inhouse funds. In fact, the performance difference becomes even larger to up to 214 basis points per year for funds' net-of-fee returns. Levels of statistical significance decrease to the 5 percent and 10 percent level which is to be expected since in these specifications identification on the coefficient of *Service outsourced* comes from changes in the sourcing status of some fund families. In this regard less than 10 percent of the 697 fund families experience a change in the sourcing status of their shareholder services over the sample period.

4.2 MATCHED SAMPLE ANALYSIS

An alternative means to deal with unobserved heterogeneity that impacts on the performance difference between service-outsourced and service-inhouse funds is to ensure that the set of control funds represents a close as possible match to the service-outsourced funds. Hence, I apply a matched sample analysis that constructs a set of control groups that represent a more comparable subsample. Specifically, each service-outsourced fund is matched with an equally weighted portfolio of service-inhouse funds that share the same characteristics. In the base model I match a service-outsourced fund to all service-inhouse funds that belong to the same investment segment and *Ln TNA family* decile in a certain year. I select *Ln TNA family* as the dominant matching criterion to account for the fact that service outsourcing is a strategic decision at the family level as well as that service-outsourced and service-inhouse funds belong to families that on average strongly differ with respect to size as described in Section 2.1. I account for other family and fund influences by extending the baseline match with other controls from Section 3.1 that have also been documented to impact on fund performance (see, e.g., Carhart, 1997, Siggelkow, 2003, Berk and Green, 2004, Chen et al., 2004, and Ferreira et al., 2013). Thus, in additional tests I link service-outsourced funds to all service-inhouse funds that, respectively, belong to the same *Family focus*, *Ln TNA*, *Ln age*, *Expense ratio* or *Turnover*

ratio decile. Finally, I measure performance differences between service-outsourced funds and the corresponding service-inhouse matching portfolio for the performance measures: net-of-fee fund return, Jensen (1968) alpha, and Carhart (1997) 4-factor alpha.

– Insert Table V approximately here -

The results from Table V clearly confirm the results from Table II. Independent of the employed performance measure service-outsourced funds outperform their comparable service-inhouse funds by up to 114 basis points per year on average. In addition, the coefficients are in 17 out of 18 specifications significant at the 1 percent level.

4.3 PERMUTATION TEST

Another approach to rule out the possibility that the performance effect of service-outsourcing is attributable to an omitted factor is to apply a permutation test. Specifically, the permutation test requires to assign the outsourcing status to funds' shareholder service randomly and then to measure the multivariate performance difference between service-outsourced funds and service-inhouse funds. This process is repeated 10,000 times which yields the exact distribution of performance differences under the null hypothesis that the service outsourcing status does not matter. Accordingly, p-values are equal to the fraction of permutations that show an effect that are as strong as the performance difference observed in Table II.

– Insert Table VI approximately here –

As expected, results from Panel A of Table VI strongly support earlier findings that service-inhouse funds underperform service-outsourced funds. Specifically, the coefficient on *Service outsourced* is significant at the 1 percent level in all specifications. For illustration purposes Panel B of Table VI shows the empirical distribution of performance differences across all permutations. From that, one can see that the performance effect is indeed normally distributed under the null that service outsourcing has no effect but that only very few iterations

yield performance differences between service-inhouse funds and service-outsourced funds that are comparable to the ones from Table II.

4.4 INSTRUMENTAL VARIABLE REGRESSION

As a final identification strategy to establish causality, I implement an instrumental variable approach. As an instrument for funds' outsourcing status I employ the number of service companies that render shareholder services in the state where the fund's management company is located. To be considered as a good instrument the number of service providing companies in the state of the fund's management company needs to be correlated with funds' service outsourcing status but correlated with fund performance solely because of the outsourcing decision. I propose that the number of service providing companies serves as such a good instrument since I expect fund families to be more likely to delegate the execution of shareholder services to an external provider if the competition among external service providers is high, i.e., the number of available external providers in the proximity of the fund's management company is high.

I identify the state where funds' management companies are located using information from item Q8D in the N-SAR reports filed with the SEC. Since the dependent variable *Service outsourced* is a binary variable that equals one if the service provider of fund *i* is unaffiliated to its management company in year *t* and zero otherwise, I employ a two-stage residual inclusion (2SRI) model as in Chen et al. (2013). The first-stage specification is:

$$\begin{aligned} Service\ outsourced_{i,t} = {} & \alpha_0 + \beta Number\ service\ providers\ in\ state_{i,t} \\ & + \gamma_1 Ln\,TNA\ family_{i,t-1} + \gamma_2 Family\ focus_{i,t-1} \\ & + \gamma_3 Ln\,TNA_{i,t-1} + \gamma_4 Ln\ age_{i,t} \\ & + \gamma_5 Expense\ ratio_{i,t} + \gamma_6 Turnover\ ratio_{i,t} \\ & + \alpha_s + \alpha_t + \varepsilon_{i,t}, \end{aligned} \tag{2}$$

whereby the main independent variable, *Number of service providers in state*, represents the logarithm of 1 plus the number of service companies that render shareholder services in the

state where the management company of fund *i* is located in year *t*. The remaining control variables are defined as in Table II. In addition, the first-stage regression includes investment segment and year fixed effects and standard errors that are clustered at the fund family level.

– Insert Table VII approximately here –

The results of Table VII confirm the notion of a significantly positive impact of the competition among service providers on fund families' decision to source shareholder services externally. Specifically, the coefficient on *Number of service providers in state* suggests that a one-standard deviation increase in the log number of services companies who do business in the state of the fund's management company (0.5886) increases the likelihood that the funds delegate their shareholder services to an external provider by about 8.42 (14.3112 × 0.5886) percentage points.

