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Management sub-advising in the mutual fund industry*

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Abstract

This is a study of how contractual mechanisms can mitigate agency conflicts in sub-advised mutual funds. Sub-advising contracts allow fund families to expand their product offerings to include new investment styles and thereby gain market share. We show that costly contractual arrangements, such as co-branding, multi-advising, and performance-based compensation, can mitigate agency conflicts in outsourcing and protect investors from potential underperformance. Fund families will find it cost-effective to implement such incentive mechanisms only when investors are sophisticated in assessing manager skill. The findings help to explain why a large percentage of fund families outsource their funds to advisory firms.

JEL classification: G11, G20, L24, M55
Keywords: Outsourcing, Sub-Advisor, Mutual Funds, Management Company, Incentive Contracts, Fund Performance, Market Share, Agency Issue.

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1. Introduction

A highly competitive asset management industry and the drive to gain market share have made sub-advising portfolio management a valuable choice for asset managers. The number of outsourced mutual funds has grown considerably in the last decade. According to the Investment Company Institute, by 2009, nearly 40% of US mutual funds used at least one sub-advisor (affiliated or unaffiliated with the fund family) to manage portfolios, compared to 25% in 1999. By 2011, the value of sub-advised funds was about $1.7 trillion.[1]

One benefit of external advising (sub-advising) is access to talent that is not available in-house. Yet sub-advisors generally manage funds for clients besides their own funds. This can present conflicts of interest, resulting in agency costs and lower returns. Research shows that management companies tend to favor their own mutual funds over sub-advised funds through preferential treatment in initial public offering (IPO) allocations and abnormal cross-trading activities (Chen et al., 2013; and Chuprinin, Massa, and Schumacher, 2015). Why then the significant growth of outsourcing contracts, and what is the principal benefit?

Our study of the growth of sub-advising shows that outsourcing helps fund families gain market share in an increasingly competitive industry. We explore different contractual mechanisms that might mitigate the agency conflicts inherent in outsourcing portfolio management. We find that mechanisms for co-branding, multi-advising, and performance-based compensation help to overcome the lower returns of sub-advised portfolios.

Interestingly, we observe that asset managers do not find it cost-effective to implement these mechanisms in funds whose clients are relatively uninformed or naïve in assessing a sub-advisor's contribution to returns. We argue that fund families use these costly contractual arrangements to protect their more sophisticated clients from the potential underperformance of funds whose management is outsourced. In this regard, outsourcing can lead to high-

[1] See http://www.frcnet.com/documents/sub-advisory-mutual-fund-assets-to-reach-2%202-trillion-by-2016.pdf for detailed information.

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quality managed portfolios, allow asset management firms to offer new investment styles, and help firms gain added market share.

In this paper, we assess the primary benefits of delegating portfolio management responsibilities to unaffiliated managers and explain why the practice has become so popular in recent decades. Our main result shows that underperformance is not intrinsic in sub-advised funds. Sub-advisors can deliver performance that is as good as the performance of internally managed funds, if specific types of arrangements (co-branding, multi-advising, or performance fees) are used to protect against conflicts of interest in the sub-advisory firm.

The first contractual arrangement we examine is co-branding. Under a co-branding arrangement, the fund family partners with a sub-advisor to capitalize on the sub-advisor's reputation (by including the name of the sub-advisor in the fund name). The motivation is to attract new investors and align incentives.[2] This should mitigate conflicts of interest, as the sub-advisor cares about its reputation as well as management and compensation. The contract design literature indicates that firm reputation and brand name provide incentives to assure contract performance and protect against adverse selection (e.g., Marshall, 1949; and Klein and Leffler, 1981). Co-branding relies upon the value of repeat sales to satisfied customers as a way to prevent underperformance.

The second mechanism is multi-advising. This is an agreement between the fund family and more than one sub-advisor.[3] We expect multi-advisory agreements to address management conflicts of interest for two reasons.

First, the Securities and Exchange Commission (SEC) exempts multi-advising funds from the requirement to gain shareholder approval to terminate sub-advisory contracts.[4] This exemption makes it easier to terminate contracts for poor performance and prompts greater competition among sub-advisors. Our evidence is consistent with Chevalier and Ellison

[2] For instance, the Metropolitan Series Fund (advisor) outsourced one of its funds to BlackRock (sub-advisor) under the name BlackRock Aggressive Growth. More recently, Metropolitan Series Fund approved a change of sub-advisor to Frontier Capital Management, and the name of the portfolio became Frontier Mid Cap Growth.

[3] For instance, JP Morgan Multi Manager Small Cap Growth Fund is externally co-managed by BlackRock Capital Management, ClariVest, UBS Global Asset Management, and Oberweis Asset Management.

[4] See SEC Release N.s. 33-8312, 34-48683, IC-26230, available at http://www.sec.gov/rules.shtml.

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(1997, 1999) and Kempf, Ruenzi, and Thiele (2009), who claim that the risk of job loss is an important determinant of managerial behavior.[5]

Second, we argue that because multi-advising contracts involve compensation that is shared by all sub-advisors subject to the contract, external managers will monitor each other. This is consistent with the literature on contractual theory that profit sharing generates mutual monitoring and peer pressure that positively affect firm productivity (Kandel and Lazear, 1992; and Kruse, Freeman, and Blasi, 2010).

The third contractual arrangement is performance-based fee compensation. There is an extensive literature analyzing performance-based contracts to solve problems of moral hazard or adverse selection (e.g., Holmstrom, 1979; or Shavell, 1979). In the mutual fund industry, performance fee compensation has been proposed to eliminate conflicts of interest between the portfolio manager and mutual fund investors.[6]

Starks (1987) claims that symmetric contracts are better than bonus contracts in motivating manager performance, while Stoughton (1993) and Li and Tiwari (2009), among others, point out that symmetric could not be the optimal structure in some cases. Ou-Yang (2003) analyzes the relationship between an investor and a professional portfolio manager in a continuous-time principal-agent framework and finds that optimal contracts are of a symmetric form. Elton, Gruber, and Blake (2003) find evidence that US mutual funds with explicit incentive fees outperform similar funds without explicit incentive fees. More recently, Kyle, Ou-Yang, and Wei (2011), in a model that endogenizes information acquisition, conclude that linear contracts could induce managers to apply more effort to information acquisition. We hypothesize that linking management compensation to performance will align managerial incentives, solving agency issues and positively affecting fund performance.

We first show that the various contractual arrangements reduce the underperformance of sub-advised funds by mitigating potential conflicts of interest and aligning incentives for

[5] This self-enforcement mechanism that assures performance by threatening termination of a relationship has also been examined by Klein and Leffler (1981), among others.

[6] Legally, if a mutual fund decides to charge an incentive fee, it must use a type of fee known as a "fulcrum fee," which constitutes a symmetric contract in which manager compensation relates investment performance to some benchmark. For example, the International Equity Fund of Accessor Capital Management compensates the sub-advisor Pictet Asset Management by a combination of a fixed rate and a floating rate based on its performance under a fulcrum fee arrangement.

advisor and sub-advisor. Specifically, risk-adjusted returns increase by up to 1.6% per year for outsourced equity funds with potential conflicts of interest that operate under a co-branding model. Multi-advisory outsourcing contracts improve fund performance by 0.98% per year. Similarly, sub-advised funds with performance-based fees enjoy improved performance by about 0.82% per year. In general, the use of contractual mechanisms is associated with an increase in risk-adjusted returns of 0.95% per year. This clearly offsets the evidence that, in general, sub-advised funds underperform in-house managed funds by 0.58% per year.

Next, we examine how asset management companies can profit from sub-advising. Authors show that price competition and product differentiation are both effective strategies to increase fund family market share. Khorana and Servaes (2012) argue that families that offer a wider range of products and more differentiated funds than the competition have greater market share. Massa (2003) notes that fund families use fund proliferation to increase market coverage and limit competition, given the free-switching options they offer investors. According to Siggelkow (2003), focusing on a few investment objectives allows management companies to manage funds more effectively and to improve fund performance, but such a focused strategy can reduce cash inflows, thus affecting profitability. Gallaher, Kaniel, and Starks (2006) observe that the more investment strategies a mutual fund family offers, the greater its flow of funds.

We argue that outsourcing allows management companies to focus and produce in-house according to their expertise, while outsourcing activities in which they lack in-house experience. Our results show that fund families that engage in sub-advising practices are able to increase their market share, especially when they lack a well-diversified internal management structure and can gain access to funds in new investment styles.

Lastly, we explore fund family decisions about when to manage which funds under various contractual mechanisms (co-branding, multi-advising, and performance-based fees). We draw on contract theory to argue that undertaking contracts is costly, so management companies will find it cost-effective to consider these arrangements only when poor performance can lead to fund outflows. Balakrishnan and Wernerfelt (1986) show that the more clauses in a contract, the more expensive it is to write the arrangement; Williamson

(1991) also observes that the more complex a contract is, the more expensive it becomes to manage the relationship.

Previous research (Sirri and Tufano, 1998; and Ferreira et al., 2012) has shown that many investors are uninformed and not able to assess a portfolio manager's contribution to returns. The moderate use of these contractual mechanisms is consistent with the fact that contracts are costly, and thus fund families use them only to attract or retain sophisticated investors. We find that fund families tend to use contractual mechanisms for portfolios sold through direct channels to more informed investors: those that do not chase winners and run away from losers.

Our work contributes to several strands of the literature. First, we apply the literature on principal-agent relationships to outsourcing in the mutual fund industry.[7] Second, we contribute to recent literature on the decisions made by mutual fund families and the consequences of these decisions for investors, including decisions on fund family structure and strategy (Nanda, Wang, and Zheng, 2004); whether to merge or liquidate funds (Khorana, Tufano, and Lei, 2007); and the role of governance structure on mutual fund performance (Ding and Wermers, 2009). More specifically, we complement the outsourcing literature in Cashman and Deli (2009), Kuhnen (2009), Del Guercio, Reuter, and Tkac (2010), Duong (2010), Chen et al. (2013), Del Guercio and Reuter (2014), and Chuprinin, Massa, and Schumacher (2015) and provide empirical evidence for the use of contract design to mitigate some of the issues in an outsourcing model. Finally, we contribute to literature on fund families (Gaspar, Massa, and Matos, 2006; or Elton, Gruber, and Green, 2007) by showing how these firms tailor outsourcing agreements according to potential types of investor to gain market share.

The paper is organized as follows. Section 2 describes our data and shows some preliminary results. Section 3 examines the effectiveness of the contractual arrangements for monitoring external firms and the implementation of these contracts. Section 4 analyzes the connection between investor sophistication and outsourcing and market share. In Section 5, we present additional analyses. Section 6 concludes.

[7] See, for example, McAfee and McMillan (1986), Holmstrom and Milgrom (1987, 1991), and Kawasaki and McMillan (1987).

2. Data description and summary statistics

2.1. Data sources

We examine actively managed US mutual funds over 1996–2011. The main data come from two sources: NSAR filings for mutual funds (required by the SEC) and the Center for Research in Security Prices (CRSP) Mutual Fund Database. Data on advisors, sub-advisors, advisory arrangements, and types of fees come from the NSAR filings. Fund returns, total net assets, turnover, expenses, and other available fund characteristics come from CRSP.

Under the Investment Company Act of 1940, all investment companies must register with the SEC. To create our database, we first download and parse all NSAR-B filings available in the SEC's Electronic Data Gathering, Analysis, and Retrieval system (EDGAR) database– a total of 55,315 files. Although certain funds voluntarily filed reports prior to the mandatory disclosure period (there are filings available starting in 1993), the data began to appear consistently in 1996; to mitigate selection bias, our sample begins with that date. Our data set is the entire population of the US open-end mutual fund market from 1996 through 2011.

The NSAR filings provide a substantial amount of information that is unavailable in other databases, such as sub-advisor names, advisory fees, and advisory contracts. The CRSP database provides information about multiple fund classes issued by a particular fund. These classes, typically denoted A, B, and C, have the same underlying portfolio; the main difference among them is in fee structure. Our observations are made at the class level.

We group data by observation at the fund level, following Nanda, Wang, and Zheng, (2004) and Gaspar, Massa, and Matos, (2006). If a fund has multiple classes, the total net assets (TNA) of the fund are the sum of all TNA over all classes. Fund returns, turnover, and expenses are aggregated at the portfolio level by weighting each class by its TNA. For fund age, we select the oldest from among all classes. Finally, to merge the CRSP and NSAR data, we use a fuzzy match procedure based on weighted Jaccard distances; this is discussed in the Internet Appendix.

2.2. Summary statistics

The literature on outsourcing in mutual funds does not consider "affiliated" sub-advised funds to be outsourced funds but rather in-house funds. We follow this approach, and henceforth refer to sub-advised funds as unaffiliated funds.[8]

Table 1 reports by year the number of all funds over 1996–2011, the number of sub-advised funds, and the number of funds subject to a conflict of interest. We exclude index funds from our sample. We consider funds susceptible to conflicts of interest when the fund family outsources its portfolio management to an unaffiliated asset manager (sub-advisor) that either manages and distributes its own funds, or provides sub-advisory services to several fund families in the same segment (Mutual Funds), and therefore commands their attention too.[9] We find that sub-advised funds have grown approximately 50% in the past two decades, from 12.6% in 1996 to 18.8% in 2011, which is similar to findings in other studies.[10] Funds with a potential conflict of interest represent on average 88% of all sub-advised funds.[11] Co-branded, multi-advising, and performance-based fee funds represent 17%, 25%, and 5% of all outsourced funds, respectively. About 42% of outsourced funds use at least one mechanism.

In Panel B, one can see meaningful differences in the proportion of sub-advised funds among categories, ranging from 8.3% in fixed-income funds to 15% in US equity or 21.3% in international funds. These results are consistent with those in some other studies. Cashman and Deli (2009), e.g., find that 16.4% of equity funds are externally managed while only 7.2% of debt funds are outsourced. Similarly, we find that the proportion of outsourced funds using any mechanism ranges from 10.2% in fixed-income to 52.3% in equity funds. Fixed-

[8] The affiliation data for arrangements between advisor and sub-advisor come from the SEC website, that allows searching for firm name, the last filing date, issuer, owner and affiliate relationships, and filing-agent relationships. We also cross-check firm affiliations using firm websites, financial news, and annual reports.

[9] While conflicts of interest across different segments (e.g., pension funds, hedge funds) might also exist, our main tests follow the literature and focus on agency issues among mutual fund families. We perform further robustness checks to control for non-1940 Act accounts that might also compromise sub-advisors, and our main results remain unchanged.

[10] For example, Cashman and Deli (2009) show that 13.6% of sub-advised funds in 2002 were unaffiliated, while Del Guercio, Reuter, and Tkac (2010) find that it is 18.0%.

[11] The proportion of mutual funds with a potential conflict of interest in our sample is higher than in Chuprinin, Massa, and Schumacher (2015). While they focus only on fund families that manage both in-house and outsourced funds simultaneously ("mixed management companies"), we also include portfolios managed by a sub-advisor working for more than one client in the same segment (mutual funds). Our results do not change if we narrow the definition of conflict of interest to outsourced funds managed by mixed management companies.

income funds appear to behave a little differently from the other categories in that the use of contractual mechanisms is not a common practice. If fixed-income pricing is less complex than equity pricing, that makes it harder for asset managers to profit from cross-trading activities; in this case a fund family will find contractual mechanisms less cost-efficient.

[Insert Table 1 here]

Table 2 reports a summary of mutual funds and management company characteristics. All variables are winsorized at the 1st and 99th percentiles. Table A.1 in the Appendix provides detailed variable definitions. Panel A reports basic portfolio characteristics for domestic equity funds. We sort funds into different categories: all funds, funds managed in-house, sub-advised funds, sub-advised funds with a potential conflict of interest, sub-advised funds using co-branding, multi-advising, performance fees, and funds using any of the three contractual mechanisms.

We observe, consistent with Chen et al. (2013), that sub-advised funds are smaller and younger, with lower flows, lower turnover, and lower raw returns than in-house managed funds. In line with findings in Duong (2010) and Chuprinin, Massa, and Schumacher (2015) we also observe that sub-advised funds are more expensive. Among outsourced funds, funds under contractual arrangements tend to be larger, cheaper, and higher-return. Co-branding funds are the ones with the highest returns. Multi-advising funds are larger and older, with higher flows. Performance fee funds are cheaper and have higher turnover.

Panel B of Table 2 reports portfolio characteristics for the fixed-income funds. We find that, consistent with previous studies (see, e.g., Sialm and Tham, 2016), equity funds in general are younger, charge higher fees, and have lower turnover ratios than fixed-income funds. Sub-advised fixed-income funds are also younger and more expensive than the in-housed managed ones. We do not find significant differences in raw returns between sub-advised and in-house fixed-income funds.

Panel C of Table 2 reports characteristics at the management company level.[12] We differentiate two types of management companies: companies with a no-outsourcing policy

[12] Because fund families using outsourcing might have a larger fraction of a specific asset category, some variables at the family level (like Family total expenses and Family performance) might depend on the proportion of equity and fixed-income funds offered. We follow Khorana and Servaes (2012) in computing variables at the family level, with the weighted average objective-adjusted across all funds in the family.

(all funds are managed in-house), and companies with an outsourcing policy (companies have at least one sub-advised fund). The last column in Panel C presents results of a *t*-test for the difference of means and the statistical significance. We find that families with a sub-advising policy are larger, manage more funds, have more experience in the industry, are better placed in the market in terms of top funds, and launch more new funds than management companies that manage every fund in-house. Although this is an initial univariate analysis, it appears to support our main hypothesis that fund families use outsourcing to achieve greater market share and at the same time offer more funds.

[Insert Table 2 here]

3. Contractual arrangements for outsourcing

We begin by showing differences in performance between funds managed in-house and outsourced funds with a potential conflict of interest. We further examine whether there is less of a difference when sub-advising involves the contractual mechanisms of co-branding, multi-advising, or performance-based compensation. As the variables of interest in the CRSP files are on a monthly frequency, we convert all variables extracted from the NSAR-B filings from a yearly to a monthly basis.[13]

For each mutual fund, we compute risk-adjusted returns (α_i) after fee (net returns) using several different models depending on the fund's category. For equity mutual funds, we use the capital asset pricing model (CAPM) (1F), the Fama and French (1993) three-factor model (3F), and the Carhart (1997) four-factor model (4F). For international mutual funds, we use an international five-factor model (5F) that adds the MSCI World Index return factor to the 4F model. To evaluate the balanced funds in our data set correctly, we add the US Aggregate Bond Index returns in excess of the risk-free rate to the 5F model. We also estimate alphas using a nine-factor model (9F) for the case of fixed-income funds; the 9F includes the 4F model and five additional risk factors: Barclays US Treasury Bill 1–3 Months; Barclays US

[13] Because investment companies report these filings at the end of the year, intra-year changes on sub-advisory contracts might arouse forward-looking concerns. We use the current and the previous year information, and both lead to similar results.

Treasury 1–3 Years; Barclays US Government Long; US Corporate High-Yield; and US Corporate AAA.[14]

We provide a separate analysis for each main portfolio asset class: equity, fixed-income, balanced, and international.

3.1. Equity mutual funds

To test the overall effect gained by using any contractual arrangement (co-branding, multi-advising, or performance fee) for outsourced funds with agency issues, we run our regressions using the Fama-MacBeth (1973) model:[15]

$$Performance_{j,t} = \beta_0 + \beta_1 Conflict_{j,t-1} + \beta_2 Mechanism_{j,t-1} + \beta_3 Conflict_{j,t-1} \times Mechanism_{j,t-1} + \beta_4 X_{j,t-1} + u_{j,t}, \quad (1)$$

where $Performance_{j,t}$ is the alpha of fund j in month t. $Conflict_{j,t-1}$ is a dummy variable indicating whether fund j is sub-advised by a family that also manages either its own funds or funds for other clients in month t. $Mechanism_{j,t-1}$ is a dummy variable with value one if the sub-advised fund has arranged either a co-branding model, multi-advisors, or a performance-based fee and zero otherwise.

The evidence in Table 2 is that portfolio characteristics might be correlated with outsourcing and thus predict performance (e.g., smaller funds with higher expense ratios are more likely to be outsourced). We then need to control for these observable variables. X_{jt-1} is a set of control variables that includes *fund size, family size, family funds, fund age, distribution fee, expenses, turnover, flows, past returns,* and *number of sub-advisors*.

[14] The CRSP value-weighted stock index net of the one-month Treasury rate (R_m) is used as the market factor. The SMB (size factor), HML (book-to-market factor), and WML (momentum factor) factors are obtained from Kenneth French's website. The MSCI World and Bond Index data are from Bloomberg. For each month, we compute the fund's risk-adjusted return using data covering the previous 24 months because many of these sub-advised funds might be closed in the short run, and requiring more observations could bias our results toward older and better managed funds. The main conclusions do not change when we compute alphas using the previous 36 observations.

[15] To be more conservative, in Tables B.2 and B.3 in the Internet Appendix B, we replicate the estimation of Eq. (1) using both pooled ordinary least squares with time and style dummies and asset manager (the company that is actually managing the portfolio) fixed-effects. The latter allows us to compare differences in performance among funds managed by the same entity and control for unobservable characteristics of asset managers.

We adjust for serial correlation by applying Newey-West (1987) estimates of standard errors with lags of order three. We also include fund-investment-style dummies to avoid concerns about potential correlation between fund styles.

The estimated parameters of Eq. (1) are displayed in Panel A of Table 3. Whatever the performance measure, funds with potential conflicts underperform other funds by between 37.2 (0.031 x 12) and 52.8 (0.044 x 12) basis points (bps) per year.

To test our hypothesis that contractual agreements such as co-branding, multi-advising, and performance-based fees should mitigate the underperformance of sub-advised funds, we need to interpret the coefficient of the interactive term $Conflict \times Mechanism$. This coefficient captures the marginal effect of requiring an incentive contract for funds with a potential conflict of interest. As expected, it is positive and statistically significant across all specifications. While sub-advised funds underperform in-house managed funds by between 57.6 bps (0.048 x 12) and 64.8 bps (0.054 x 12) per year, the use of contractual mechanisms reduces fund underperformance by between 64.8 bps (0.054 x 12) and 94.8 bps (0.079 x 12) per year.

The coefficient of *Mechanism* (β_2) is not statistically significant. This parameter compares the performance of any outsourced fund using contractual arrangements and any remaining fund (in-house managed included). There is no theoretical reason to think that an external fund with these contractual arrangements should systematically outperform both any in-house funds and external funds without contractual arrangements.

In Panel B of Table 3, we replicate the estimation using a different variable for each specific mechanism (co-branding, multi-advising, and performance fee) to rule out the concern that a particular contractual agreement drives our results. $Conflict$ is negative and statistically significant, and the coefficients for the interactive terms remain positive and statistically significant, consistent with our previous results. The use of co-branding reduces fund underperformance by between 145.2 bps (0.121 x 12) and 159.6 bps (0.133 x 12) per year. Entering into a sub-advisory contract with more than one sub-advisor helps to mitigate poor performance; using multiple sub-advisors reduces fund underperformance by between 81.6 bps and 98.4 bps per year. Lastly, consistent with our hypothesis that a compensation scheme based on performance mitigates the agency issues of outsourcing, the *Conflict* $\times$

Performance fee coefficient shows that performance fee arrangements help to reduce underperformance of sub-advised funds by between 37.2 and 81.6 bps. [16]

[Insert Table 3 here]

3.2. Other mutual fund categories

In Table 4 Panel A, we report the results for the regression Eq. (1) using categories other than equity.[17] For international funds, the *Conflict* variable has a negative and statistically significant value of 146.4 bps per year, and the β_3 coefficient for the product (*conflict* × *mechanism*) is positive and statistically significant as expected, with a value of 62.4 bps annually. Sub-advised balanced funds with a potential conflict of interest underperform by about 75.6 bps per year, but use of a contractual mechanism has a positive and statistically significant effect of 58.8 bps annually.

For fixed-income mutual funds, the findings are different. First, we observe that neither the *mechanism* variable nor the product (*conflict* × *mechanism*) are statistically significant. Second, we observe that the coefficients for the *conflict* variable are negative (−0.063, −0.075) but weakly significant. This might suggest that because outsourced fixed-income funds do not perform very differently from their in-house peers, the use of costly mechanisms might not be effective. Because fixed-income pricing is less complex than equity pricing, it might be more difficult to favor in-house managed funds in this case.

These results were suggested in Table 1 and Table 2, which show that contractual mechanisms for debt funds are not common in the market, nor were there significant differences in raw returns between in-house and sub-advised fixed-income funds. Only 10% of sub-advised debt funds operate under a contractual mechanism agreement, compared to 44% and 52% of the other categories. Consequently, the market likely recognizes a need for these contractual agreements only for some types of asset classes and not for fixed-income, where underperformance appears to be less of an issue.

[16] One might be concerned that outsourced funds using contract mechanisms outperform after fees only because they enjoy lower fees and not because incentives are aligned. In Table B.4 in Internet Appendix B, we re-estimate Eq. (1) using gross returns, and find similar results. This confirms that the contractual mechanisms play an important role in affecting managerial incentives, and rules out alternative interpretations that performance improvement is due simply to reducing expenses or distribution fees.

[17] The results using gross returns are identical, and conclusions do not change (see Table B.5 in Internet Appendix B). For all fund categories pooled in Table B.6, the main results remain unchanged.

Panel B of Table 4 describes the same analysis using the specific contractual agreements (co-branding, multi-manager, and performance fee), and the conclusions remain identical.

[Insert Table 4 here]

3.3. Testing for reputation, competitiveness, and incentives

We draw on the industrial organization literature to explain the positive impact on performance when outsourcing contracts include contractual mechanisms intended to mitigate agency issues in firms that have managerial conflicts of interest. According to Klein and Leffler (1981), brand reputation provides some implicit protection against adverse selection. We therefore expect outsourcing contracts with co-branding to mitigate agency issues if the sub-advisor already enjoys a superior reputation in the industry. Klein and Leffler (1981) also provide evidence on self-enforcement mechanisms that tend to assure performance under threat of relationship termination. Replacement risk in a multi-advising agreement should create a competitive environment where only sub-advisors that can outperform their peers will retain their contracts.[18]

Holmstrom (1979), among others, analyzes performance-based contracts to solve problems of moral hazard and adverse selection. While the outsourcing of contracts generally poses agency issues, incentives could be aligned by way of a floating compensation structure based on performance. We expect such a compensation contract would work best when the principal is more uncertain about the agent's performance. Therefore, we hypothesize that this mechanism should be more effective in outsourcing contracts with inexperienced sub-advisors that have a higher return dispersion among the funds they manage, both generating greater uncertainty about final performance.

To test these hypotheses, we estimate the logistic model:

$$\text{Prob}(y_{i,t} = 1) = \frac{\exp(\beta_f z_i)}{1+\exp(\beta_f z_i)}, \quad (2)$$

where $\beta_f z_i = (a_0 + a_1 \Gamma_{j,t-1} + a_2 X_{i,t-1} + \delta_t + T_t + e_{i,t})$. The dependent variable $(y_{i,t})$ is a dummy variable that equals one if the outsourced fund has a co-branding model, a multi-

[18] Note that the multi-advisor structure is not the same as teams of managers as analyzed in the mutual fund literature (e.g., Bar, Kempf, and Ruenzi, 2011; or Patel and Sarkissian, 2017). In the multi-advisor case, each sub-advisor manages a fraction of the fund's portfolio, but sub-advisors do not necessarily act as a team.

advising contract, or a performance-based fee. $\Gamma_{j,t-1}$ is the vector of the main explanatory variables, proxies for reputation, competitiveness, and incentive alignment. $X_{i,t-1}$ is a vector of fund and family variables lagged by one period. We include style dummies (δ_t) and time dummies (T_t). Standard errors are clustered at the fund level.

We explain the use of co-branding contracts using three proxies for reputation: *Sub-advisor experience, Top 5 sub-advisor,* and *Sub-advisor performance*. *Sub-advisor experience* is the natural logarithm of the number of years that a sub-advisor has been in business. *Top 5 sub-advisor* is measured using the average proportion of months a manager has had at least a one-star fund (funds performing in the top 5% of all funds with a particular investment objective) during the past five years. *Sub-advisor performance* is measured as the objective-adjusted sub-advisor returns over the last 60 months, calculated as follows:

$$\sum_{j=1}^{J}[w_j(R_j - \sum_{i=1}^{I} w_i R_i)], \tag{3}$$

where w_j is the weight of a fund in the sub-advisory company, R_j is the return of fund *j* in the *J* funds of the sub-advisor, w_i is the weight of fund *i* in its investment objective, and R_i is the return of fund *i* in the *I* funds within that specific style investment.

Panel A of Table 5 reports the results of the co-branding and reputation analysis for US domestic equity funds. The coefficients for the three reputational variables are positive and statistically significant, with marginal coefficients that range from 0.005 to 0.007. Considering the unconditional probability of operating with a co-branding agreement, a one-standard deviation improvement in *Sub-advisor experience* (0.695), *Top 5 sub-advisor* (0.179), and *Sub-advisor performance* (0.355) means that the funds are 19.5% (0.007 x 0.695 / 0.025), 5.0%, and 7.1% more likely to institute a co-branding contract than other funds, respectively. Therefore, we can conclude that the stronger the sub-advisors' reputation, the more likely the fund will operate under a co-branding agreement.

We estimate the probability that outsourced funds will have a multi-advising contract using two proxies for sub-advisor competitiveness: *Sub-advisor idiosyncratic dev,* and *Sub-advisor beta dev*. Sub-advisor risk-taking decisions are measured using the total net asset-weighted average idiosyncratic and systematic risk of the funds they are currently managing. These variables are calculated as the differences (in absolute terms) between the actual value and the average of that period for all funds within an investment objective.

We argue that fund tracking error and beta deviations are affected by the internal competition that multi-advising contracts generate. Thus, in a competitive framework, portfolio management will deviate more from its peers, given more active management rather than passive tracking of a benchmark.

Idiosyncratic risk is computed as the standard deviation of the residual when estimating the Alpha 6F model (Carhart's model augmented by an international index and a global bond index), and systematic risk is the market beta from the same performance model. As expected, both coefficients are positively related to the use of multi-advising contracts (and statistically significant). The effectiveness of this result is consistent with Klein and Leffler's (1981) predictions about self-enforcement mechanisms in assuring performance.[19]

In Panel C of Table 5, we use the number of years a firm has managed mutual funds (*Sub-advisor experience*) and the cross-sectional standard deviation of sub-advisor fund returns over the past 24 months (S*ub-advisor return dispersion)* to explain adoption of a contract that compensates external firms based on performance. We argue that sub-advisors that lack a historical track record or deliver more extreme outcomes will involve higher levels of uncertainty. These estimates confirm that funds are more likely to establish performance fee contracts with less experienced sub-advisors and those with more dispersed fund returns, as a way to guard against uncertainty and poor management. For example, a fund managed by a sub-advisor with one standard deviation less experience (0.709) is 21.3% (0.709 x 0.003/ 0.01) more likely to be externally managed under a performance-based fee. Similarly, for sub-advisors one standard deviation higher on the return dispersion among all their funds, performance fee agreement is 31.9% more likely.

[Insert Table 5 here]

4. Outsourcing policy, market share, and investor sophistication

4.1. Outsourcing decisions and market share

Studies of mutual fund decisions find that fund families have incentives to expand the menu of funds they offer customers, in terms of both numbers of funds and ranges of

[19] Note that because all variables are contemporaneous, we are not claiming that past higher deviations positively predict the use of multi-advising contracts but are instead identifying a simple positive relation, controlling for other variables, evidence that under these contracts, portfolio managers tend to deviate more from others within the same style.

investment objectives, to increase their market share.[20] We examine whether management companies that engage in outsourcing contracts can increase their market share while offering a wider range of products, especially in investment styles in which they have no previous experience. We aggregate funds at the family level, reducing our sample to family-month observations. Market share at the family level is measured as the sum of all assets under management by each management company divided by all assets under management in the industry during that period. Our data show that less than one-third of management companies outsource at least one fund, indicating that outsourcing decisions are made at the family level.

We regress market share on the outsourcing decisions and fund family characteristics using the model:

$$log(Market\ Share)_{i,t} = \beta_0 + \beta_1 Outsourcing\ Decisions_{i,t-12} + \beta_2 Market\ Share_{i,t-12} + \beta_3 X_{i,t-12} + u_{i,t,} \quad (4)$$

where $Outsourcing\ decisions_{i,t-12}$ captures different decisions on outsourcing made by management company i over the last year. We consider a one-year lag because this is the average time that investors take to adjust a portfolio and therefore to change the management company's market share.

We use different variables to measure outsourcing decisions. We define the *Outsourcing policy* variable as equal to one for management companies that are offering sub-advised funds and zero otherwise. It is also important to distinguish the types of funds that a firm is outsourcing, as we expect that outsourcing funds with new investment objectives would help a fund gain market share. We measure this outsourcing decision with *Outsource new style*, a dummy variable that equals one only if the management company is using outsourcing to manage at least one fund in a different investment style from those managed in-house. To explore the number of funds a family is currently outsourcing, we include the variable *Ratio outsourced funds,* which is the proportion of sub-advised funds of an advisor relative to all the funds it manages.