In the second-stage I regress funds' performance on the binary variable *Service outsourced* and include the residual from the first-stage regression (*First stage residual*) as additional independent variable.

– Insert Table VIII approximately here –

The results of the second-stage regressions show a strong and significantly positive impact of *Service outsourced* on fund performance. In particular, controlling for endogeneity, service-outsourced funds outperform their internally administered peers by 179 for funds' net-of-fee returns, 253 basis points for Khorana (1996) objective-adjusted returns, 186 basis points for the Jensen (1968) alpha, and 191 basis points for the Carhart (1997) 4-factor alpha.

Taken together, results of Table VIII provide further support to the idea that funds whose families eliminated responsibilities in a non-core area also put a focus on portfolio management. In fact, the outperformance is not only robust to the instrumental variable test but becomes even larger when controlled for endogeneity.

5. Potential Channels for the Performance Effect of Service Outsourcing

Building on the robust finding that service-outsourced funds outperform service-inhouse funds, I study potential channels through which the pronounced portfolio management focus of funds that belong to families with delegated shareholder services affects performance. Specifically, one can think of two possible mechanisms that impact on funds' performance.

First, service-outsourcing could impact on fund performance directly since it affects fund expenses. In particular, the reliance of service-outsourced funds on external service providers' comparative advantage in rendering these services could allow them to source shareholder services at lower costs which in turn lessen the strain on net-of-fee returns. Thus, the first group of measures that investigates potential channels of a relation between service outsourcing and performance consists of funds' service fees and expense ratios. Mutual funds' service fees are calculated as described in Section 2.1 using information from N-SAR while information on funds' expense ratios are from CRSP.

Second, since fund families' strategic decision to eliminate responsibilities in non-core fund activities is associated with a focus on portfolio management of its member funds, I expect to observe a positive relation between the service sourcing status and measures on superior investment skills. Specifically, the employed skill measures consists of funds' active share (Cremers and Petajisto, 2009; Petajisto, 2013), return gap (Kacperczyk et al., 2008), industry concentration (Kacperczyk et al., 2005) and the R^2 measure (Amihud and Goyenko, 2013). Thereby, active share is estimated as the deviation of funds' stock portfolio weights from the stocks' weights in the benchmark portfolio of the funds. Hence, active share detects investment skill based on funds' under- or overweighting of the benchmark portfolios' stocks (Cremers and Petajisto, 2009).[9] Return gap is calculated as the difference between the gross-of-fee return

[9] Information on funds' active share is obtained from the website of Antti Petajisto: http://www.petajisto.net/index.html.

and the hypothetical return of the recently reported holdings of the fund and captures superior investment decisions unreported to the public (Kacperczyk et al., 2008). Kacperczyk et al. (2005) show that funds with more concentrated portfolios in terms of industry diversification perform better which suggests that these funds have managers with superior investment abilities. Finally, the 1-R^2 selectivity measure from Amihud and Goyenko (2013), obtained from fund return regressions on the risk factors suggested by the Carhart (1997) 4-factor model, predicts better future fund performance since these funds seem to take more profitable idiosyncratic bets.

– Insert Table IX approximately here –

Results from Table IX show evidence clearly in favor of both channels how service outsourcing is related to the superior performance of service-outsourced funds. In particular, consistent with the first mechanism service-outsourced funds exhibit service fees that are 8 basis points lower than service fees of service-inhouse funds. To put this number into perspective it is important to note that service-inhouse funds have service fees of about 25 basis points per year. In other words, service fees of service-outsourced funds are 32 percent lower, consistent with outsourcing as an effective means to exploit potentials for cost reductions in non-core activities of mutual funds. Relatedly, the coefficient on *Service outsourced* suggests that service-outsourced funds have total expense ratios that are lower by about 12 basis points per year. This corresponds to a difference of approximately 10 percentage points in a typical fund's expense ratio. Moreover, Table IX provides support for the second hypothesized mechanism. Specifically, the main independent variable *Service outsourced* is significantly positive related to all four measures for active management. In addition, these effects are not only statistically significant but matter also from an economical point of view. For instance, service-outsourced funds exhibit values for industry concentrations and 1-R^2 that are, on average, 83 basis points and 93 basis points higher. This corresponds to a difference of about

11.81 percentage points and 10.33 percentage points, respectively, relative to a typical service-inhouse fund.

In summary, the results of this set of tests are in favor of the hypothesis that service-outsourced funds can be associated with superior investment skills. This provides further support to the idea that the service outsourcing status of funds indicates an emphasis on portfolio management.

6. Service Outsourcing and Fund Flows

Earlier results show that service outsourcing can take effect on funds' performance results in the form of a direct influence through cost reductions as well as in the form of a pursuit of superior investment strategies. Both effects are in line with the literature on industrial organization which suggests that companies should eliminate responsibilities in non-core tasks and focus on their core activities to be successful in the market (Prahalad and Hamel, 1990). Thus, in this section I quantify the benefits accruing to service-outsourced funds because of their emphasize on their core business and how this is attributable to the two channels outlined above. Moreover, I measure the degree of fund success by the ability to maximize assets under management (Khorana and Servaes, 2012; Investment Company Institute, 2015).