The set of family characteristics included as controls ($X_{i,t-12}$) are *Family expenses, Family performance,* and *Family turnover*, which are weighted-average objective-adjusted

[20] See Massa (2003) or Khorana and Servaes (2012), among others.

measures computed across all funds in the family. Thus, these variables are weighted in the same fashion as indicated for Eq. (3) but replacing the fund returns with the particular variable of interest (fund expenses, alphas, or turnover). We also include some other control variables such as *Funds started*, *Family funds, Family experience*, *Family with top 5 funds,* and *Herfindahl across funds*. All these variables are defined in Table A.1 in the Appendix. We estimate Eq. (4) using the generalized method of moments (GMM) as in Arellano and Bover (1995) and Blundell and Bond (1998), which is an augmented version of the difference GMM of the Arellano-Bond (1991) approach.[21]

Table 6 presents the estimations for the different specifications. Model (1) reports a positive (0.3) and statistically significant coefficient for the primary variable of interest, *Outsourcing policy*. This result suggests that a change in the outsourcing policy of a management company (shifting from not using to using outsourcing) implies an increase in its market share of approximately 35% [$e^{0.3} - 1$]. That is, in a family with market share of 15% before implementing an outsourcing policy, the new policy of sub-advising should lead to a higher market share of 20.25% [0.15 x (1 + 0.35) x 100]. Although coefficients for the controls are not reported, we find that family experience and number of funds in the family positively affect market share, consistent with the literature.[22]

Model (2) reports a positive (0.113) and significant value for *Outsource new style*, suggesting that outsourcing decisions have a positive impact on market share when the sub-advised funds have different investment objectives from those already managed in-house. Model (3) considers the proportion of outsourced funds (*Ratio outsourced funds*), and yields a positive and significant value of 0.843. The economic interpretation is that an increase of one standard deviation in the proportion of outsourced funds (0.266) drives the advisor's market share 25% [$e^{0.843 \text{ x } 0.266} - 1$] higher. Thus, a family with a market share of 15% that changes the proportion of outsourced funds from the average (0.186) to one standard

[21] Kiviet (1995), among others, demonstrates that ordinary least squares estimates are inconsistent when the lagged dependent variable is included in the specification model. As we are including the lagged market share as an independent variable, following Khorana and Servaes (2012), we must estimate our model using the system GMM. We estimate a system of equations in both differences and levels. We use the lagged values of the differences as instruments in the levels equation and the lagged values of the levels as instruments in the difference equation.

[22] We check for second-order serial correlation of the error term and for the validity of the instruments using the Hansen test. Tests confirm that the error term is serially uncorrelated and that the instruments used in the GMM are exogenous.

deviation higher, 0.452 [0.186 + 0.266], will increase its market share to 18.75% [0.15 x (1 + 0.25) x 100].

We have assumed a linear relation between the proportion of outsourced funds and market share. Yet it seems unlikely that changes in the proportion of outsourced funds for a management company with many externally managed funds will have the same impact on market share as an equivalent change for a management company with fewer external funds. To explore this in detail, we test the relation by splitting *Ratio outsourced funds* into three different variables to account for changes at low, middle, and high levels of outsourcing. $Low\ ratio_{i,t-12}$ considers changes in the proportion of outsourced funds from less than 20%, measured as the min(*Ratio outsourced funds*, 0.2) to $High\ ratio_{i,t-12}$ for at least 80% of funds outsourced, measured as the max(0.8, *Ratio outsourced funds*).

The model (4) results in Table 6 confirm a nonlinear relation between the proportion of outsourced funds and market share. $Low\ ratio$ is positive and statistically significant, with a coefficient of 2.013 and a p-value of 0.01, while $Mid\ ratio$ and $High\ ratio$ are not statistically significant. The results of model (5) provide more evidence about how sub-advising a reasonable proportion of funds while offering new styles of investment allows management companies to increase their market share, supporting our initial hypothesis as to explanations for the high growth of sub-advising in the asset management industry.

[Insert Table 6 here]

4.2. Investor sophistication and outsourcing

Contracts entail effort and cost (Balakrishnan and Wernerfelt, 1986), and searching for and evaluating different management companies takes time and is costly. What primarily drives a fund family to adopt a contractual mechanism for sub-advising practices?

We argue that fund families would find contractual mechanisms cost-effective only if the target investor is sensitive to changes in poor performance. Sirri and Tufano (1998) show that fund flows depend asymmetrically on past returns; unsophisticated investors chase top funds while not avoiding poorly performing ones. We use the Sirri and Tufano (1998) approach to test whether asymmetry in flows is moderated in the case of portfolios under contractual mechanisms. This would be consistent with sophisticated investors having a strong preference for funds with mechanisms.

We measure investor sophistication following Sirri and Tufano (1998) and use a piecewise linear specification to examine different flow-performance sensitivities at different levels of fund returns. In each month and for each investment objective, we rank funds from 0 to 1 on the basis of their past year net return, where 1 is the top performer and 0 the worst. The variables in these piecewise decompositions represent the marginal fund-flow response to performance.

Following the literature, we classify funds into three unequal groups. The bottom group (*Low rank*) is the lowest quintile defined as Min(0.2, Rank). The middle three quintiles are combined into one group (*Mid rank*) defined as Min(0.6, Rank − LowRank), and the highest quintile (*High rank*) is defined as Rank − (LowRank + MidRank). We estimate the piecewise linear regressions using the model:

$$
\begin{aligned}
&Flows_{j,t} = \\
&\beta_1 LowRank_{j,t-1} + \beta_2 Mechanism_{j,t-1} + \beta_3 LowRank_{j,t-1}\, x\, Mechanism_{j,t-1} + \\
&\beta_4 MidRank_{j,t-1} + \beta_5 MidRank_{j,t-1}\, x\, Mechanism_{j,t-1} + \\
&\beta_6 HighRank_{j,t-1} + \beta_7 HighRank_{j,t-1}\, x\, Mechanism_{j,t-1} + \beta_8 X_{j,t-1} + \\
&u_{j,t.}
\end{aligned}
\qquad (5)
$$

Table 7 provides the results for different specifications of Eq. (5). In model (1), we find that flows for better performing funds are more sensitive to performance than flows for middle and lower performers, consistent with previous literature. Models (2), (3), and (4) provide evidence that investors in funds with contractual mechanisms are more sensitive to poorer performance while not sensitive to better performance. Model (5) confirms our hypothesis that only mutual funds with sophisticated investors use contractual mechanisms.

In general, mutual fund investors do not sell poorly performing funds but buy winners. Investors in funds with contractual mechanisms are highly sensitive to lower-ranked funds, while less sensitive to higher-ranked portfolios, however. Thus, the results confirm that sub-advised funds using contractual mechanisms target toward more sophisticated investors than outsourced funds that do not use any mechanisms to guard against the negative effects of potential conflicts of interest.

[Insert Table 7 here]

Table 8 examines whether outsourced funds subject to agency issues that do not use any contractual mechanisms are distributed through brokers looking for a less informed sort of investor rather than through a direct channel. In this case, we estimate a monthly logistic model only for sub-advised equity funds:

$$\text{Prob}(y_{i,t} = 1) = \frac{\exp(\beta_j z_i)}{1+\exp(\beta_j z_i)} \quad (6)$$

where $\beta_j z_i$ is $(\beta_0 + \beta_1 Conflict_{i,t-1} + \beta_2 Conflict_{i,t-1}\ x\ Indirect\ channel_{i,t-1} + \beta_3 Indirect\ channel_{i,t-1} + \beta_4 x_{i,t-1} + \varepsilon_{it})$. The dependent variable ($y_{i,t}$) is the *Mechanism* variable that equals one if the outsourced fund is using co-branding, multi-advising, or performance fee arrangements. $Indirect\ channel_{i,t-1}$ is a dummy variable that equals one if the fund charges a load fee, as a proxy for broker distribution, and zero otherwise (direct channel).[23]

The estimated value of *Indirect channel* is negative and statistically significant at the 1% level, suggesting that these contractual arrangements are less likely to be written on funds sold through brokers. In economic terms, we show that sub-advised funds using brokers are about (0.236/0.35) 67.4% less likely to be under contractual arrangements than similar sub-advised funds sold through a direct channel. We argue that fund families use indirect channels of distribution as an alternative to adopting costly contract mechanisms to protect fund outflows. There is less of a negative probability of using control mechanisms when funds are facing potential conflicts of interest. The coefficients of *Conflict* and the interactive term (*Conflict x Indirect channel*) are positive and significant, consistent with our hypothesis that management companies use contractual mechanisms for sub-advised funds with potential conflicts of interest. These results are consistent with Del Guercio et al. (2010, 2014), who argue that investor sophistication can be related to fund distribution channels.

[Insert Table 8 here]

[23] Bergstresser, Chalmers, and Tufano (2009) show that investors generally do not pay front-end or back-end loads when they purchase mutual funds through a direct channel. Massa, Reuter, and Zitzewitz (2010) also use load funds as a proxy for funds distributed through indirect channels.

5. Bargaining power, new categories, and side-by-side management

A final important challenge of this study is the potential endogeneity of the main explanatory variables. We address this concern while considering different alternative interpretations.

5.1. Effect of bargaining power

We have shown that contractual arrangements such as co-branding, multi-advising, and performance fees are associated with a reduced underperformance of funds managed by sub-advisory firms that also manage other funds. This result occurs because these contract arrangements presumably align advisor incentives, although there might be alternative explanations. It could be that top sub-advisors agree on contracts because they know they can perform well with little effort and either gain higher compensation through performance fees or promote themselves through a co-branding contract.

To rule out this alternative channel and confirm that writing these contracts actually encourages extra effort from sub-advisors, we use an instrumental variables approach. The selection of the instrument requires finding a variable that is highly correlated with the use of these contractual arrangements and not correlated with the individual fund performance. We expect the decision on a contractual mechanism to depend basically on the bargaining power of the advisor. We use *Sub-advisor revenue dependence* as the instrument, computed as the sub-advisor's revenues from the advisor owner of fund *j* divided by the sub-advisor's total revenues. When the sub-advisor's revenue is highly (less) dependent on a single firm, the sub-advisor will have less (more) bargaining power, and thus will be more (less) willing to accept the advisor's contract clauses.

Given the binary nature of the endogenous variable, we use a three-stage least squares procedure (3SLS) that can consistently estimate the β_2 and β_3 coefficients in Eq. (1) assuming we have a set of valid instruments (z). The main advantages of using this approach over other procedures such as two-stage least squares are as follows: *a)* It takes into account the binary nature of the endogenous variable; *b)* it does not require the binary response model of the first stage to be correctly specified (in alternative procedures such as 2SLS, consistency is not guaranteed unless the first stage is correctly specified); and *c)* the standard errors are still

asymptotically valid although some regressors are generated in the first stage (see, e.g., Wooldridge, 2002).

In the first stage, we estimate a binary response model (a probit) of the determinants of the *Mechanism* variable on the instrument and a set of control variables (x) that includes every control variable in Eq. (1). In the second stage, we regress *mechanism* on mechanism-fitted probabilities (from the first stage) and the set of controls (x). In the third stage, we regress performance (alphas) on the mechanism-fitted values of the second stage and the set of controls (x).

First stage: $Pr(Y=1|\, x, z) = \Phi(a_0 + a_1 Z + a_2 X)$

Second stage: $Y = b_0 + b_1 \hat{Y} + b_2 X + v$

Third stage: $Performance = \beta_0 + \beta_1 Conflict + \beta_2 \hat{Y}^{2s} + \beta_3 Conflict\ x\ \hat{Y}^{2s} + \beta_4 X + u,$ (7)

where Φ is the cumulative distribution function for a standardized normal random variable, Y is a dummy variable measuring the use of mechanism, Z is the instrument (we use *Sub-advisor revenue dependence*), and X is a vector of control variables. $\hat{Y}$ is the mechanism-fitted values from the first stage, and $\hat{Y}^{2s}$ is the mechanism-fitted values from the second stage.

The results are reported in Table 9. The first-stage results in Panel A show that *Sub-advisor revenue dependence* is highly correlated with the use of a contractual mechanism. Consistent with our intuition, the coefficient (0.505) is positive and statistically significant at 99% (t-statistic 4.64), with a marginal effect coefficient of 5.9%, suggesting that greater advisor bargaining power leads to higher probabilities of contractual arrangements. *Family size* is positively related and *Family funds* negatively related to the use of *Mechanism*. This means that firms that engage sub-advisory services are more likely to write costly contractual mechanisms when they have a large volume of assets concentrated in fewer funds. In Panel B, for the third stage, we observe that the main results remain unchanged, as the product (*Conflict x Mechanism*) is positive (between 57.6 and 151.2 bps annually) and statistically significant for every performance measure used (1F, 3F, and 4F). The coefficient for the conflict variable is negative and statistically significant, and ranges between 46.8 and 109.2 bps per year.

[Insert Table 9 here]

These results overall provide some support for the prediction that establishing contractual agreements aligns the principal's (advisor) and the agent's (sub-advisor) incentives and thus significantly affects the performance of outsourced funds, even after accounting for endogeneity issues.

5.2. Creating new styles using in-house managed funds

We have shown that fund families that engage in outsourcing can gain greater market share, especially when they launch funds with new investment objectives. One might also argue that investors respond more favorably to families that offer differentiated products independent of fund management status.

To analyze how internal versus external management of new category funds affects the market share of the firm, we begin by controlling for management company expertise. We are concerned about a sample selection bias in that management companies decide to outsource all new funds only if their internal management structure does not allow them to manage such new funds in-house. Once we control for management company expertise, we would expect that offering a new investment category fund will contribute to an increase in market share, whether the fund is managed in-house or outsourced. We employ Heckman's (1978) approach, which uses the inverse Mills' ratio (obtained from a probit model that estimates the probability of managing a fund in a new style in-house) as an additional control in our market share model in a second stage.

In Panel A of Table 10, we estimate the probability of internally managing a fund created in a new investment category using *Herfindahl in-house styles* (the sum of the squared fractions of each investment objective's share in the total management company assets of in-house managed funds) and the family control variables used previously. As we expect, the coefficient of *Herfindahl in-house styles* is negative and statistically significant, suggesting that families with a more concentrated internal management structure are less likely to manage a new fund category in-house.

Next, we estimate the system GMM regression models to test the effect of offering funds in new styles over market share:

$$log(Market\ Share)_{i,t}$$
$$= \beta_0 + \beta_1 New\ Style_{i,t-1}$$
$$+ \beta_2 Inhouse\ New\ Style_{i,t-1} + \beta_3 Outsource\ New\ Style_{i,t-1} + \beta_4 X_{i,t-1}$$
$$+ u_{i,t,} \quad (8)$$

where $New\ style_{i,t-1}$ equals one if in the previous month, management company *i* created a fund in a different investment category from its established funds. If this new fund is managed internally, $Inhouse\ new\ style_{i,t-1}$ will be one; if this fund is outsourced to an unaffiliated sub-advisor, $Outsource\ new\ style_{i,t-1}$ will be one instead. We also control for a set of family characteristics $X_{i,t-1}$, in which we include $Market\ share_{i,t-1}$, which is the market share of family *i* in period *t*-1. We also add the inverse Mills' ratio as a control variable in the third column to correct for sample bias.

Panel B of Table 10 shows that when we include the inverse Mills' ratio both the internal and the external management of new investment categories have a positive effect on the management company's market share. The coefficient estimated for the Mills' ratio provides insight into the relation between the omitted variable and market share, indicating that management companies with greater market share are more likely to manage new funds in-house.

Looking at Column 3 of Table 10, we can conclude that outsourcing management in a new investment category allows fund families to gain much greater market share, unless the family already has a well-diversified internal management structure. In this case, the increase in market share will come from the mere fact of offering a new style rather than the outsourcing decision, as in-house management will make a contribution similar to that of external management.

[Insert Table 10 here]

5.3. Side-by-side portfolio management

We define sub-advised funds with potential conflicts of interest as mutual funds managed by unaffiliated asset managers (sub-advisors) that either manage and distribute their own mutual funds or advise for several fund families. While the literature focuses on the potential agency issues related to outsourcing contracts in a particular segment (1940 Act accounts), one could argue that sub-advisors might also be managing other accounts (hedge funds,

pension funds, or other separate accounts) different from mutual funds. We perform a variety of robustness checks to control for non-1940 Act accounts that might also command the attention of sub-advisors.

We collect a sample of management companies that manage not only mutual funds but also hedge funds or other separate accounts. We use two different sources: Morningstar and the data used in Del Guercio, Genc, and Tran (2017) (hereafter DGT).[24] Using the DGT data, we can identify management companies offering hedge funds and other separate accounts, as well as track firms that allow individual managers to run mutual funds side-by-side with hedge funds (and the percentage of assets in the family with these side-by-side managers) from 2005 to 2011. We use Morningstar to extend the DGT sample and identify management companies offering hedge funds or separate accounts from 1996 to 2004.

To test the overall effect gained by using any contractual arrangement (co-branding, multi-advising, or performance fee) for outsourced funds with potential agency issues, while controlling for funds under side-by-side management, we run our regressions using the Fama-MacBeth (1973) model:

$$Performance_{j,t} = \beta_0 + \beta_1 Conflict_{j,t-1} + \beta_2 Mechanism_{j,t-1} + \beta_3 Conflict_{j,t-1} \times Mechanism_{j,t-1} + \beta_4 SidebySide_{j,t-1} + \beta_5 Conflict_{j,t-1} \times SidebySide_{j,t-1} + \beta_6 X_{j,t-1} + u_{j,t,} \quad (9)$$

where $SidebySide_{j,t-1}$ are different variables to indicate whether fund $_j$ is managed by a management company that also manages other non-1940 Act accounts.

Table 11, Panel A, reports estimates of Eq. (9), measuring side-by-side management at the firm level. *SbS PIV advisor* is a dummy variable that equals one if the advisor provides at least one pooled investment vehicle (PIV) such as a hedge fund or commingled trust. *SbS SepAcc advisor* is a dummy variable that equals one if the advisor offers institutional accounts such as pension funds or endowments. We also include the interaction of *SidebySide x Conflict* to analyze the performance of outsourced funds when the sub-advisor manages and distributes its own mutual funds besides other accounts.

Panel B confines the sample to US equity funds managed by the largest 30 fund families over 2005–2011 (as provided by DGT). *SbS manager dummy* is an indicator variable for

[24] We thank authors Diane Del Guercio, Egemen Genc, and Hai Tran, all of whom provided additional data to enable our analysis.

families that have at least one fund with a side-by-side manager, and *SbS manager %* is the percentage of funds in the family with side-by-side managers.

We show that the estimates of *Conflict* are still negative, and *Conflict x Mechanism* is also positive and statistically significant in both panels. These results indicate that, after controlling for side-by-side agency issues, sub-advised funds with potential conflicts of interest underperform their in-house peers. However, contractual mechanisms that monitor the sub-advisor, help to mitigate the underperformance.

Note particularly in Panel A that side-by-side management is positively related to fund performance, consistent with findings in Nohel, Wang, and Zheng (2010). They argue that money management firms use side-by-side to attract and retain the best portfolio managers. The positive effect of side-by-side management is diminished when a fund is managed by a sub-advisor with potential conflicts of interest. In Panel B and consistent with Del Guercio, Genc, and Tran (2017), we find that letting portfolio managers run mutual funds and other more lucrative accounts simultaneously has a negative effect on mutual fund performance.

[Insert Table 11 here]

6. Conclusions

Our analysis of the growth of sub-advising in the investment fund industry over recent decades shows that outsourcing contracts allows management companies to gain market share in an increasingly competitive business. An important finding distinguishing our study from others is that outsourced funds underperform only when investors are uninformed. When the investor demands good management, the market actually provides several effective contractual arrangements that serve to monitor sub-advisors. Therefore, by offering each type of client what it demands, fund families can benefit from outsourcing to improve their market share.

We show that an incentive fee mechanism and different types of sub-advisory agreements—such as multi-advising contracts and co-branding business models—can have a positive impact on fund performance that ranges from a 0.82% to 1.6% per year higher risk-adjusted return. There are a variety of theories that explain these positive results. First, reputation effects constitute an implicit protection against adverse selection. That is, as long as a fund's performance is linked to the sub-advisor's reputation, co-branding an outsourcing contract can help to align incentives. Second, profit sharing can generate mutual monitoring

and peer pressure while it positively affects firm productivity. In a multi-advising contract, where compensation is shared by all firms in the contract, sub-advisors monitor each other. Finally, performance-based contracts can solve moral hazard or adverse selection problems. When sub-advisors are compensated under a fulcrum fee structure, the management company (principal) will be able to extract higher yields from an outsourcing contract.

We show that management companies with outsourcing policies can gain more market share than those that manage all their funds in-house. We see this particularly when a firm outsources funds to offer an investment style not already offered in-house. Outsourcing is especially useful to firms offering new funds in areas where they lack expertise.

Appendix

Table A.1

Variable definitions

Variable	Description
Co-branding	Equals one if the fund is sub-advised under a co-branding arrangement, and zero otherwise.
Conflict	Dummy variable that equals one if the sub-advised fund is managed by a family that either manages its own mutual funds or mutual funds for several clients, and zero otherwise.
Distribution fee	Percentage of assets that fund charges for distribution and marketing under the 12b-1 fee.
Expenses	Total annual expenses and fees divided by the year-end TNA.
Family total expenses	Weighted-average objective-adjusted expenses computed across all funds in the family using Eq. (6) but replacing returns with fund expenses.
Family experience	Natural logarithm of number of years the management company has been in business.
Family funds	Logarithm of number of funds in the family, excluding fund itself.
Family performance	Percentage of objective-adjusted family gross monthly returns using Eq. (6).
Family size	Logarithm of TNA for all funds in the family, excluding fund itself.
Family turnover	Average objective-adjusted turnover computed across all funds in the company using Eq. (6) but replacing returns with Turnover.
Family with top 5 funds	Dummy variable that equals one if at least one fund of the family performs in the top 5% of all funds with a particular investment objective, and zero otherwise.
Flows	Percentage that represents new inflows into the fund over the previous year.
Fund age	Number of years since fund inception.
Fund size	Natural logarithm of TNA under management in millions of dollars.
Funds started	Number of funds started by the company in a given period.
Gross returns	Fund past year return before fees (in %).
Herfindahl across funds	Sum of the squared fractions of each fund's share in total management company assets.
Herfindahl in-house Styles	Sum of the squared fractions of each investment objective's share in total management company assets of in-house managed funds.
High ratio	Max(0.8, Ratio outsourced funds).
HighRank	Funds ranked from 0 to 1 on the basis of past year net return, where 1 is the top performer and 0 the worst. HighRank is defined as HighRank=Rank-(LowRank+MidRank).
In-house new style	An indicator variable that equals one if the family has created a fund in a different investment category from its established funds and is managing it in-house.
Indirect channel	Dummy variable that equals one if the fund charges any load fee, as a proxy for indirect distribution.
Inverse Mills' ratio	Obtained from a probit model that estimates the probability of managing a fund in-house.
Low ratio	Min(Ratio outsourced funds, 0.2).
LowRank	Funds ranked from 0 to 1 on the basis of past year net return, where 1 is the top performer and 0 the worst. LowRank is the bottom group (Low Rank) defined as the min(0.2, Rank).
Market share	Logarithm of the sum of all assets under management by each management company divided by all assets under management in the industry in that period.

Table A.1 (continued)

Variable Definitions

Variable	Description
Mechanism	Dummy variable that equals one if the fund is sub-advised using co-branding, multi-manager, or performance-fee arrangements, and zero otherwise.
MidRank	Funds ranked from 0 to 1 on the basis of past year net return, where 1 is the top performer and 0 the worst. MidRank is defined as Min(0.6, Rank − LowRank).
Mid ratio	Ratio of outsourced funds with a minimum of 0.2 and a maximum of 0.8.
Multi-advising	Dummy variable that equals one if the fund is sub-advised by more than one sub-advisor, and zero otherwise.
New style	Dummy variable that equals one for management companies that are currently offering a new investment style that is managed in-house.
Number of sub-advisors	Number of external sub-advisors of an outsourced fund.
Outsource new style	Indicator variable that equals one if the management company is outsourcing fund styles different from those it manages in-house.
Outsourcing policy	Dummy variable that equals one for management companies that offer at least one sub-advised fund and zero otherwise.
Past returns	Cumulative gross fund returns over past 12 months.
Performance fee	Dummy variable that equals one if the sub-advised fund is under a fulcrum fee compensation structure.
Ratio outsourced funds	Proportion of outsourced funds over the total funds of the family.
StD monthly returns	Standard deviation of prior year's monthly returns.
SbS manager dummy	Dummy variable that equals one if a family has side-by-side managers.
SbS manager %	Percentage of funds in the family with side-by-side managers.
SbS SepAcc advisor	Dummy variable that equals one if the advisor offers institutional accounts such as pension funds, endowments, wealthy investors, etc.
SbS PIV advisor	Dummy variable that equals one if the advisor provides at least one pooled investment vehicle (PIV) such as hedge funds or commingled trust.
Sub-advisor beta dev.	TNA-weighted average beta deviations of all funds the sub-advisor has under management.
Sub-advisor experience	Natural logarithm of number of years that the sub-advisor has been in business.
Sub-advisor funds	Average number of funds sub-advisor has been managing during the last 60 months.
Sub-advisor idiosyncratic dev.	TNA-weighted average idiosyncratic risk deviations of all funds the sub-advisor has under management (in %).
Sub-advisor performance	Objective-adjusted sub-advisor returns over the last 60 months. Represents a global measure of all types of mutual funds managed by a management company.
Sub-advisor return dispersion	Cross-sectional standard deviation of all the fund returns managed by a sub-advisor within the same investment style and month, averaged across the past 24 months.
Sub-advisor revenue dependence	For mutual fund *j*, computed as sub-advisor revenues from the advisor owner of fund *j* divided by the sub-advisor's total revenues.
Top 5 sub-advisor	Average proportion of months with at least a one-star fund rating (funds performing in the top 5% of all funds with a particular investment objective) during past five years.
Turnover	Minimum of aggregate purchase and sale of securities divided by average TNA over the calendar year (% per year).

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Table 1

Sub-advising contracts over time: Portfolio level

Panel A reports the number and percentage of sub-advised funds as well as the proportion of each type of sub-advisory agreement over the period 1996–2011 for all US open-end funds. The *Conflict of interest* column contains the number of funds managed externally by an unaffiliated sub-advisor that is either the advisor of its own mutual funds or managing mutual funds for several fund families. *Co-branding* refers to funds that use the sub-advisor's reputation by including the sub-advisor's name in the fund's name. *Multi-advising* refers to funds sub-advised by more than one sub-advisor. *Performance fee* applies when the sub-advised fund charges a floating fee that depends on prior fund performance. The last column (*Mechanism*) indicates the proportion of sub-advised funds that use any of the contractual agreements (co-branding, multi-advising, and/or performance fee). The last five columns are shown as a percentage of sub-advised funds. Panel B shows the average information for the whole sample, classifying mutual funds in different categories by asset classes.

	All funds	Sub-advised funds	Conflict of interest (%)	Co-branding (%)	Multi-advising (%)	Performance fee (%)	Mechanism (%)
Panel A: Over time							
1996	2562	322 (12.6%)	68.0	12.24	14.77	4.22	30.38
1997	2799	339 (12.1%)	74.6	17.62	15.33	4.60	36.40
1998	2928	358 (12.2%)	77.1	18.25	24.21	3.51	45.26
1999	2924	354 (12.1%)	79.4	21.31	22.34	3.09	45.70
2000	3235	378 (11.7%)	82.5	20.31	25.85	3.69	47.08
2001	2919	342 (11.7%)	87.1	15.02	21.09	4.47	34.82
2002	3125	404 (12.9%)	90.3	13.21	28.03	4.58	40.16
2003	3032	433 (14.3%)	91.5	17.08	38.12	5.45	51.24
2004	2851	387 (13.6%)	91.5	20.22	37.67	6.65	55.12
2005	2687	374 (13.9%)	95.7	15.93	24.18	4.12	40.11
2006	2464	328 (13.3%)	89.3	16.67	31.33	5.33	47.33
2007	2382	345 (14.5%)	98.6	14.12	23.05	3.46	38.62
2008	2371	362 (15.3%)	97.8	16.90	24.93	6.93	45.15
2009	2469	414 (16.8%)	99.3	16.95	21.24	4.53	39.14
2010	2280	388 (17.0%)	98.7	14.55	21.56	4.16	38.18
2011	2196	412 (18.8%)	85.4	13.56	22.03	4.24	37.29
Average	*2702*	*371 (13.7%)*	88.4	*16.50*	*24.73*	*4.56*	*42.00*
Panel B: Asset classes							
Equity	1409	212 (15.0%)	91.0	21.00	30.80	4.60	52.30
Fixed-income	744	62 (8.3%)	90.3	8.50	3.40	1.70	10.20
International	324	69 (21.3%)	82.6	14.00	24.60	5.30	43.90
Balanced	132	23 (17.4%)	78.3	10.00	30.00	10.00	40.00
Others	93	5 (5.4%)	80.0	0.00	20.00	0.00	20.00

Table 2

Mutual funds and management company characteristics

This table reports summary statistics for mutual funds and management companies over the period 1996–2011 for US open-end funds. Panel A includes domestic equity funds and Panel B fixed-income funds. Both panels present the averages for different variables computed across the different segments: all funds, funds managed in-house, outsourced funds, funds with conflict of interest, and outsourced funds using co-branding, multi-advising, performance fee, or any of these arrangements (Mechanism). Panel C, in the first column, shows the average data for those management companies that never use outsourcing (all their mutual funds are managed in-house), and the second column presents the average data for management companies that are not managing all mutual funds in–house (at least one is outsourced). The last column presents a *t*-test for the difference of means. * denotes significance at the 10% level, ** denotes significance at the 5% level, and *** denotes significance at the 1% level. All variables are winsorized at the 1st and 99th percentiles. Variable definitions are provided in Table A.1 in the Appendix.

Panel A: Mutual fund characteristics: Equity

	All	In-house	Sub-advised	Conflict of interest	Co-branding	Multi-advising	Performance fee	Mechanism
Fund size (log TNA)	4.1	4.2	3.8	3.8	3.8	4.3	4.0	4.1
Fund age (years)	8.6	9.1	7.2	7.4	6.3	8.1	8.0	7.3
Distribution fee (% per year)	0.22	0.21	0.24	0.25	0.25	0.21	0.10	0.21
Expenses (% per year)	1.4	1.4	1.5	1.5	1.5	1.4	1.4	1.4
Turnover (% per year)	101.9	103.8	95.1	93.8	85.2	91.0	96.2	89.2
Flows (% per year)	51.1	51.3	50.3	49.9	43.6	58.2	34.8	50.0
Gross returns (% past year)	8.0	8.3	6.9	6.6	8.3	7.5	4.5	7.4

Panel B: Mutual fund characteristics: Fixed-income

	All	In-house	Sub-advised	Conflict of interest	Co-branding	Multi-advising	Performance fee	Mechanism
Fund size (log TNA)	4.2	4.2	4.1	4.1	4.0	4.2	3.7	4.1
Fund age (years)	9.5	9.6	8.9	8.9	8.8	10.1	8.4	9.5
Distribution fee (% per year)	0.21	0.21	0.20	0.20	0.23	0.19	0.09	0.19
Expenses (% per year)	1.0	1.0	1.1	1.1	1.1	1.1	1.1	1.1
Turnover (% per year)	137.2	126.9	187.7	192.9	155.2	163.9	124.1	156.6
Flows (% per year)	48.0	49.2	42.0	46.0	40.9	46.8	10.8	38.9
Gross returns (% past year)	6.4	6.4	6.6	6.6	5.6	6.4	6.8	6.2

Table 2 (continued)

Mutual funds and management company characteristics

Panel C: Management companies characteristics

	Management companies never using outsourcing	Management companies using outsourcing	Difference
Family size (log TNA)	4.77	6.30	-1.53***
Family funds (log number of funds)	1.08	2.40	-1.32***
Family with top 5 funds	0.31	0.56	-0.25***
Funds started (number of funds)	0.07	0.32	-0.25***
Family total expenses (% objective-adjusted)	0.33	0.30	0.03***
Family experience (log years)	1.30	1.43	-0.14***
Family performance (% monthly objective-adjusted)	0.01	-0.01	0.01

Table 3

Sub-advising equity mutual funds using mechanisms

This table reports monthly Fama-MacBeth (1973) estimates of risk-adjusted returns on fund characteristics over the period 1996–2011 for US equity open-end funds. Fund returns are calculated after fees and expenses (net return). The dependent variable is fund performance measured by the alpha from CAPM (ALPHA 1F), the Fama-French three-factor model (ALPHA 3F), and Carhart's four-factor model (ALPHA 4F). Conflict is a dummy variable that equals one if the sub-advised fund is managed by a family that is either managing its own mutual funds or managing mutual funds for several clients and zero otherwise. Mechanism is a dummy variable equal to one if the fund is sub-advised using co-branding, multi-manager, or performance-fee arrangements and 0 otherwise. Panel B repeats the analysis using each specific mechanism (co-branding, multi-advising, and performance-fee) in a different regression. Control variables are lagged one period. In Panel B, control variables are included although not reported. Investment style dummies are always included but not reported. The constant term has been omitted. The *t*-statistics adjusted for serial correlation using Newey-West (1987) are reported in parentheses. Variable definitions are provided in Table A.1 in the Appendix. * denotes significance at the 10% level, ** denotes significance at the 5% level, and *** denotes significance at the 1% level.