Specifically, I relate the service outsourcing status of mutual funds to their net-inflows using the method suggested by Sirri and Tufano (1998) and estimate *Fund flow* for each fund *i* and year *t* as:

$$Fund\ \ flow_{i,t} = \frac{TNA_{i,t} - TNA_{i,t-1} \times (1 + R_{i,t})}{TNA_{i,t-1}}, \tag{3}$$

whereby *TNA* represents the total net assets under management and *R* the total net-of-fee return of fund *i* in year *t*. Thus, *Fund flow*, denotes the percentage growth rate of fund *i* in year *t* adjusted for the fund's internal growth. The main independent variable is as before, *Service outsourced*, a binary variable that equals one if the service provider of the fund *i* is unaffiliated

to its management company in year *t* and zero otherwise. In addition, I include several characteristics that have been documented to affect funds' net-inflows. Specifically, I control for family and fund characteristics by including *Ln TNA family*, *Family focus*, *Ln TNA*, *Ln age*, and *Turnover ratio* as defined in Section 2. as well as fund flows lagged by one year since Gruber (1996) and Sirri and Tufano (1998) show a positive influence of past flows on subsequent flows. I augment the baseline specification with funds' expense ratios (*Expense ratio*) to control for the expense related heterogeneity between service-outsourced funds and service-inhouse funds that stems from their decision to source shareholder services externally or not. Lastly, I extend the regression models with controls for funds' past performance to account for service-outsourced funds ability to generate better performance outcomes. Specifically, a number of studies show a non-linear influence of past performance on net-inflows (see, e.g., Ippolito, 1992, Chevalier and Ellison, 1997, and Sirri and Tufano, 1998). Hence, I control for past performance using a quadratic performance rank of the fund (Barber et al., 2005). Alternatively, I use a piecewise linear regression approach as in Sirri and Tufano (1998), whereby I estimate three slope coefficients based on the performance rank of the fund: one coefficient for the *Bottom quintile*, one for the three *Middle quintiles*, and one for the *Top quintile* that are defined as:

$$\begin{aligned} Bottom\ quintile_{i,t-1} &= \min(0.2; PerfRank_{i,t-1}) \\ Middle\ quintiles_{i,t-1} &= \min(0.6; PerfRank_{i,t-1} - Bottom\ quintile_{i,t-1}) \\ Top\ quintile_{i,t-1} &= PerfRank_{i,t-1} - (Bottom\ quintile_{i,t-1} + Middle\ quintiles_{i,t-1}), \end{aligned} \tag{4}$$

whereby the performance rank, *PerfRank*, of fund *i* in year *t-1* is based on its performance relative to all other funds within the same investment segment and year. Furthermore, I run pooled OLS regressions with time and segment fixed effects and cluster standard errors at the fund family level.

– Insert Table X approximately here –

The results of Table X clearly show that service outsourced funds grow at considerably higher rates than their inhouse administered peers. The coefficient for *Service outsourced* suggests that service-outsourced funds exhibit annual growth rates that are about 16 percentage points larger than their service-inhouse peers. Still, once the hetergogeneity in expenses is controlled for the total benefit for service-outsourced funds is reduced to about 13 percentage points per year. Moving to the model specifications that account for a performance difference between service-outsourced funds and service-inhouse funds the loading on *Service outsourced* becomes statistically insignificant. This result is robust, independent of the employed performance control (the quadratic performance rank in column 3 or the piecewise linear regression approach in column 4). The relation between the remaining control variables and mutual funds' net-inflows are in line with the findings of previous studies (see, e.g., Gruber, 1996, Chevalier and Ellison, 1997, Sirri and Tufano, 1998, Bergstresser and Poterba, 2002, and Del Guercio and Tkac, 2002).

Taken together, the results from Table X show that funds with delegated shareholder services are also equipped with a substantial comparative advantage that materializes in the form of considerable higher growth rates. Moreover, the results indicate that the benefits to service-outsourced funds are largely driven by their superior performance generating ability, consistent with evidence from the literature that investors reward fund performance.

7. Conclusion

Mutual fund families strategically shape their member funds' behavior to match targeted positions in the fund industry. Accordingly, the supply side of professional asset management is not homogeneous but segmented through families' decisions to attract investors that vary by their performance and service preferences. In this paper, I argue that funds of families which delegate the execution of non-portfolio management services to external specialists are more

concerned with portfolio management. This view is supported by theories from the literature on industrial organization that firms with a focus on their core competencies reduce resource consumption in non-core areas.

In particular, I document that service-outsourced funds outperform service-inhouse funds after controlling for other factors that could impact on performance. Extending this finding I observe that the sourcing status of funds' shareholder service is negatively related to fund expenses and positively related to measures associated with superior investment abilities. In particular, from the latter observation I conclude that funds with varying emphasis on portfolio management can be classified by the outsourcing status in their non-core responsibilities.

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Table I. Sample characteristics by service outsourcing status

This table reports descriptive statistics for the total sample (Total) and both funds that delegate their shareholder services to unaffiliated service providers (Outsourced) and funds that administer shareholder services internally (Inhouse). Fund family characteristics are reported for fund families that entirely consist of service-outsourced funds and those with no or partially service-outsourced funds. All other characteristics are reported at the fund level. Number of families, represents the number of families within each group. Family size, is the total net assets under management of the fund family in million USD. Number of funds in family, represents the number of funds within a fund family. Family focus, represents the concentration of a fund family across investment segments defined as in Siggelkow (2003). Number of funds, is the number of total funds and both the number of service-outsourced and service-inhouse funds. Fund size, represents the fund's total net assets under management in million USD. Fund age, is the fund's age in years. Service fee, represents the costs spent on shareholder servicing relative to total net assets under management. Expense ratio, is the fund's fees charged for total services. Turnover ratio, is the fund's yearly turnover. Family focus, Service fee, Expense ratio and Turnover ratio, are reported in percentage points. The last column of the table reports the difference in fund family and fund statistics between the outsourced and inhouse group. ***, **, * denote statistical significance for the difference in means between both groups at the 1%, 5%, and 10% significance level, respectively.