	ALPHA 1F		ALPHA 3F		ALPHA 4F	
Panel A: Mechanisms in general						
Conflict	-0.044***	-0.054**	-0.033**	-0.050***	-0.031**	-0.048***
	(-2.65)	(-2.49)	(-2.40)	(-3.13)	(-2.25)	(-2.97)
Mechanism		-0.007		-0.002		0.001
		(-0.45)		(-0.12)		(0.08)
Conflict × Mechanism		0.054**		0.058**		0.079***
		(2.11)		(2.40)		(3.01)
Fund size (log TNA)	-0.010**	-0.009**	-0.008**	-0.008**	-0.012***	-0.012***
	(-2.34)	(-2.28)	(-2.21)	(-2.19)	(-3.06)	(-3.06)
Family size (log family TNA)	0.030***	0.031***	0.022***	0.023***	0.022***	0.023***
	(4.82)	(4.94)	(4.12)	(4.23)	(4.36)	(4.52)
Family funds	-0.046***	-0.046***	-0.029***	-0.030***	-0.028***	-0.029***
	(-3.49)	(-3.50)	(-3.02)	(-3.11)	(-3.19)	(-3.36)
Fund age	0.033***	0.033***	0.026**	0.026**	0.028***	0.028***
	(4.29)	(4.16)	(2.47)	(2.39)	(2.72)	(2.69)
Distribution fee	-0.162***	-0.167***	-0.061**	-0.063**	-0.071***	-0.071***
	(-4.04)	(-4.15)	(-2.18)	(-2.25)	(-2.80)	(-2.84)
Expenses	0.028	0.026	-0.037	-0.040	-0.044	-0.048
	(0.67)	(0.63)	(-1.18)	(-1.26)	(-1.44)	(-1.54)
Turnover	0.022	0.021	0.006	0.007	0.003	0.004
	(1.60)	(1.60)	(0.39)	(0.43)	(0.24)	(0.34)
Flows	0.045***	0.044***	0.029***	0.028***	0.028***	0.028***
	(5.34)	(5.29)	(4.68)	(4.66)	(4.53)	(4.51)
Past returns	0.024***	0.024***	0.025***	0.025***	0.023***	0.023***
	(7.26)	(7.26)	(6.10)	(6.12)	(5.93)	(5.96)
Observations	184199	184199	184199	184199	184199	184199
R^2	0.170	0.168	0.168	0.165	0.155	0.153

Table 3 (continued)
Sub-advising equity mutual funds using mechanisms.

	ALPHA 1F	ALPHA 3F	ALPHA 4F
Panel B: Specific Mechanisms			
Conflict	-0.073***	-0.065***	-0.070***
	(-3.59)	(-3.89)	(-4.17)
Co-branding	-0.015	-0.001	0.037
	(-0.57)	(-0.04)	(1.52)
Conflict × Co-branding	0.121***	0.133***	0.125***
	(3.37)	(3.83)	(3.17)
R^2	0.168	0.165	0.154
Conflict	-0.062***	-0.042***	-0.039***
	(-3.55)	(-2.77)	(-2.61)
Multi-advising	0.019	-0.018	-0.041
	(0.49)	(-0.42)	(-1.18)
Conflict × Multi-advising	0.082***	0.068**	0.079***
	(3.10)	(2.48)	(2.79)
R^2	0.169	0.169	0.156
Conflict	-0.047***	-0.023**	-0.020*
	(-4.49)	(-2.26)	(-1.90)
Performance-fee	-0.048	-0.026	-0.033
	(-1.62)	(-1.12)	(-1.63)
Conflict × Performance-fee	0.031**	0.040**	0.068***
	(2.30)	(2.48)	(2.79)
R^2	0.235	0.196	0.188
Observations	184199		

Table 4

Sub-advising mutual funds using mechanisms by asset category.

This table reports monthly Fama-MacBeth (1973) estimates of risk-adjusted returns on fund characteristics. The sample contains US mutual funds from 1996 to 2011 for different categories (in columns): International, Balanced, and Fixed-income funds. Fund returns are calculated after fees and expenses (net returns). The dependent variable is fund performance measured by Carhart's model augmented by an international index (ALPHA 5F) and a global bond index (ALPHA 6F), and Carhart's model augmented by three government bond indexes and two corporate indexes (ALPHA 9F). Conflict is a dummy variable that equals one if the sub-advised fund is managed by a family that is either managing its own mutual funds or managing mutual funds for several clients and zero otherwise. Mechanism is a dummy variable equal to one if the fund is sub-advised using co-branding, multi-manager, or performance-fee arrangements and zero otherwise. Panel B repeats the analysis using each specific mechanism (co-branding, multi-advising, and performance-fee) in a different regression, and control variables (lagged) are included although not reported. Investment style dummies are always included but not reported. The constant term has been omitted. The *t*-statistics adjusted for serial correlation using Newey-West (1987) are reported in parentheses. Variable definitions are provided in Table A.1 in the Appendix. * denotes significance at the 10% level, ** denotes significance at the 5% level, and *** denotes significance at the 1% level.

	INTERNATIONAL FUNDS ALPHA 5F		BALANCED FUNDS ALPHA 6F		FIXED INCOME FUNDS ALPHA 9F	
Panel A: Mechanisms in general						
Conflict	-0.123***	-0.122***	-0.050**	-0.063***	-0.063*	-0.075*
	(-5.45)	(-4.50)	(-2.34)	(-3.28)	(-1.79)	(-1.75)
Mechanism		-0.050		-0.003		0.022
		(-1.51)		(-0.16)		(1.16)
Conflict × Mechanism		0.052**		0.049***		-0.006
		(1.99)		(3.03)		(-0.18)
Fund size (log TNA)	-0.015	-0.011	-0.006**	-0.006**	0.002	0.002
	(-1.38)	(-1.03)	(-2.25)	(-2.27)	(0.80)	(0.98)
Family size (log family TNA)	0.038***	0.039***	-0.002	-0.003	0.003	0.003
	(4.34)	(4.43)	(-0.35)	(-0.47)	(0.98)	(0.94)
Family funds	-0.054***	-0.055***	0.026***	0.028***	0.003	0.003
	(-3.16)	(-3.19)	(2.82)	(3.12)	(0.49)	(0.49)
Fund age	0.069**	0.071**	0.011	0.011	0.005	0.005
	(2.09)	(2.06)	(1.53)	(1.57)	(0.75)	(0.73)
Distribution fee	-0.217***	-0.225***	-0.073***	-0.075***	-0.022	-0.024
	(-5.72)	(-5.74)	(-7.28)	(-7.01)	(-1.51)	(-1.55)
Expenses	-0.029	-0.013	-0.030**	-0.030**	-0.064***	-0.061***
	(-0.68)	(-0.33)	(-2.47)	(-2.34)	(-4.18)	(-3.97)
Turnover	0.016	0.026	-0.013*	-0.011	0.001	0.002
	(0.53)	(0.90)	(-1.67)	(-1.27)	(0.76)	(0.81)
Flows	0.070***	0.070***	0.054***	0.054***	0.012***	0.012***
	(4.45)	(4.52)	(3.54)	(3.58)	(2.83)	(2.70)
Past returns	0.017***	0.014**	0.025***	0.026***	0.007**	0.007**
	(2.83)	(2.06)	(6.10)	(6.02)	(2.24)	(2.33)
Observations	44207	44207	17984	17984	88733	88733
R^2	0.224	0.219	0.128	0.122	0.218	0.218

Table 4 (continued)

Sub-advising mutual funds using mechanisms by asset category.

	INTERNATIONAL FUNDS ALPHA 5F	BALANCED FUNDS ALPHA 6F	FIXED INCOME FUNDS ALPHA 9F
Panel B: Specific Mechanisms			
Conflict	-0.130***	-0.052**	-0.069*
	(-6.84)	(-2.36)	(-1.90)
Co-branding	-0.038	-0.056	0.041*
	(-1.00)	(-1.59)	(1.86)
Conflict × Co-branding	0.137***	0.024*	-0.024
	(3.35)	(1.88)	(-0.97)
R^2	0.266	0.128	0.217
Conflict	-0.099***	-0.053***	-0.007
	(-5.48)	(-3.85)	(-0.88)
Multi-advising	-0.307	-0.090	-0.012
	(-1.20)	(-1.50)	(-0.93)
Conflict × Multi-advising	0.110***	0.076***	-0.025
	(2.88)	(3.15)	(-1.09)
R^2	0.274	0.126	0.210
Conflict	-0.082***	-0.059***	-0.017*
	(-3.79)	(-3.67)	(-1.73)
Performance-fee	0.080***	0.054***	0.083***
	(3.06)	(3.53)	(3.06)
Conflict × Performance-fee	0.062*	0.038**	0.014
	(1.74)	(2.24)	(0.39)
R^2	0.219	0.118	0.102
Observations	44207	17984	88733

Table 5

Reputation, competitiveness, and incentives

This table reports the estimates of monthly logistic regressions addressing whether external funds are under different contractual arrangements based on different sub-advisor, fund, and family characteristics. The dependent variable is a dummy that equals one if the outsourced fund is using a co-branding model (Panel A), a multi-advising contract (Panel B), or a performance-based fee (Panel C). The explanatory variables (proxies for reputation, competitiveness, and incentive alignment) and controls are defined in Table A.1. The sample contains US equity mutual funds from 1996 to 2011. Time and investment-style dummies are included but not reported; *t*-statistics are reported in parentheses, and the constant term has been omitted. For each panel, in the second column, we show average marginal effects (Mfx), and standard deviations (Std) are shown in squared brackets. The unconditional probability is described as the baseline predicted probability. Standard errors are clustered at fund level. * denotes significance at the 10% level, ** denotes significance at the 5% level, and *** denotes significance at the 1% level.

	Panel A: Reputation Co-branding		*Panel B: Competitiveness Multi-advising*		*Panel C: Incentives Performance-fee*	
	Coef / *t*	Mfx / Std	Coef / *t*	Mfx / Std	Coef / *t*	Mfx / Std
Sub-advisor experience	0.341**	0.007			-0.500***	-0.003***
	(2.50)	[0.695]			[-3.14]	[0.709]
Top 5 sub-advisor	0.318**	0.007				
	(2.55)	[0.179]				
Sub-advisor performance	0.236***	0.005				
	(2.59)	[0.355]				
Sub-advisor idiosyncratic dev.			0.422**	0.014		
			(2.31)	[0.251]		
Sub-advisor beta dev.			0.179***	0.006		
			(4.66)	[1.938]		
Sub-advisor return dispersion					0.266***	0.002***
					[2.81]	[1.597]
Fund size (log TNA)	0.016	0.000	0.038	0.001	-0.023	-0.000
	(0.36)	[2.098]	(0.81)	[2.066]	[-0.25]	[2.082]
Family size (log family TNA)	-0.233***	-0.005	0.083	0.003	0.006	0.000
	(-3.68)	[2.660]	(1.48)	[2.855]	[0.05]	[2.856]
Family funds	0.488***	0.011	-0.281**	-0.010	0.266	0.002
	(3.69)	[1.246]	(-2.24)	[1.307]	[1.09]	[1.310]
Fund age	-0.614***	-0.013	-0.386**	-0.013	-0.266	-0.002
	(-3.13)	[0.556]	(-2.41)	[0.558]	[-0.74]	[0.557]
Distribution fee	-0.205	-0.004	-0.299	-0.010	-3.076***	-0.021***
	(-0.68)	[0.326]	(-1.12)	[0.324]	[-3.21]	[0.324]
Expenses	0.086	0.002	0.077	0.003	0.372	0.003
	(0.51)	[0.530]	(0.51)	[0.532]	[1.11]	[0.529]
Turnover	-0.042	-0.001	-0.075**	-0.003	-0.080	-0.001
	(-1.02)	[1.910]	(-2.06)	[1.844]	[-1.37]	[1.886]
Flows	0.011	0.000	-0.044	-0.001	-0.004	-0.000
	(0.87)	[1.964]	(-1.11)	[1.978]	[-0.10]	[1.936]
Past returns	0.027**	0.001	-0.025***	-0.001	-0.029**	-0.000**
	(2.43)	[6.294]	(-3.41)	[6.364]	[-2.31]	[6.304]
Style and time dummies	Yes		Yes		Yes	
Observations	184199		184199		184199	
Pseudo R^2	0.036		0.043		0.080	
Baseline predicted probability	0.025		0.033		0.010	

Table 6

Outsourcing and market share: Management company level

This table reports results for the system GMM regressions of management company market share on family outsourcing decisions. We capture outsourcing decisions using three variables: Outsourcing policy, Outsource new style, and the Ratio of outsourced funds. The sample includes all US management companies from 1996 to 2011. Low ratio, Mid ratio, and High ratio variables are used instead of the Ratio of outsourced funds to test the nonlinear relation between the proportion of outsourced funds and the market share. Control variables are Family expenses, Family performance, Funds started, Family funds, Family turnover, Family experience, Family with top 5 funds, and Herfindahl across funds. Definitions are provided in Table A.1 in the Appendix. Variables are lagged 12 months as indicated in Eq. (4). Time dummies are also included but not reported, and the constant term has been omitted. We report *p*-values in parentheses, using robust standard errors. * denotes significance at the 10% level, ** denotes significance at the 5% level, and *** denotes significance at the 1% level.

	Market share				
	(1)	(2)	(3)	(4)	(5)
Outsourcing policy	0.299***				0.216**
	(0.00)				(0.01)
Outsource new style		0.113*			0.103**
		(0.07)			(0.03)
Ratio outsourced funds			0.843**		
			(0.02)		
Low ratio				2.013***	1.810*
				(0.01)	(0.06)
Mid ratio				0.132	0.135
				(0.81)	(0.76)
High ratio				-6.976	-2.324
				(0.16)	(0.51)
Past market share	0.145**	0.144**	0.145**	0.145**	0.146**
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Time dummies	Yes	Yes	Yes	Yes	Yes
Control variables	Yes	Yes	Yes	Yes	Yes
Observations	24623	24623	24623	24623	24623

Table 7
Flow-performance sensitivity

This table shows the results for the regressions of fund flows on fund return ranks. The dependent variable is the percentage of net new inflows into the fund over the previous year. Return rank variables are estimated using a piecewise linear regression framework to define three linear segments in the flow-performance sensitivity following Sirri and Tufano (1998). Mechanism is a dummy equal to one if the fund is outsourced and uses co-branding, multi-managers, and/or performance fee arrangements. Control variables are Fund size, Family size, and Expenses, and Std monthly returns are lagged one period. Time and investment style dummies, and control variables (family size, family funds, age, distribution and marketing fees, expenses, turnover, flows, and past returns) are included but not reported. *t*-statistics are reported in parentheses, standard errors are clustered at fund level, and the constant term has been omitted. The sample contains US equity mutual funds from 1996 to 2011. Variable definitions are in Table A.1. * denotes significance at the 10% level, ** denotes significance at the 5% level, and *** denotes significance at the 1% level.

	Fund flows				
	(1)	(2)	(3)	(4)	(5)
LowRank	-0.129	-0.126	-0.125	-0.127	-0.120
	(-0.73)	(-0.72)	(-0.71)	(-0.72)	(-0.68)
MidRank	-0.043	-0.140	-0.131	-0.114	-0.139
	(-0.47)	(-1.33)	(-1.25)	(-1.06)	(-1.33)
HighRank	0.812***	0.803***	0.769***	0.803***	0.839***
	(8.07)	(7.96)	(7.43)	(7.73)	(8.08)
Mechanism		0.049	0.066	0.107	0.051
		(0.61)	(0.86)	(1.41)	(0.62)
LowRank × Mechanism		0.871*			0.549**
		(1.69)			(2.01)
MidRank × Mechanism			0.362*		0.267*
			(1.85)		(1.72)
HighRank × Mechanism				0.203	-0.558*
				(0.32)	(-1.85)
Control variables	Yes	Yes	Yes	Yes	Yes
Observations	184199	184199	184199	184199	184199
Adjusted R^2	0.029	0.029	0.029	0.029	0.029

Table 8
Distribution channel

This table reports the results of monthly logistic regression estimates of whether a sub-advised mutual fund uses mechanisms on the type of distribution channel and other fund and family characteristics. The dependent variable is Mechanism (a dummy equal to one if the fund is outsourced and uses co-branding, multi-managers, and/or performance fee arrangements). Indirect channel is a dummy variable that equals one if the fund charges a load fee as a proxy for indirect distribution. Time and investment-style dummies and control variables (family size, family funds, age, distribution and marketing fees, expenses, turnover, flows, and past returns) are included but not reported. Average marginal effects (Mfx) and standard deviations (Std) are also shown. *t*-statistics are reported in parentheses, standard errors are clustered at fund level, and the constant term has been omitted. The sample contains US equity sub-advised funds from 1996 to 2011. Variable definitions are in Table A.1. * denotes significance at the 10% level, ** denotes significance at the 5% level, and *** denotes significance at the 1% level.