	Total	Outsourced	Inhouse	Difference
Family characteristics:				
Fraction of service outsourced (%)		100.00	1.85	
Number of families	697	579	177	
Family size (in million USD)	4,014.43	1,302.67	12,098.94	-10,796.27 ***
Number of funds in family	3.91	2.59	7.84	-5.24 ***
Family focus (%)	75.04	80.35	59.21	21.14 ***
Fund characteristics:				
Number of funds	2,740	1,562	1,522	
Fund size (in million USD)	1,015.30	493.98	1,537.49	-1,043.52 ***
Fund age (years)	8.13	7.09	9.34	-2.26 ***
Service fee (%)	0.21	0.16	0.25	-0.09 ***
Expense ratio (%)	1.31	1.33	1.29	0.05 ***
Turnover ratio (%)	104.64	98.39	110.90	-12.51 ***

Table II. Service outsourcing and fund performance

This table presents results from pooled OLS regressions that analyze the impact of service outsourcing on mutual fund performance using four different performance measures: Fund return (Return), Khorana (1996) objective-adjusted return (OAR), Jensen (1968) alpha (Jensen), and Carhart (1997) 4-factor alpha (Carhart). Alpha estimations are based on 12-month window regressions of funds' net-of-fee excess returns on the market excess return and, as required, the long-short portfolio returns of the benchmark mimicking portfolios. The main independent variable is Service outsourced, a binary variable that equals one if all service providers of the fund are unaffiliated to the fund's management company and zero otherwise. Additional independent controls include Ln TNA family, Family focus, Ln TNA, Ln age, Expense ratio, and Turnover ratio. Ln TNA family, is the logarithm of the fund family's total net assets under management. Family focus, represents the concentration of a fund family across investment segments defined as in Siggelkow (2003). Ln TNA, represents the logarithm of the fund's total net assets under management. Ln TNA family, Family focus, Ln TNA are all lagged by one year. Ln age, is the logarithm of the fund's age in years. Expense ratio, represents the fund's total expense ratio. Turnover ratio is the fund's yearly turnover ratio. Regressions are run with year and segment fixed effects. P-values reported in parentheses are based on robust standard errors clustered at the fund family level. ***, **, * denote statistical significance at the 1%, 5%, and 10% significance level, respectively.

Dependent variable:	Return		OAR		Jensen		Carhart	
Service outsourced	0.0070	***	0.0073	***	0.0062	**	0.0039	*
	(0.0060)		(0.0075)		(0.0114)		(0.0900)	
Ln TNA family	0.0044	***	0.0047	***	0.0034	***	0.0023	***
	(0.0000)		(0.0000)		(0.0000)		(0.0001)	
Family focus	0.0153	***	0.0150	**	0.0137	**	0.0088	*
	(0.0052)		(0.0132)		(0.0112)		(0.0617)	
Ln TNA	-0.0079	***	-0.0076	***	-0.0050	***	-0.0024	***
	(0.0000)		(0.0000)		(0.0000)		(0.0002)	
Ln age	0.0109	***	0.0090	***	0.0051	***	-0.0017	
	(0.0000)		(0.0000)		(0.0008)		(0.1895)	
Expense ratio	-1.1998	***	-0.7903	***	-1.0074	***	-0.9708	***
	(0.0000)		(0.0056)		(0.0001)		(0.0002)	
Turnover ratio	-0.0021	**	-0.0009		-0.0015	**	-0.0015	
	(0.0171)		(0.3880)		(0.0165)		(0.1478)	
Segment fixed effects	Yes		No		Yes		Yes	
Year fixed effects	Yes		Yes		Yes		Yes	
Number of Observations	19,871		19,871		19,871		19,871	
Adj.-R^2	0.7250		0.0051		0.1508		0.1049	

Table III. Service outsourcing and alternative measures for a portfolio management focus

This table presents results from pooled OLS regressions that analyze the impact of service outsourcing on mutual fund performance using four different performance measures: Fund return (Return), Khorana (1996) objective-adjusted return (OAR), Jensen (1968) alpha (Jensen), and Carhart (1997) 4-factor alpha (Carhart). Alpha estimations are based on 12-month window regressions of funds' net-of-fee excess returns on the market excess return and, as required, the long-short portfolio returns of the benchmark mimicking portfolios. The sample is restricted to the observations that belong to funds that are marketed either directly to investors or brokered through financial advisors. I classify a fund as belonging to the direct (indirect) distribution channel based on classification provided by Thomson Reuters Lipper. The main independent variable is Service outsourced, a binary variable that equals one if all service providers of the fund are unaffiliated to the fund's management company and zero otherwise. Additional independent controls include: Direct channel and Advisor outsourced. Direct channel, a binary variable that equals one if the fund is marketed directly to fund investors and zero otherwise. Advisor outsourced, a binary variable that equals one if the fund has at least one sub-advisor and zero otherwise similar to Chen et al. (2013). Other independent variables and fixed effects are defined as in Table II. P-values reported in parentheses are based on robust standard errors clustered at the fund family level. ***, **, * denote statistical significance at the 1%, 5%, and 10% significance level, respectively.