	The use of mechanism			
	Coef	*t*-stat	Mfx	Std
Indirect channel	-0.9682***	(-3.14)	-0.2361***	0.4696
Conflict	0.6574***	(5.98)	0.1603***	0.4958
Conflict × Indirect channel	0.6126**	(2.01)	0.1494**	0.4508
Control variables	Yes			
Observations	40962			
Pseudo R^2	0.086			
Baseline predicted probability	0.350			

Table 9

The effect of bargaining power on sub-advising decisions–3SLS procedure

This table presents a three-stage procedure of the effect of sub-advisory agreements with mechanisms on equity mutual fund performance. Panel A shows the 1st stage of a probit regression of the determinants of the mechanism variable on a set of controls and an instrument variable (Sub-advisor revenue dependence). The dependent variable is a dummy variable equal to one if the fund is sub-advised using co-branding, multi-manager, or performance fee arrangements and zero otherwise. Sub-advisor revenue dependence measures the proportion of the sub-advisor's total income that comes from the advisor of that specific outsourced mutual fund (it is computed as sub-advisor revenues from the advisor owner of fund "*j*" divided by the sub-advisor's total revenues). The second column in Panel A shows the average marginal effects (Mfx), and standard deviations (Std) are also presented in squared brackets. Panel B shows the 3rd-stage estimation of the effect of sub-advising with mechanisms on fund performance. The dependent variable is fund performance measured by the alpha from CAPM (ALPHA 1F), the Fama-French three-factor model (ALPHA 3F), and Carhart's four-factor model (ALPHA 4F). Fitted mechanism is the fitted value of the Mechanism variable from the 2nd-stage regression of the 2SLS estimation. The sample includes domestic US equity mutual funds from 1996 to 2011. Time and style dummies are included but not reported, and the constant terms have been omitted. The *t*-statistics are reported in parentheses adjusted for serial correlation using Newey-West (1987). The baseline predicted probability of Panel A is 0.073. The variable definitions are in Table A.1. * denotes significance at the 10% level, ** denotes significance at the 5% level, and *** denotes significance at the 1% level.

	Panel A: (1st Stage) – The use of mechanism		*Panel B: (3rd Stage) – Fund performance*		
	Coef/*t*	Mfx / Std	ALPHA 1F	ALPHA 3F	ALPHA 4F
Sub-advisor revenue dependence	0.505***	0.059			
	(4.642)	[0.225]			
Conflict x Fitted mechanism			0.126***	0.063**	0.048*
			(4.21)	(2.47)	(1.91)
Fitted mechanism			-0.038	-0.041	-0.035
			(-1.24)	(-1.63)	(-1.49)
Conflict	1.587***	0.185	-0.091***	-0.037**	-0.039**
	(23.113)	[0.291]	(-4.83)	(-2.02)	(-2.22)
Fund size (log TNA)	-0.002	-0.000	-0.005*	-0.003	-0.004
	(-0.092)	[1.636]	(-1.66)	(-1.11)	(-1.29)
Family size (log family TNA)	0.065***	0.008	0.029***	0.028***	0.030***
	(3.012)	[2.868]	(8.36)	(8.40)	(8.34)
Family funds	-0.134***	-0.016	-0.041***	-0.033***	-0.036***
	(-2.960)	[1.313]	(-4.57)	(-4.46)	(-4.77)
Fund age	-0.098**	-0.011	0.031***	0.037***	0.028***
	(-1.964)	[0.558]	(3.27)	(3.44)	(2.69)
Distribution fee	-0.308***	-0.036	-0.179***	-0.109***	-0.111***
	(-2.762)	[0.323]	(-9.98)	(-7.18)	(-7.84)
Expenses	0.056	0.007	0.070***	0.011	0.009
	(0.876)	[0.535]	(4.15)	(0.81)	(0.66)
Turnover	-0.005	-0.001	-0.009***	-0.012***	-0.012***
	(-0.543)	[2.042]	(-4.22)	(-5.91)	(-6.60)
Flows	-0.024**	-0.003	0.025***	0.019***	0.018***
	(-2.061)	[2.048]	(13.58)	(10.81)	(11.37)
Past returns	-0.002	-0.000	0.021***	0.015***	0.012***
	(-0.722)	[6.442]	(9.18)	(6.90)	(6.05)
Style dummies	Yes	Yes	Yes	Yes	Yes
Time dummies	Yes	Yes	Yes	Yes	Yes
Observations	184199		184199	184199	184199
Pseudo R^2	0.201				
R^2			0.064	0.040	0.035

Table 10

New styles and market share: Selection bias approach

This table reports the monthly regressions with and without applying a selection bias approach to the effect of managing (either in-house or sub-advised) new investment styles on fund family market share. The sample includes all US management companies from 1996 to 2011. The dependent variable in Panel A is In-house new style, a dummy variable that equals one for management companies that are currently offering a new investment style that is managed in-house. Herfindahl in-house styles is the sum of the squared fractions of each investment objective's share in total management company assets of in-house managed funds. In Panel A, the second column shows average marginal effects (Mfx), and additionally, standard deviations (Std) are shown in squared brackets. In Panel B, we report the estimates of system GMM regressions where the dependent variable is log(market share), the natural logarithm of the sum of all assets under management by each management company divided by all assets under management in the industry in that period. New style is a dummy variable that equals one for management companies that are currently offering a new investment style that is managed either in-house or outsourced. Inverse Mills' ratio has been estimated from the probit model of Panel A (Heckman correction approach). Time dummies are included but not reported, and the constant term has been omitted. *p*-values are reported in parentheses using robust standard errors. The baseline predicted probability of Panel A is 0.593. Variable definitions are in Table A.1. * denotes significance at the 10% level, ** denotes significance at the 5% level, and *** denotes significance at the 1% level.

	Panel A: *Prob (In-house new style)*		*Panel B:* *Log(market share)*		
	Coef/*p*-value	Mfx/Std	Coef/*p*-value	Coef/*p*-value	Coef/*p*-value
Herfindahl in-house styles	-0.127***	-0.047			
	(0.00)	[0.311]			
New style			0.1206**	0.0275	-0.0596
			(0.05)	(0.74)	(0.33)
In-house new style				0.0490	0.1063*
				(0.49)	(0.06)
Outsource new style				0.1260**	0.1011*
				(0.03)	(0.07)
Family expenses	0.054***	0.020	-0.0008	-0.0011	-0.0070
	(0.00)	[0.549]	(0.98)	(0.98)	(0.86)
Family performance	-0.006	-0.002	0.0006	0.0006	-0.0012
	(0.19)	[2.028]	(0.42)	(0.42)	(0.22)
Funds started	-0.016***	-0.006	-0.0116	-0.0116	-0.0097
	(0.00)	[2.077]	(0.19)	(0.18)	(0.20)
Family funds	0.675***	0.251	0.1464*	0.1417*	0.3700**
	(0.00)	[1.342]	(0.07)	(0.08)	(0.02)
Family turnover	-0.005	-0.002	0.0645*	0.0642*	0.0605
	(0.40)	[1.563]	(0.07)	(0.08)	(0.10)
Family experience	0.021**	0.008	2.9879***	2.9648***	2.8806***
	(0.05)	[0.810]	(0.00)	(0.00)	(0.00)
Top 5% performance	0.065***	0.024	-0.0039	-0.0038	0.0132
	(0.00)	[0.499]	(0.30)	(0.31)	(0.11)
Herfindahl across funds	-0.633***	-0.236	-0.0003	0.0006	-0.1728
	(0.00)	[0.320]	(1.00)	(0.99)	(0.20)
Past market share			0.1853***	0.1849***	0.1192**
			(0.00)	(0.00)	(0.04)
Inverse Mills' ratio					0.5190**
					(0.05)
Time dummies	Yes		Yes	Yes	Yes
Observations	24623		24623	24623	24623
Pseudo R^2	0.364				

Table 11

Sub-advising equity mutual funds using mechanisms: Side-by-side management

This table reports monthly Fama-MacBeth (1973) estimates of risk-adjusted returns on fund characteristics. Fund returns are calculated after fees and expenses (net return). The dependent variable is fund performance measured by the alpha from Carhart's four-factor model (ALPHA 4F). Conflict is a dummy variable that equals one if the sub-advised fund is managed by a family that is either managing its own mutual funds or managing mutual funds for several clients, and zero otherwise. Mechanism is a dummy variable equal to one if the fund is sub-advised using co-branding, multi-manager, or performance-fee arrangements and zero otherwise. SbS PIV advisor is a dummy variable that equals one if the advisor provides at least one pooled investment vehicle (PIV) such as hedge funds or commingled trust. SbS SepAcc advisor is a dummy variable that equals one if the advisor offers institutional accounts such as pension funds, endowments, wealthy investors, etc. SbS manager dummy and SbS manager % indicate families with side-by-side managers and the percentage of funds in the family with side-by-side managers, respectively. Side-by-side managers are defined as those managing mutual funds and hedge funds simultaneously. In Panel A, we report all domestic US equity funds of our sample, while Panel B is restricted to US equity funds managed by the largest 30 fund families from 2005 to 2011. Investment style dummies and control variables are included but not reported. The constant term has been omitted. The *t*-statistics adjusted for serial correlation using Newey-West (1987) are reported in parentheses. * denotes significance at the 10% level, ** denotes significance at the 5% level, and *** denotes significance at the 1% level.

	Fund performance (ALPHA 4F)					
Panel A: Advisory firms managing side-by-side pooled investment vehicles and separate accounts						
Conflict	-0.038***	-0.012*	-0.038**	-0.042***	-0.013*	-0.056***
	(-3.85)	(-1.77)	(-2.05)	(-4.17)	(-1.76)	(-2.94)
Mechanism			0.010			0.013
			(0.65)			(0.90)
Conflict*Mechanism			0.091***			0.089***
			(3.91)			(3.56)
SbS PIV advisor	0.026***	0.032***	0.031***			
	(3.14)	(3.72)	(3.59)			
Conflict x SbS PIV advisor		-0.059***	-0.043**			
		(-2.64)	(-2.04)			
SbS SepAcc advisor				0.025***	0.029***	0.029***
				(3.30)	(3.78)	(3.86)
Conflict x SbS SepAcc advisor					-0.054**	-0.017
					(-2.56)	(-0.85)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes
Observations	184199	184199	184199	184199	184199	184199
R^2	0.149	0.150	0.150	0.149	0.149	0.149
Panel B: Individual managers running side-by-side hedge funds						
Conflict	-0.042*	-0.051**	-0.051**	-0.091***	-0.062**	-0.095***
	(-1.89)	(-2.13)	(-2.29)	(-4.01)	(-2.45)	(-3.80)
Mechanism					0.030	0.036
					(1.07)	(1.50)
Conflict x Mechanism					0.064***	0.065***
					(3.00)	(2.76)
SbS manager dummy		-0.047***		-0.053***		-0.053***
		(-3.03)		(-3.35)		(-3.31)
SbS manager %	-0.739		-0.742		-0.741	
	(-1.16)		(-1.17)		(-1.17)	
Conflict x SbS manager dummy				0.069**		0.026
				(2.37)		(0.89)
Conflict x SbS manager %			0.644		-0.205	
			(0.76)		(-0.27)	
Control variables	Yes	Yes	Yes	Yes	Yes	Yes
Observations	38574	38574	38574	38574	38574	38574
R^2	0.172	0.171	0.171	0.171	0.169	0.168

Internet Appendix to

"Management sub-advising in the mutual fund industry"

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Technical Appendix: Jaccard Similarity for a Fuzzy Match

Also known as the Jaccard Index, the Jaccard similarity coefficient is a statistical measure of similarity between sample sets. For two sets, it is defined as the cardinality of their intersection divided by the cardinality of their union. For example, the sets {a, b, c} and {a, c, d} have a Jaccard similarity of 2/4 = 0.5 because the cardinality of their intersection is 2 {a, c} and that of their union is 4 {a, b, c, d}. The maximum obtainable index is one, in which case the sets are identical; therefore, the higher the index is, the greater the similarity between the sets.

A more sophisticated way to proceed with this algorithm is to use the weighted Jaccard Index, which enables us to assign weights to each item in a set and define the weighted Jaccard similarity index as the total weight of the intersection divided by the total weight of the union. Imagine an example with weights as follows: {(a, 25), (b, 35), (c, 13)}, {(a, 25), (c, 13), (d, 27)}. The weighted Jaccard similarity is then (25 + 13) / (25 + 35 + 13 + 27) = 38/100 = 0.38.

Because Jaccard similarity is defined over sets, our fuzzy match algorithm must convert data records to sets before calculating the Jaccard similarity. We can convert the data into sets of words, using spaces to separate the sets (trust and fund name). For example, the record {“Pacific Select Fund,” “Fidelity Series”} will be structured into the set {“Pacific,” “Select,” “Fund,” “Fidelity,” “Series”}. Then, a weight is assigned to each word because not all the words are of equal importance. Words are assigned high weights if they occur infrequently in a sample of records and low weights if they occur frequently. For example, frequent words such as “Fund” might be given a low weight, while less frequent words such as “Vanguard” might be given a high weight. We also include some words repeated frequently in the sample but were considered to be of high importance and so were manually assigned high weights.

Finally, transforming the sample can greatly increase the power of the Jaccard Index. For example, if we allow an abbreviation such as “US” to represent “USA,” “EEUU”, or “United States,” we obtain better results. This also occurs with misspelled words. For example, “Pidelity” is not a different word from “Fidelity” but rather a typographical error made by the register. Therefore, weighted Jaccard Index similarity under transformation is the maximum weighted Jaccard similarity across all pairs of transformed sets. We use fuzzy match and Jaccard similarity together to find the pair of inputs with the highest Jaccard Index.

We proceed as follows:

1. The name of the fund in the CRSP files is written as "trust name: fund name, class." Once we aggregate the class-level information to the fund level, we eliminate the class; thus, we have, for each observation, the trust name and the fund name. We collect identical information for each observation in the NSAR database (trust and fund name).
2. When we have trust and fund names in both databases, we conduct a fuzzy match by name using weighted Jaccard similarity (as described above).
3. For each pair of trust and fund names in both databases, we have an index from 0 to 1, which indicates the degree of similarity between the two. We first drop all outputs with index values below 0.5 and directly accept as valid outputs with index values of 1.0.
4. For outputs between 0.50 and 0.85, we double-check characteristics manually, assigning 0 to those belonging to different funds and 1 to those identified as identical. We again drop those with values of 0 and accept those with values of 1.
5. If the output is between 0.85 and 1.00, we undertake another filtering process. We extract key words pertaining to investment style such as "equity," "bond," "small-cap," and so on, and all possible combinations among them. Both outputs must exactly coincide with these words. Thus, at this point, the fund names have a Jaccard similarity above 0.85 and are also characterized by the same investment style. Those that differ in investment style are dropped from the sample.

To ensure the accuracy of the process, we then manually double-check a random set of matches representing 5% of the final data set.

APPENDIX B

In Supplement Tables B.1 through B.10, we report tables for the robustness checks discussed in the text. To save space, the headers summarize the check performed by each table.

Table B.1

Mutual Funds Characteristics: Full Sample

This table reports summary statistics for mutual funds and management companies over the period 1996-2011 for all US open-end funds. Panel A shows the averages for different variables computed across the different segments shown in the columns: all funds, funds managed in-house, outsourced funds, funds with conflict of interest and outsourced funds using co-branding, multi-advising, performance fee or any of these arrangements (Mechanism). All variables are winsorized at the 1st and 99th percentiles. Variable definitions are provided in Table A.1 in the Appendix.

Panel A: Mutual Fund Characteristics

	All	In-House	Sub-Advised	Conflict of Interest	Co-Branding	Multi-Advising	Performance Fee	Mechanism
Fund Size (log TNA)	4.261	4.345	3.887	3.921	3.943	4.254	3.956	4.099
Fund Age (years)	9.447	9.787	7.963	8.121	7.316	8.634	8.119	8.041
Distribution Fee (% per year)	0.210	0.207	0.225	0.229	0.237	0.197	0.102	0.205
Expenses (% per year)	1.163	1.131	1.316	1.291	1.361	1.298	1.321	1.325
Turnover (% per year)	101.461	98.494	114.771	116.678	98.133	102.287	103.240	100.814
Flow (% per year)	51.213	52.007	47.552	48.899	44.364	53.711	21.643	47.091
Gross Returns (% past year)	6.862	6.921	6.571	6.328	7.124	6.933	5.914	6.896

Table B.2
Sub-Advising Equity Mutual Funds using Mechanism. Fixed Effects Analysis

This table presents results for monthly pooled OLS with time and style dummies (Panel A) and sub-advisor fixed effects (Panel B) regression estimates of risk-adjusted returns on fund characteristics. The sample contains US Equity mutual funds from 1996 to 2011. Fund returns are calculated after fees and expenses (net return). The dependent variable is fund performance measured by the alpha from CAPM (ALPHA 1F), the Fama-French three factor model (ALPHA 3F), and Carhart's four factor model (ALPHA 4F). Conflict is a dummy variable that equals 1 if the sub-advised fund is managed by a family that is either managing its own mutual funds or managing mutual funds for several clients, and 0 otherwise. Mechanism is a dummy variable equal to 1 if the fund is sub-advised using co-branding, multi-manager or performance-fee arrangements and 0 otherwise. Control variables previously described are lagged 1 period. Time and Investment Style dummies are included but not reported, and the constant term has been omitted. Standard errors are clustered at fund (Panel A) and sub-advisor (Panel B) levels, and the t-statistics are reported in parentheses. Variable definitions are provided in Table A.1. * denotes significance at the 10% level, ** denotes significance at the 5% level and *** denotes significance at the 1% level.

	Panel A			Panel B		
	ALPHA 1F	ALPHA 3F	ALPHA 4F	ALPHA 1F	ALPHA 3F	ALPHA 4F
Conflict	-0.056***	-0.045***	-0.041***	-0.151***	-0.105***	-0.107***
	(-3.00)	(-3.15)	(-2.89)	(-5.11)	(-4.45)	(-4.51)
Mechanism	-0.012	-0.008	-0.009	0.030	0.052*	0.052*
	(-0.44)	(-0.35)	(-0.40)	(0.81)	(1.72)	(1.80)
Conflict × Mechanism	0.052*	0.045*	0.043*	0.084**	0.041**	0.044**
	(1.89)	(1.82)	(1.81)	(2.27)	(2.36)	(2.54)
Fund Size (log TNA)	-0.010**	-0.006*	-0.008**	-0.020***	-0.012***	-0.013***
	(-2.24)	(-1.88)	(-2.32)	(-4.16)	(-3.23)	(-3.59)
Family Size (log family TNA)	0.034***	0.021***	0.021***	-0.001	0.000	0.001
	(6.09)	(4.71)	(4.74)	(-0.10)	(0.02)	(0.19)
Family Funds	-0.042***	-0.019**	-0.019**	-0.004	-0.010	-0.010
	(-3.56)	(-2.03)	(-2.03)	(-0.26)	(-0.74)	(-0.79)
Fund Age	0.038***	0.031***	0.029***	0.037**	0.028**	0.027**
	(2.85)	(2.88)	(2.70)	(2.58)	(2.43)	(2.41)
Distribution Fee	-0.197***	-0.093***	-0.100***	-0.314***	-0.186***	-0.197***
	(-6.33)	(-3.75)	(-3.90)	(-8.96)	(-6.77)	(-6.94)
Expenses	0.070***	-0.011	-0.012	0.179***	0.071***	0.075***
	(2.67)	(-0.53)	(-0.53)	(7.24)	(3.50)	(3.58)
Turnover	-0.010**	-0.011***	-0.011***	-0.004	-0.009*	-0.008*
	(-2.03)	(-3.27)	(-3.31)	(-0.93)	(-1.94)	(-1.90)
Flows	0.025***	0.017***	0.016***	0.023***	0.015***	0.014***
	(7.29)	(6.94)	(7.01)	(7.29)	(6.66)	(6.66)
Past Returns	0.021***	0.018***	0.016***	0.016***	0.012***	0.010***
	(12.94)	(12.27)	(11.39)	(9.97)	(7.76)	(6.82)
Time Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Style Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Sub-Advisor Fixed Effects	No	No	No	Yes	Yes	Yes
Observations	184199	184199	184199	184199	184199	184199
R^2	0.134	0.133	0.128	0.258	0.230	0.228

Table B.3
Sub-Advising Equity Mutual Funds using Mechanism. Fixed Effects Analysis (II)

This table presents results for monthly pooled OLS with time and style dummies (Panel A) and asset manager fixed effects (Panel B) regression estimates of risk-adjusted returns on fund characteristics. The sample contains US Equity mutual funds from 1996 to 2011. Fund returns are calculated after fees and expenses (net return). The dependent variable is fund performance measured by the alpha from Carhart's four factor model (ALPHA 4F). Conflict is a dummy variable that equals 1 if the sub-advised fund is managed by a family that is either managing its own mutual funds or managing mutual funds for several clients, and 0 otherwise. Mechanism is a dummy variable equal to 1 if the fund is sub-advised using co-branding, multi-manager or performance-fee arrangements and 0 otherwise. Control variables previously described are lagged 1 period. Time and Investment Style dummies are included but not reported, and the constant term has been omitted. Standard errors are clustered at fund (Panel A) and asset manager (Panel B) levels, and the t-statistics are reported in parentheses. Variable definitions are provided in Table A.1. * denotes significance at the 10% level, ** denotes significance at the 5% level and *** denotes significance at the 1% level.

	ALPHA 4F					
	Panel A			Panel B		
Conflict	-0.052***	-0.035**	-0.043***	-0.086***	-0.080***	-0.079***
	(-4.17)	(-2.57)	(-3.39)	(-4.04)	(-3.55)	(-3.62)
Co-Branding	0.023			0.049		
	(0.78)			(1.63)		
Conflict × Co-Branding	0.108***			0.073*		
	(2.75)			(1.73)		
Multi-Advising		-0.050*			-0.025	
		(-1.84)			(-0.67)	
Conflict × Multi-Advising		0.058*			0.066*	
		(1.96)			(1.87)	
Performance-Fee			-0.126*			-0.007
			(-1.76)			(-0.07)
Conflict × Performance-Fee			0.156**			0.066*
			(2.08)			(1.65)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Time Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Style Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Asset Manager Fixed Effects	No	No	No	Yes	Yes	Yes
Observations	184199	184199	184199	184199	184199	184199
R^2	0.099	0.099	0.099	0.223	0.223	0.223

Table B.4 Sub-Advising Equity Mutual Funds Using Mechanisms (Gross Returns)

This table presents monthly Fama-MacBeth (1973) estimates of risk-adjusted returns on fund characteristics. The sample contains US equity funds from 1996 to 2011. Fund returns are calculated before fees and expenses (gross returns). The dependent variable is fund performance measured by the alpha from CAPM (ALPHA 1F), the Fama-French three factor model (ALPHA 3F), and Carhart's four factor model (ALPHA 4F). Mechanism is a dummy variable equal to 1 if the fund is sub-advised using co-branding, multi-manager or performance-fee arrangements and 0 otherwise. Panel B repeats the analysis using each specific mechanism (co-branding, multi-advising and performance-fee) in a different regression, and control variables (lagged) are included although not reported. Investment Style dummies are always included but not reported. Constant term has been omitted. The t-statistics adjusted for serial correlation using Newey-West (1987) are reported in parentheses. * denotes significance at the 10% level, ** denotes significance at the 5% level and *** denotes significance at the 1% level.

	ALPHA 1F		ALPHA 3F		ALPHA 4F	
Panel A: With and without Mechanism						
Conflict	-0.040**	-0.051**	-0.029**	-0.050***	-0.028*	-0.047***
	(-2.34)	(-2.33)	(-2.12)	(-3.07)	(-1.96)	(-2.88)
Mechanism		-0.007		-0.003		0.001
		(-0.44)		(-0.14)		(0.06)
Conflict × Mechanism		0.056**		0.062**		0.082***
		(2.19)		(2.57)		(3.12)
Fund Size (log TNA)	-0.010**	-0.010**	-0.009**	-0.009**	-0.013***	-0.013***
	(-2.53)	(-2.48)	(-2.43)	(-2.43)	(-3.27)	(-3.28)
Family Size (log family TNA)	0.030***	0.031***	0.022***	0.022***	0.022***	0.023***
	(4.81)	(4.89)	(4.14)	(4.23)	(4.35)	(4.49)
Family Funds	-0.046***	-0.046***	-0.030***	-0.031***	-0.028***	-0.029***
	(-3.58)	(-3.56)	(-3.16)	(-3.23)	(-3.32)	(-3.46)
Fund Age	0.033***	0.034***	0.027**	0.026**	0.028***	0.028***
	(4.43)	(4.30)	(2.49)	(2.42)	(2.75)	(2.71)
Distribution Fee	-0.154***	-0.158***	-0.052*	-0.054*	-0.061**	-0.062**
	(-3.85)	(-3.98)	(-1.87)	(-1.95)	(-2.44)	(-2.51)
Expenses	0.106**	0.105**	0.041	0.039	0.034	0.031
	(2.52)	(2.50)	(1.30)	(1.21)	(1.09)	(0.98)
Turnover	0.024*	0.023*	0.008	0.008	0.005	0.006
	(1.72)	(1.72)	(0.50)	(0.53)	(0.38)	(0.46)
Flows	0.044***	0.044***	0.028***	0.028***	0.027***	0.027***
	(5.32)	(5.26)	(4.63)	(4.60)	(4.48)	(4.44)
Past Returns	0.024***	0.024***	0.025***	0.025***	0.023***	0.023***
	(7.23)	(7.22)	(6.06)	(6.08)	(5.88)	(5.89)
R^2	0.179	0.177	0.175	0.173	0.162	0.160
Panel B: Specific Mechanism						
Conflict		-0.068***		-0.061***		-0.065***
		(-3.27)		(-3.62)		(-3.93)
Co-Branding		-0.013		0.000		0.039
		(-0.49)		(0.01)		(1.64)
Conflict × Co-Branding		0.114***		0.127***		0.119***
		(3.15)		(3.78)		(3.12)
R^2		0.177		0.173		0.161
Conflict		-0.058***		-0.038**		-0.036**
		(-3.23)		(-2.49)		(-2.32)
Multi-Advising		0.014		-0.017		-0.041
		(0.39)		(-0.41)		(-1.17)
Conflict × Multi-Advising		0.083***		0.063**		0.074**
		(2.98)		(2.26)		(2.56)
R^2		0.178		0.177		0.163
Conflict		-0.044***		-0.019*		-0.016
		(-3.94)		(-1.85)		(-1.52)
Performance-Fee		-0.049*		-0.026		-0.033
		(-1.85)		(-1.10)		(-1.65)
Conflict × Performance-Fee		0.011		0.041***		0.070***
		(1.29)		(2.46)		(2.75)
R^2		0.243		0.203		0.193
Observations			184199			

Table B.5

Sub-Advising Mutual Funds Using Mechanisms by Asset Categories. (Gross Returns)

This table presents monthly Fama-MacBeth (1973) estimates of risk-adjusted returns on fund characteristics. The sample contains US mutual funds from 1996 to 2011 for different categories (in columns): International, Balanced and Fixed-Income funds. Fund returns are calculated before fees and expenses (gross returns). The dependent variable is fund performance measured by Carhart's model augmented by an international index (ALPHA 5F) and a global bond index (ALPHA 6F) and Carhart's model augmented by 3 government bond indexes and 2 corporate indexes (ALPHA 9F). Conflict is a dummy variable that equals 1 if the sub-advised fund is managed by a family that is either managing its own mutual funds or managing mutual funds for several clients, and 0 otherwise. Mechanism is a dummy variable equal to 1 if the fund is sub-advised using co-branding, multi-manager or performance-fee arrangements and 0 otherwise. Panel B repeats the analysis using each specific mechanism (co-branding, multi-advising and performance-fee) in a different regression, and control variables (lagged) are included although not reported. Investment Style dummies are always included but not reported. The constant term has been omitted. The t-statistics adjusted for serial correlation using Newey-West (1987) are reported in parentheses. Variable definitions are provided in Table A.1. * denotes significance at the 10% level, ** denotes significance at the 5% level and *** denotes significance at the 1% level.

	INTERNATIONAL FUNDS ALPHA 5F		BALANCED FUNDS ALPHA 6F		FIXED INCOME FUNDS ALPHA 9F	
Panel A: Mechanisms in general						
Conflict	-0.114***	-0.109***	-0.045**	-0.059***	-0.060*	-0.067*
	(-4.90)	(-4.23)	(-2.02)	(-3.01)	(-1.73)	(-1.65)
Mechanism		-0.043		0.006		0.022
		(-1.48)		(0.33)		(1.16)
Conflict × Mechanism		0.046*		0.043***		-0.015
		(1.89)		(2.73)		(-0.44)
Fund Size (log TNA)	-0.017	-0.014	-0.007**	-0.007***	0.001	0.002
	(-1.54)	(-1.26)	(-2.58)	(-2.62)	(0.59)	(0.77)
Family Size (log family TNA)	0.037***	0.038***	-0.006	-0.006	0.003	0.003
	(4.18)	(4.24)	(-0.90)	(-1.06)	(0.95)	(0.92)
Family Funds	-0.054***	-0.056***	0.028***	0.030***	0.001	0.002
	(-3.15)	(-3.19)	(3.19)	(3.59)	(0.29)	(0.30)
Fund Age	0.067**	0.067**	0.010	0.011	0.004	0.003
	(2.09)	(2.06)	(1.44)	(1.52)	(0.63)	(0.60)
Distribution Fee	-0.193***	-0.200***	-0.060***	-0.063***	-0.002	-0.003
	(-5.34)	(-5.35)	(-7.21)	(-7.25)	(-0.13)	(-0.22)
Expenses	0.033	0.048	0.044***	0.044***	0.006	0.009
	(0.79)	(1.24)	(5.24)	(5.12)	(0.42)	(0.58)
Turnover	0.013	0.022	-0.013*	-0.011	0.002	0.002
	(0.44)	(0.79)	(-1.67)	(-1.25)	(0.98)	(1.01)
Flows	0.069***	0.068***	0.056***	0.056***	0.012***	0.012***
	(4.44)	(4.49)	(3.44)	(3.48)	(2.86)	(2.69)
Past Returns	0.017***	0.014**	0.025***	0.026***	0.006**	0.007**
	(2.83)	(2.12)	(6.25)	(6.12)	(2.12)	(2.21)
Observations	44207	44207	17984	17984	88733	88733
R^2	0.237	0.232	0.108	0.106	0.204	0.204

Table B.5 (Cont.)
Sub-Advising Mutual Funds Using Mechanisms by Asset Categories. (Gross Returns)

	INTERNATIONAL FUNDS ALPHA 5F	BALANCED FUNDS ALPHA 6F	FIXED INCOME FUNDS ALPHA 9F
Panel B: Specific Mechanisms			
Conflict	-0.119***	-0.046**	-0.065*
	(-6.70)	(-2.03)	(-1.83)
Co-Branding	-0.050	-0.060*	0.039*
	(-1.33)	(-1.70)	(1.75)
Conflict × Co-Branding	0.137***	0.025*	-0.024
	(3.33)	(1.90)	(-0.98)
R^2	0.280	0.203	0.112
Conflict	-0.097***	-0.049***	-0.006
	(-5.54)	(-3.53)	(-0.73)
Multi-Advising	-0.135	-0.092	-0.013
	(-1.26)	(-1.45)	(-0.98)
Conflict × Multi-Advising	0.112***	0.076***	-0.022
	(2.90)	(3.08)	(-0.84)
R^2	0.281	0.196	0.117
Conflict	-0.080***	-0.056***	-0.017*
	(-3.52)	(-3.47)	(-1.68)
Performance-Fee	0.078***	0.057***	0.085***
	(3.04)	(3.91)	(3.15)
Conflict × Performance-Fee	0.067*	0.037**	0.014
	(1.95)	(2.25)	(0.39)
R^2	0.228	0.090	0.104
Observations	44207	17984	88733

Table B.6
Sub-Advising Mutual Funds Using Mechanisms: Full Sample

This table presents results for monthly Fama-MacBeth (1973) estimates of risk-adjusted returns on fund characteristics. The sample contains all US mutual funds from 1996 to 2011. Fund returns are calculated after fees and expenses (net returns). The dependent variable is fund performance measured by Carhart's four factor model (ALPHA 4F), Carhart's model augmented by an international index and a global bond index (ALPHA 6F) and Carhart's model augmented by 3 government bond indexes and 2 corporate indexes (ALPHA 9F). Conflict is a dummy variable that equals 1 if the sub-advised fund is managed by a family that is either managing its own mutual funds or managing mutual funds for several clients, and 0 otherwise. Control variables are lagged 1 period. Investment Style dummies are always included but not reported. The constant term has been omitted. The t-statistics adjusted for serial correlation using Newey-West (1987) are reported in parentheses. Variable definitions are provided in Table A.1. * denotes significance at the 10% level, ** denotes significance at the 5% level and *** denotes significance at the 1% level.