Dependent variable:	Return		OAR		Jensen		Carhart	
Service outsourced	0.0102	***	0.0093	***	0.0080	***	0.0045	*
	(0.0015)		(0.0067)		(0.0083)		(0.0929)	
Direct channel	0.0028		0.0056	*	0.0020		-0.0002	
	(0.3642)		(0.0828)		(0.4981)		(0.9473)	
Advisor outsourced	-0.0050		-0.0062	**	-0.0055	**	-0.0025	
	(0.1128)		(0.0426)		(0.0491)		(0.3199)	
Ln TNA family	0.0044	***	0.0044	***	0.0034	***	0.0025	***
	(0.0000)		(0.0000)		(0.0002)		(0.0018)	
Family focus	0.0097		0.0095		0.0070		0.0048	
	(0.1929)		(0.2155)		(0.3352)		(0.4583)	
Ln TNA	-0.0087	***	-0.0080	***	-0.0057	***	-0.0029	***
	(0.0000)		(0.0000)		(0.0000)		(0.0008)	
Ln age	0.0112	***	0.0088	***	0.0047	**	-0.0019	
	(0.0000)		(0.0001)		(0.0162)		(0.2643)	
Expense ratio	-1.1485	***	-0.6765		-1.2646	***	-1.3374	***
	(0.0068)		(0.1012)		(0.0023)		(0.0008)	
Turnover ratio	-0.0025	**	-0.0020	**	-0.0020	***	-0.0016	
	(0.0106)		(0.0223)		(0.0009)		(0.1571)	
Segment fixed effects	Yes		No		Yes		Yes	
Year fixed effects	Yes		Yes		Yes		Yes	
Number of Observations	12,879		12,879		12,879		12,879	
Adj.-R^2	0.7193		0.0070		0.1454		0.0964	

Table IV. Service outsourcing and fund performance with family fixed effects.

This table presents results from pooled OLS regressions that analyze the impact of service outsourcing on mutual fund performance using four different performance measures: Fund return (Return), Khorana (1996) objective-adjusted return (OAR), Jensen (1968) alpha (Jensen), and Carhart (1997) 4-factor alpha (Carhart). Alpha estimations are based on 12-month window regressions of funds' net-of-fee excess returns on the market excess return and, as required, the long-short portfolio returns of the benchmark mimicking portfolios. The main independent variable is Service outsourced, a binary variable that equals one if all service providers of the fund are unaffiliated to the fund's management company and zero otherwise. In addition, regressions are run with family fixed effects to control for any unobservable heterogeneity across families. Other independent variables and fixed effects are defined as in Table II. P-values reported in parentheses are based on robust standard errors clustered at the fund family level. ***, **, * denote statistical significance at the 1%, 5%, and 10% significance level, respectively.

Dependent variable:	Return	OAR	Jensen	Carhart
Service outsourced	0.0214 **	0.0165 *	0.0132 *	0.0090 *
	(0.0182)	(0.0510)	(0.0803)	(0.0650)
Ln TNA family	-0.0162 ***	-0.0175 ***	-0.0115 ***	-0.0064 ***
	(0.0000)	(0.0000)	(0.0000)	(0.0002)
Family focus	0.0060	0.0073	-0.0026	-0.0045
	(0.6151)	(0.6085)	(0.8274)	(0.6738)
Ln TNA	-0.0104 ***	-0.0100 ***	-0.0072 ***	-0.0036 ***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Ln age	0.0166 ***	0.0140 ***	0.0088 ***	0.0006
	(0.0000)	(0.0000)	(0.0000)	(0.6863)
Expense ratio	-0.4107	-0.2844	-0.8183 **	-0.5071
	(0.2640)	(0.4985)	(0.0312)	(0.1318)
Turnover ratio	-0.0015 *	-0.0006	-0.0006	0.0002
	(0.0685)	(0.6544)	(0.4695)	(0.8119)
Family fixed effects	Yes	Yes	Yes	Yes
Segment fixed effects	Yes	No	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Number of Observations	19,871	19,871	19,871	19,871
Adj.-R^2	0.7345	0.0287	0.1731	0.1289

Table V. Matched sample analysis

This table presents results from a matched sample analysis where each service-outsourced fund is matched with an equally weighted portfolio of service-inhouse funds using the following matching criteria: Year, Segment, Ln TNA family, Family focus, Ln TNA, Ln age, Expense ratio and Fund turnover. In the first row, service-outsourced funds are matched to all service-inhouse funds that belong to the same segment and the same LN TNA family decile in a certain year. In rows two through six the decile ranking based on Family focus, Ln TNA, Ln age, Expense ratio and Turnover ratio are used as additional matching criterion. Then performances differences between service-outsourced funds and the corresponding inhouse matching portfolio are tested for the performance measures Fund return (Return), Jensen (1968) alpha (Jensen), and Carhart (1997) 4-factor alpha (Carhart). ***, **, * denote statistical significance at the 1%, 5%, and 10% significance level, respectively.