	Fund Performance											
	ALPHA 4F	ALPHA 6F	ALPHA 9F	ALPHA 4F	ALPHA 6F	ALPHA 9F	ALPHA 4F	ALPHA 6F	ALPHA 9F	ALPHA 4F	ALPHA 6F	ALPHA 9F
Conflict	-0.0257***	-0.0349***	-0.0450***	-0.0296***	-0.0379***	-0.0474***	-0.0203**	-0.0302***	-0.0480***	-0.0055*	-0.0235***	-0.0257***
	(-4.52)	(-5.08)	(-4.88)	(-5.47)	(-6.00)	(-5.15)	(-2.31)	(-3.52)	(-4.94)	(-1.71)	(-2.75)	(-3.58)
Mechanism	-0.0224	-0.0004	-0.0172									
	(-1.50)	(-0.03)	(-1.59)									
Co-Branding				0.0120	0.0360**	0.0413***						
				(1.06)	(2.60)	(2.69)						
Multi-Advising							-0.0223	-0.0403	-0.0534*			
							(-1.14)	(-1.01)	(-1.91)			
Performance-Fee										-0.0144	0.0304	-0.0349
										(-0.82)	(1.00)	(-1.33)
Conflict × Mechanism	0.0430*	0.0503**	0.0518**									
	(1.86)	(2.26)	(2.02)									
Conflict × Co-Branding				0.0641**	0.0789***	0.0603*						
				(2.51)	(3.90)	(1.87)						
Conflict × Multi-Advising							0.0555**	0.0611***	0.0779***			
							(2.12)	(2.66)	(3.13)			
Conflict × Performance-Fee										0.0284	0.0860***	0.0298*
										(1.23)	(3.01)	(1.89)
Control Variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Style Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	346481	346481	346481	346481	346481	346481	346481	346481	346481	346481	346481	346481
R^2	0.227	0.195	0.204	0.227	0.195	0.205	0.124	0.188	0.189	0.246	0.169	0.172

Table B.7
Reputation, Competitiveness and Incentives. Full Sample

This table reports the estimates of monthly logistic regressions addressing whether external funds are under different contractual arrangements based on different sub-advisor, fund and family characteristics. The dependent variable is a dummy that equals 1 if the outsourced fund is using a co-branding model (Panel A), a multi-advising contract (Panel B) or a performance-based fee (Panel C). The explanatory variables (proxies for reputation, competitiveness and incentive alignment) and controls are defined in Table A.1. The sample contains all US mutual funds from 1996 to 2011. Time and investment-style dummies are included but not reported; t-statistics are reported in parentheses, and the constant term has been omitted. For each panel, in the second column, we show average marginal effects (Mfx), and standard deviations (Std) are shown in squared brackets. The unconditional probability is described as the baseline predicted probability. Standard errors are clustered at fund level. * denotes significance at the 10% level, ** denotes significance at the 5% level and *** denotes significance at the 1% level.

	Panel A: Reputation Co-Branding		*Panel B: Competitiveness Multi-Advising*		*Panel C: Incentives Performance-Fee*	
	Coef / t	Mfx / Std	Coef / t	Mfx / Std	Coef / t	Mfx / Std
Sub-Advisor Experience	0.386***	0.005			-0.369***	-0.002***
	(3.22)	[0.692]			[-2.59]	[0.703]
Top 5 Sub-Advisor	0.309**	0.004				
	(2.44)	[0.176]				
Sub-Advisor Performance	0.222**	0.003				
	(2.48)	[0.319]				
Sub-Advisor Idiosyncratic Dev.			0.109***	0.003		
			(3.11)	[1.873]		
Sub-Advisor Beta Dev.			0.737***	0.018		
			(5.28)	[0.494]		
Sub-Advisor Return Dispersion					0.201*	0.001*
					[1.81]	[1.531]
Fund Size (log TNA)	0.049	0.001	0.010	0.000	0.002	0.000
	(1.11)	[2.017]	(0.26)	[1.991]	[0.03]	[2.006]
Family Size (log family TNA)	-0.214***	-0.003	0.113**	0.003	0.002	0.000
	(-3.40)	[2.433]	(2.37)	[2.599]	[0.02]	[2.589]
Family Funds	0.482***	0.007	-0.343***	-0.008	0.171	0.001
	(3.69)	[1.155]	(-3.28)	[1.219]	[0.86]	[1.211]
Fund Age	-0.791***	-0.011	-0.311**	-0.008	-0.337	-0.002
	(-4.25)	[0.527]	(-2.27)	[0.530]	[-1.12]	[0.529]
Distribution Fee	-0.876***	-0.012	-0.471**	-0.012	-3.490***	-0.018***
	(-3.33)	[0.330]	(-2.13)	[0.327]	[-4.03]	[0.328]
Expenses	0.814***	0.011	0.243*	0.006	0.726***	0.004***
	(5.83)	[0.537]	(1.92)	[0.539]	[3.08]	[0.537]
Turnover	-0.029	-0.000	-0.012	-0.000	-0.042	-0.000
	(-1.05)	[1.855]	(-0.60)	[1.822]	[-0.83]	[1.856]
Flows	0.003	0.000	-0.006	0.000	-0.003	-0.000
	(0.20)	[1.821]	(-0.38)	[1.858]	[-0.08]	[1.795]
Past Returns	0.023*	0.000	-0.027***	-0.001	-0.028**	-0.000**
	(1.92)	[5.036]	(-4.03)	[5.126]	[-2.14]	[5.042]
Style and Time Dummies	Yes		Yes		Yes	
Observations	346481		346481		346481	
Pseudo R2	0.053		0.055		0.076	
Baseline Predicted Probability	0.018		0.032		0.009	

Table B.8
Flow-Performance Sensitivity, Distribution Channels and the Use of Mechanisms. Full Sample

Panel A shows the results for the regressions of fund flows on fund return ranks. The dependent variable is the percentage of net new inflows into the fund over the previous year. Return rank variables are estimated using a piecewise linear regression framework to define three linear segments in the flow-performance sensitivity following Sirri and Tufano (1998). Mechanism is a dummy equal to 1 if the fund is outsourced and uses co-branding, multi-managers, and/or performance fee arrangements. Control variables are Fund Size, Family Size, and Expenses, and Std Monthly Returns are lagged 1 period. Time and Investment Style dummies are also included but not reported. Panel B reports the results of monthly logistic regression estimates of whether a sub-advised mutual fund uses mechanisms depending on the type of distribution channel and other fund and family characteristics. The dependent variable is Mechanism. Indirect Channel is a dummy variable that equals 1 if the fund charges any load fee as a proxy for indirect distribution. Time and investment-style dummies and control variables (family size, family funds, age, distribution and marketing fees, expenses, turnover, flows and past returns) are included but not reported. Average marginal effects (Mfx) and standard deviations (Std) are also shown. For both panels, t-statistics are reported in parentheses, standard errors are clustered at fund level and the constant term has been omitted. The sample contains all US mutual funds from 1996 to 2011 in Panel A, and those sub-advised funds in Panel B. Variable definitions are in Table A.1. * denotes significance at the 10% level, ** denotes significance at the 5% level and *** denotes significance at the 1% level.

Panel A: Flow-Performance Sensitivity

	(1)	(2)	(3)	(4)	(5)
LowRank	-0.0776	-0.0751	-0.0764	-0.0783	-0.0724
	(-0.44)	(-0.43)	(-0.44)	(-0.45)	(-0.41)
MidRank	0.0784***	0.0778***	0.0781***	0.0785***	0.0775***
	(2.63)	(2.61)	(2.62)	(2.64)	(2.60)
HighRank	0.8952***	0.8877***	0.8714***	0.9011***	0.9315***
	(6.68)	(6.62)	(6.47)	(6.63)	(6.84)
Mechanism		-0.1004**	-0.0652	-0.0305	-0.1011**
		(-2.04)	(-1.31)	(-0.62)	(-2.06)
LowRank × Mechanism		1.0117**			1.3595**
		(2.46)			(2.00)
MidRank × Mechanism			0.2950**		-0.1233
			(2.12)		(-0.52)
HighRank × Mechanism				-0.1819	-0.2933**
				(-0.33)	(-1.98)
Control Variables	Yes	Yes	Yes	Yes	Yes
Observations	346481	346481	346481	346481	346481
Adjusted R^2	0.028	0.03	0.03	0.03	0.031

Panel B: Distribution Chanel

	Coef	t-stat	Mfx	Std
Indirect Channel	-1.0281***	(-3.36)	-0.2395***	0.4283
Conflict	0.3525***	(3.83)	0.0821***	0.4932
Conflict × Indirect Channel	0.7713**	(2.54)	0.1797**	0.4080
Control Variables	Yes			
Observations	61221			
Pseudo R2	0.080			
Baseline Predicted Probability	0.330			

Table B.9 Sub-Advising Equity Mutual Funds Using Mechanisms: lag-year variables

This table reports monthly Fama-MacBeth (1973) estimates of risk-adjusted returns on fund characteristics over the period 1996-2011 for US equity open-end funds. Fund returns are calculated after fees and expenses (net return). The dependent variable is fund performance measured by the alpha from CAPM (ALPHA 1F), the Fama-French three factor model (ALPHA 3F), and Carhart's four factor model (ALPHA 4F). Conflict is a dummy variable that equals 1 if the sub-advised fund is managed by a family that is either managing its own mutual funds or managing mutual funds for several clients and 0 otherwise. Mechanism is a dummy variable equal to 1 if the fund is sub-advised using co-branding, multi-manager or performance-fee arrangements and 0 otherwise. Panel B repeats the analysis using each specific mechanism (co-branding, multi-advising and performance-fee) in a different regression. In Panel B, control variables are included although not reported. Investment style dummies are always included but not reported. The constant term has been omitted. The t-statistics adjusted for serial correlation using Newey-West (1987) are reported in parentheses. Variable definitions are provided in Table A.1 in the Appendix. * denotes significance at the 10% level, ** denotes significance at the 5% level and *** denotes significance at the 1% level.

	ALPHA 1F		ALPHA 3F		ALPHA 4F	
Panel A: Mechanisms in general						
Conflict	-0.047**	-0.047*	-0.024*	-0.024*	-0.029*	-0.025*
	(-2.25)	(-1.93)	(-1.81)	(-1.82)	(-1.89)	(-1.73)
Mechanism		-0.018		-0.023		-0.018
		(-1.18)		(-1.15)		(-0.97)
Conflict × Mechanism		0.062**		0.101***		0.143***
		(2.58)		(2.69)		(2.97)
Fund Size (log TNA)	-0.012***	-0.012***	-0.010***	-0.010***	-0.014***	-0.013***
	(-3.83)	(-3.81)	(-2.88)	(-2.84)	(-3.52)	(-3.50)
Family Size (log family TNA)	0.027***	0.027***	0.020***	0.019***	0.021***	0.020***
	(4.85)	(4.81)	(3.95)	(3.84)	(4.00)	(3.86)
Family Funds	-0.034***	-0.034***	-0.021**	-0.021**	-0.022**	-0.022**
	(-2.79)	(-2.76)	(-2.31)	(-2.23)	(-2.46)	(-2.37)
Fund Age	0.035***	0.035***	0.034***	0.033***	0.034***	0.034***
	(4.60)	(4.52)	(3.12)	(3.03)	(3.29)	(3.23)
Distribution Fee	-0.182***	-0.182***	-0.075***	-0.073**	-0.084***	-0.082***
	(-4.29)	(-4.30)	(-2.63)	(-2.53)	(-3.34)	(-3.23)
Expenses	0.026	0.025	-0.043	-0.046	-0.046	-0.049
	(0.59)	(0.56)	(-1.37)	(-1.44)	(-1.47)	(-1.54)
Turnover	0.022*	0.021*	0.017	0.017	0.008	0.008
	(1.67)	(1.66)	(1.17)	(1.16)	(0.71)	(0.73)
Flows	0.052***	0.052***	0.034***	0.035***	0.034***	0.035***
	(5.59)	(5.59)	(5.04)	(4.99)	(4.98)	(4.94)
Past Returns	0.028***	0.028***	0.028***	0.028***	0.026***	0.026***
	(7.39)	(7.36)	(6.10)	(6.09)	(5.84)	(5.82)
R^2	0.187	0.186	0.177	0.177	0.170	0.170
Panel B: Specific Mechanisms						
Conflict		-0.055***		-0.045***		-0.047***
		(-4.54)		(-4.59)		(-5.00)
Co-Branding		-0.065		0.048		0.040*
		(-1.55)		(1.48)		(1.69)
Conflict × Co-Branding		0.115***		0.103*		0.083**
		(3.29)		(1.87)		(2.43)
R^2		0.186		0.177		0.170
Conflict		-0.056***		-0.041***		-0.036***
		(-4.65)		(-3.77)		(-3.38)
Multi-Advising		0.020		-0.044		-0.054
		(0.51)		(-1.27)		(-0.75)
Conflict × Multi-Advising		0.118***		0.096***		0.083***
		(4.84)		(3.25)		(3.11)
R^2		0.187		0.179		0.171
Conflict		-0.033***		-0.040*		-0.037**
		(-3.20)		(-1.71)		(-2.71)
Performance-Fee		-0.035***		-0.011		-0.017
		(-2.81)		(-1.05)		(-1.57)
Conflict × Performance-Fee		0.069*		0.058**		0.068***
		(1.89)		(2.38)		(3.10)
R^2		0.243		0.205		0.199
Observations	172358					

Table B.10

Sub-Advising Equity Mutual Funds Using Mechanisms (Only Mixed-Management Companies)

This table reports monthly Fama-MacBeth (1973) estimates of risk-adjusted returns on fund characteristics over the period 1996-2011 for US equity open-end funds managed by fund families that have their own mutual fund distribution and clientele. Fund returns are calculated after fees and expenses (net return). The dependent variable is fund performance measured by the alpha from CAPM (ALPHA 1F), the Fama-French three factor model (ALPHA 3F), and Carhart's four factor model (ALPHA 4F). Conflict is a dummy variable that equals 1 if the sub-advised fund is managed by a family that is also managing their own funds or managing funds for other clients and 0 otherwise. Mechanism is a dummy variable equal to 1 if the fund is sub-advised using co-branding, multi-manager or performance-fee arrangements and 0 otherwise. Control variables are lagged 1 period. Investment style dummies are always included but not reported. The constant term has been omitted. The t-statistics adjusted for serial correlation using Newey-West (1987) are reported in parentheses. Variable definitions are provided in Table A.1 in the Appendix. * denotes significance at the 10% level, ** denotes significance at the 5% level and *** denotes significance at the 1% level.

	ALPHA 1F		ALPHA 3F		ALPHA 4F	
Conflict	-0.0552***	-0.0763***	-0.0512***	-0.0628***	-0.0445***	-0.0593***
	(-3.42)	(-4.19)	(-3.33)	(-3.90)	(-3.00)	(-3.72)
Mechanism		0.0544**		0.0265**		0.0353**
		(2.38)		(2.30)		(2.34)
Fund Size (log TNA)	-0.0132***	-0.0133***	-0.0133***	-0.0134***	-0.0171***	-0.0171***
	(-3.42)	(-3.49)	(-3.65)	(-3.68)	(-4.45)	(-4.49)
Family Size (log family TNA)	0.0276***	0.0274***	0.0216***	0.0212***	0.0229***	0.0226***
	(4.38)	(4.34)	(3.84)	(3.79)	(4.42)	(4.37)
Family Funds	-0.0394***	-0.0388***	-0.0260**	-0.0251**	-0.0257***	-0.0249***
	(-2.91)	(-2.86)	(-2.39)	(-2.32)	(-2.77)	(-2.68)
Fund Age	0.0372***	0.0378***	0.0312***	0.0312***	0.0289***	0.0290***
	(5.54)	(5.67)	(4.16)	(4.15)	(4.15)	(4.17)
Distribution Fee	-0.1258***	-0.1243***	-0.0437	-0.0425	-0.0595**	-0.0587**
	(-2.78)	(-2.75)	(-1.48)	(-1.44)	(-2.33)	(-2.29)
Expenses	0.0110	0.0106	-0.0403	-0.0405	-0.0422	-0.0422
	(0.26)	(0.25)	(-1.37)	(-1.38)	(-1.51)	(-1.50)
Turnover	0.0122	0.0123	0.0003	0.0003	-0.0024	-0.0023
	(0.96)	(0.97)	(0.02)	(0.02)	(-0.22)	(-0.22)
Flows	0.0416***	0.0416***	0.0280***	0.0281***	0.0271***	0.0271***
	(5.78)	(5.79)	(5.56)	(5.57)	(5.18)	(5.20)
Past Returns	0.0229***	0.0228***	0.0237***	0.0237***	0.0221***	0.0221***
	(7.16)	(7.13)	(6.36)	(6.36)	(6.37)	(6.37)
Style Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Observations	164438	164438	164438	164438	164438	164438
R^2	0.257	0.256	0.222	0.221	0.212	0.211