		Dependent variable:		
Matching characteristics	Observations	Return	Jensen	Carhart
Year, Segment, and Ln TNA family	9,951	0.0114 ***	0.0101 ***	0.0073 ***
		(0.0000)	(0.0000)	(0.0000)
Year, Segment, Ln TNA family, and Family focus	5,173	0.0097 ***	0.0085 ***	0.0069 ***
		(0.0000)	(0.0000)	(0.0001)
Year, Segment, Ln TNA family, and Ln TNA	6,665	0.0101 ***	0.0089 ***	0.0074 ***
		(0.0000)	(0.0000)	(0.0000)
Year, Segment, Ln TNA family, and Ln age	5,827	0.0057 ***	0.0050 ***	0.0031 *
		(0.0002)	(0.0048)	(0.0717)
Year, Segment, Ln TNA family, and Expense ratio	5,772	0.0090 ***	0.0086 ***	0.0044 ***
		(0.0000)	(0.0000)	(0.0000)
Year, Segment, Ln TNA family, and Turnover ratio	5,462	0.0089 ***	0.0093 ***	0.0082 ***
		(0.0000)	(0.0000)	(0.0000)

Table VI. Permutation test for the impact of funds' shareholder service outsourcing status on performance

This table presents results from a permutation test that investigates the impact of service outsourcing on mutual fund performance using four different performance measures: Fund return (Return), Khorana (1996) objective-adjusted return (OAR), Jensen (1968) alpha (Jensen), and Carhart (1997) 4-factor alpha (Carhart). Alpha estimations are based on 12-month window regressions of funds' net-of-fee excess returns on the market excess return and, as required, the long-short portfolio returns of the benchmark mimicking portfolios. In particular, the outsourcing status of shareholder services is randomly assigned to funds and the performance difference measured between service-outsourced funds and service-inhouse funds. This process is repeated 10,000 times. In Panel A, I report the regression results of the permutation tests and Panel B shows the distributions of the performance differentials. The main independent variable in both panels is Service outsourced, a binary variable that equals one if all service providers of the fund are unaffiliated to the fund's management company and zero otherwise. Other independent variables and fixed effects are defined as in Table II and not reported for brevity. P-values reported in parentheses represent the fraction of permutations that show an effect that is at least as strong as the performance difference observed in Table II. ***, **, * denote statistical significance at the 1%, 5%, and 10% significance level, respectively.

Panel A: Regression results

Dependent variable:	Return	OAR	Jensen	Carhart
Service outsourced	0.0070 ***	0.0073 ***	0.0062 ***	0.0039 ***
	(0.0000)	(0.0001)	(0.0002)	(0.0099)
Fund and family controls	Yes	Yes	Yes	Yes
Segment fixed effects	Yes	No	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Number of Observations	19,871	19,871	19,871	19,871
Permutations	10,000	10,000	10,000	10,000

Panel B: Distribution of performance differentials

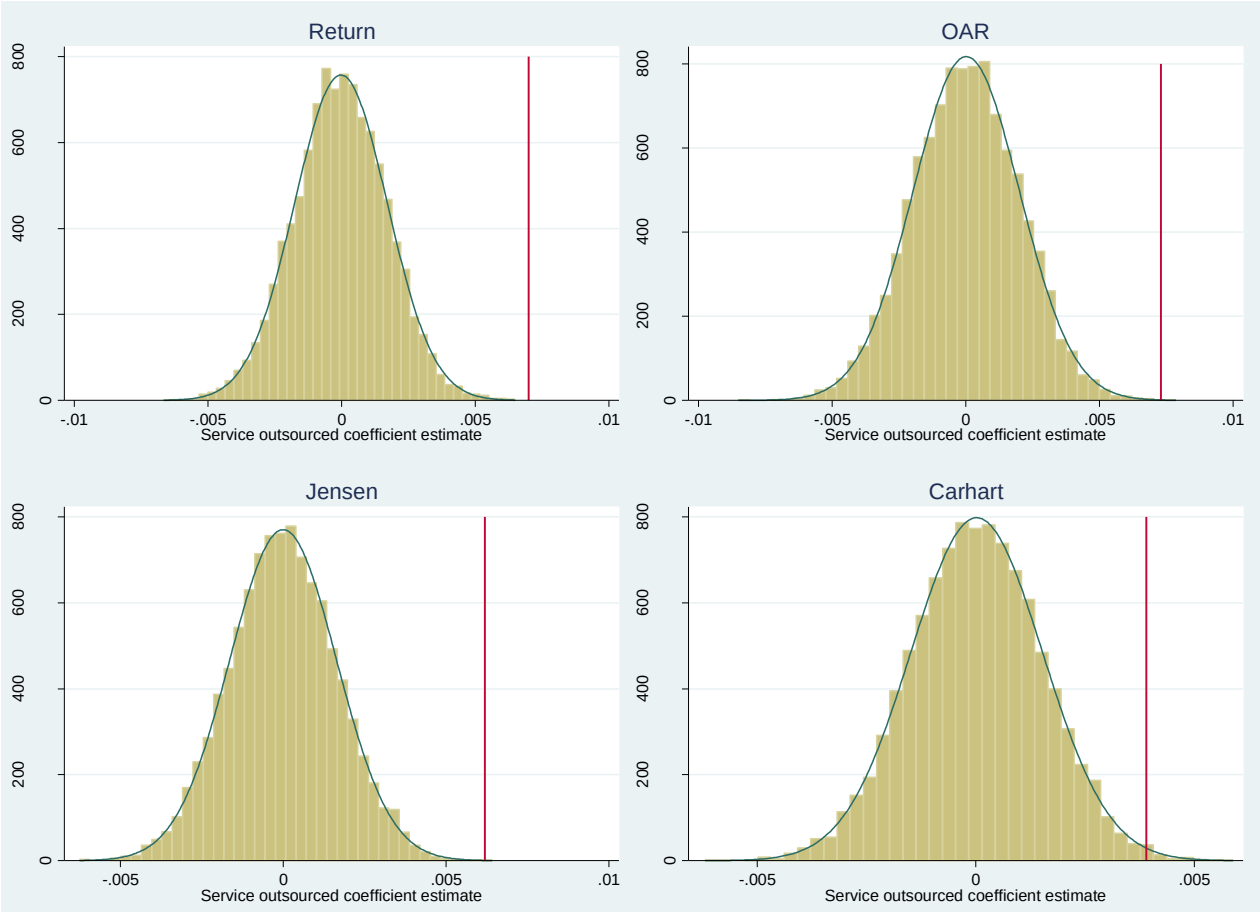

Table VII. First stage of 2SRI – The impact of the number of service providing companies located in the state of the fund's management company on outsourcing

This table presents results from the logit fist-stage regression of the 2SRI estimation of the effect of service outsourcing on performance. The first-stage regression measures the effect of the competitive environment among service providing companies on whether the mutual fund sourced shareholder services externally. The dependent variable is the binary variable Service outsourced that equals one if all service providers of the fund are unaffiliated to the fund's management company and zero otherwise. The main independent variable is Number service providers in state, which represents the number of service companies that provide external shareholder services in the state that the fund's management company is located. Other independent variables and fixed effects are defined as in Table II. P-values reported in parentheses are based on robust standard errors clustered at the fund family level. Average marginal effects in percentages are shown in square brackets. ***, **, * denote statistical significance at the 1%, 5%, and 10% significance level, respectively.

Dependent variable:	Service outsourced	
Number service providers in state	0.5804	***
	(0.0070)	
	[14.3112]	
Ln TNA family	-0.6578	***
	(0.0000)	
	[-16.2192]	
Family focus	1.4289	**
	(0.0106)	
	[35.2311]	
Ln TNA	0.0925	*
	(0.0772)	
	[2.281]	
Ln age	-0.3563	***
	(0.0004)	
	[-8.7849]	
Expense ratio	-67.1623	***
	(0.0050)	
	[-16.5602]	
Turnover ratio	-0.1014	*
	(0.0854)	
	[-2.500]	
Segment fixed effects	Yes	
Year fixed effects	Yes	
Number of Observations	18,302	
Pseudo-R^2	0.3050	

Table VIII. Second stage of 2SRI – The impact of service outsourcing on fund performance

This table presents results from the second-stage regression of the 2SRI estimation of the effect of service outsourcing on performance. The main independent variable is Service outsourced, a binary variable that equals one if all service providers of the fund are unaffiliated to the fund's management company and zero otherwise. Additional independent controls include: First stage residual, the residual from the first stage logit regression of the 2SRI estimation from Table VI. Other independent variables and fixed effects are defined as in Table II. P-values reported in parentheses are based on robust standard errors clustered at the fund family level. ***, **, * denote statistical significance at the 1%, 5%, and 10% significance level, respectively.

Dependent variable:	Return	OAR	Jensen	Carhart
Service outsourced	0.0179 *	0.0253 **	0.0186 *	0.0191 **
	(0.0934)	(0.0291)	(0.0687)	(0.0368)
First stage residual	-0.0116	-0.0188	-0.0134	-0.0158 *
	(0.2896)	(0.1176)	(0.2026)	(0.0939)
Ln TNA family	0.0056 ***	0.0065 ***	0.0046 ***	0.0040 ***
	(0.0000)	(0.0000)	(0.0002)	(0.0006)
Family focus	0.0146 ***	0.0131 **	0.0120 **	0.0065
	(0.0059)	(0.0193)	(0.0141)	(0.1404)
Ln TNA	-0.0082 ***	-0.0081 ***	-0.0051 ***	-0.0026 ***
	(0.0000)	(0.0000)	(0.0000)	(0.0002)
Ln age	0.0118 ***	0.0104 ***	0.0057 ***	-0.0009
	(0.0000)	(0.0000)	(0.0002)	(0.4779)
Expense ratio	-0.9533 ***	-0.4832	-0.7786 ***	-0.8468 ***
	(0.0018)	(0.1362)	(0.0081)	(0.0013)
Turnover ratio	-0.0020 ***	-0.0008	-0.0013 *	-0.0012 *
	(0.0048)	(0.4403)	(0.0692)	(0.1000)
Segment fixed effects	Yes	No	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Number of Observations	18,302	18,302	18,302	18,302
Adj.-R^2	0.7283	0.0051	0.1471	0.1025

Table IX. Mechanisms for performance impact of service outsourcing

This table presents results from pooled OLS regressions that analyze the impact of service outsourcing on fund expenses and measures of active management. The group of measures on fund expenses includes Service fee and Expense ratio. Service fee, resents the costs spent on shareholder servicing relative to total net assets under management. Expense ratio, represents the fund's total expense ratio. The group of measures on active management include: Active share, Return Gap, Industry concentration, and 1- R^2. Active share, measures the difference between the stock's portfolio weights in the fund and the portfolio weights of the stocks in the fund's benchmark portfolio. Return gap, is the difference between the actual gross-of-fee fund return and the hypothetical return of the recently reported fund holdings as in Kacperczyk et al. (2008). Industry concentration, is the concentration of funds' stock positions across industries as in Kacperczyk et al. (2005). 1- R^2, is the selectivity measure of Amihud and Goyenko (2013) that is obtained from 12-month window regressions of funds' net-of-fee excess returns on the excess market return and the SMB, HML, and MOM (momentum) factors as in the Carhart (1997) 4-factor model. The main independent variable is Service outsourced, a binary variable that equals one if all service providers of the fund are unaffiliated to the fund's management company and zero otherwise. Other independent variables, added as needed, and fixed effects are defined as in Table II. P-values reported in parentheses are based on robust standard errors clustered at the fund family level. ***, **, * denote statistical significance at the 1%, 5%, and 10% significance level, respectively.

Dependent variable:	Service fee	Expense Ratio	Active share	Return Gap	Industry concentration	1-R2
Service outsourced	-0.0008 ***	-0.0012 ***	0.0378 ***	0.0002 *	0.0083 ***	0.0093 **
	(0.0000)	(0.0010)	(0.0000)	(0.0808)	(0.0023)	(0.0122)
Ln TNA family	0.0001	-0.0003 ***	-0.0005	0.0002 ***	0.0000	-0.0007
	(0.1917)	(0.0008)	(0.8199)	(0.0002)	(0.9721)	(0.4608)
Family focus	0.0000	0.0012 *	0.0974 ***	-0.0003	0.0213 ***	0.0270 ***
	(0.9004)	(0.0875)	(0.0000)	(0.2155)	(0.0015)	(0.0022)
Ln TNA	-0.0001 **	-0.0005 ***	-0.0070 ***	-0.0001 **	0.0004	-0.0032 ***
	(0.0408)	(0.0000)	(0.0027)	(0.0190)	(0.5872)	(0.0013)
Ln age	0.0002 ***	-0.0001	0.0160 ***	-0.0001	0.0035 **	0.0088 ***
	(0.0023)	(0.6756)	(0.0008)	(0.4325)	(0.0461)	(0.0002)
Expense ratio			8.2636 ***	-0.0052	1.7183 ***	1.7870 ***
			(0.0000)	(0.7478)	(0.0000)	(0.0016)
Turnover ratio	0.0000	0.0001	-0.0051	0.0000	0.0029 ***	0.0003
	(0.5616)	(0.1982)	(0.4756)	(0.6975)	(0.0023)	(0.7360)
Segment fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Number of Observations	19,562	19,562	12,797	15,606	16,758	19,871
Adj.-R^2	0.0650	0.2232	0.3789	0.0264	0.7040	0.3742

Table X. Service outsourcing and fund flows

This table presents results from pooled OLS regressions that analyze the impact of service outsourcing on fund flows. Fund flows are estimated as the fund's percentage growth rate adjusted for the internal growth of the fund as in Sirri and Tufano (1998). The main independent variable is Service outsourced, a binary variable that equals one if all service providers of the fund are unaffiliated to the fund's management company and zero otherwise. Additional independent controls include Ln TNA family, Family focus, Ln TNA, Ln age, Turnover ratio, Fund flow, Sigma fund flow, and Sigma fund return. Ln TNA family, is the logarithm of the fund family's total net assets under management. Family focus, represents the concentration of a fund family across investment segments defined as in Siggelkow (2003). Ln TNA, represents the logarithm of the fund's total net assets under management. Ln TNA family, Family focus, Ln TNA are all lagged by one year. Ln age, is the logarithm of the fund's age in years. Turnover ratio is the fund's yearly turnover ratio. Fund flow, is the net-inflow of the fund lagged by one year. Sigma fund flow, represents the standard deviation of the fund's monthly flows during the previous year. Sigma fund return, is the standard deviation of the fund's monthly net-of-fee returns during the previous year. Furthermore, I include Expense ratio, the fund's total expense ratio (model 2). To account for the non-linear influence of fund performance on net-inflows I include PerfRank and PerfRank2 representing the performance rank and squared performance rank of the fund in the previous year (model 3). Alternatively, model 4 reports results using a piecewise linear regression approach as in Sirri and Tufano (1998). Regressions are run with year and segment fixed effects. P-values reported in parentheses are based on standard errors clustered by fund family. ***, **, * denote statistical significance at the 1%, 5%, and 10% significance level, respectively.

Dependent variable:	Fund flow in t			
Model:	1	2	3	4
Service outsourced	0.1594 **	0.1286 **	0.0992	0.1004
	(0.0296)	(0.0483)	(0.1166)	(0.1133)
Expense ratio		-24.2708 **	-25.4126 **	-25.5861 **
		(0.0139)	(0.0127)	(0.0126)
PerfRank			-1.6220 ***	
			(0.0045)	
PerfRank²			2.5360 ***	
			(0.0001)	
Bottom quintile				-0.1361
				(0.7933)
Middle quintiles				0.3313 ***
				(0.0001)
Top quintile				6.2392 ***
				(0.0001)
Ln TNA family	0.1961 ***	0.1880 ***	0.1867 ***	0.1867 ***
	(0.0005)	(0.0007)	(0.0007)	(0.0008)
Family focus	0.4223 ***	0.4545 ***	0.3661 ***	0.3663 ***
	(0.0002)	(0.0001)	(0.0008)	(0.0008)
Ln TNA	-0.3241 ***	-0.3374 ***	-0.3496 ***	-0.3511 ***
	(0.0002)	(0.0002)	(0.0001)	(0.0001)
Ln age	-0.0521	-0.0560	-0.0385	-0.0337
	(0.3635)	(0.3209)	(0.4996)	(0.5601)
Turnover ratio	0.0419 *	0.0457 **	0.0428 *	0.0417
	(0.0908)	(0.0479)	(0.0933)	(0.1107)
Fund flow	0.0012 **	0.0013 **	0.0008 *	0.0008 **
	(0.0219)	(0.0152)	(0.0522)	(0.0297)
Sigma fund flow	-0.0014	-0.0021	-0.0014	-0.0013
	(0.3241)	(0.1409)	(0.2893)	(0.3130)
Sigma fund return	-0.6630	-0.4040	-0.1987	-0.3667
	(0.1594)	(0.4128)	(0.6921)	(0.4739)
Segment fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Number of Observations	18,063	18,063	18,063	18,063
Adj.-R^2	0.0196	0.0202	0.0289	0.0305

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2007

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2006

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2005

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2004

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