THE RELEVANCE OF PORTFOLIO MANAGEMENT CORE COMPETENCIES IN OUTSOURCING DECISIONS*

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ABSTRACT

This empirical paper analyzes the role of investment companies' core competencies in explaining the growing importance of outsourcing within the mutual fund industry. We demonstrate that management companies tend to allocate portfolios that are not within their core competencies (defined as the main asset classes or investment objectives managed) to subadvisors whose core competency coincides with the outsourced mutual fund. We investigate the efficiency of such decisions in terms of performance, and the findings suggest that selecting a subadvisor according to core competency improves mutual fund performance. We also observe evidence that in-house fund management improves when firms outsource their non-core funds.

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1. Introduction

Over the last decade, the number of subadvised funds has grown considerably and at a significantly higher rate than the growth of mutual funds managed in-house. According to the Investment Company Institute (ICI), approximately 40% of funds were delegated to a subadvisor for portfolio management in 2009. The number of mutual funds with either affiliated or unaffiliated subadvisors grew from 1,304 in 1999 to 2,414 in April 2009, which represents an increase of 85%. Moreover, the value of outsourced funds is expected to increase by up to 2.2 trillion dollars by 2016 (Financial Research Corporation). These figures suggest the emergence of a new business model within the mutual fund industry that must be studied and properly understood.

Despite the growth of outsourcing portfolio management in the mutual fund industry, relatively little research has been conducted on how outsourcing decisions are made. Studies of this new business model for mutual funds have compared the performance of outsourced funds to that of funds managed in-house. In general, these studies (Duong (2010), Chupirin et al. (2012) and Chen et al. (2013), among others) indicate that externally managed funds significantly underperform internally managed funds, and they provide explanations based on the specific actions taken by portfolio managers to benefit in-house mutual funds (e.g., assigning preferential IPOs and the preferential use of information). According to Moreno et al. (2012), the underperformance of outsourced funds is based on the strategic allocation of managers according to past performance. Based on these studies, explaining the significant growth that outsourced funds have experienced in recent years is difficult. If externally managed funds underperform in-house funds, it seems unreasonable for investment companies to continue using outsourcing as a business model. It is likely that the problem lies in the goals of previous studies, which have focused on analyzing the performance of external and internal funds and not on how outsourcing decisions are made in the industry.[1] Issues such as which funds should be transferred to external companies or how to choose the best subadvisor have not yet been explained. The aim of this paper is to analyze the relevance of core competencies in outsourcing decision-making within the mutual fund industry. Once we clarify the factors

[1] The only existing study of outsourcing decions is Kuhnen (2009), who analyzes how the decision to outsource is influenced by connections among members of the board of directors and advisors and observes that subadvised contracts are more likely to occur when such relationships are strong.

upon which these outsourcing decisions are made, it is likely that we will be able to explain the high growth rate of outsourcing in mutual funds over the last decade.

Previous research on industrial organization indicates that companies should focus on the tasks or products that perform best, that is, their core competency, and outsource other activities to companies whose core competencies are aligned with those activities. This specialization generates the following efficiency gains: *i)* the company can focus on its core competency (which provides a competitive advantage) and thus improve performance (Quinn, 1992; Ellram and Billington, 2001), and *ii)* the activities outsourced to other companies, which specialize in that activity, will also be completed more efficiently than if they were performed internally (Hamel and Prahalad, 1990; Venkatesan, 1992 and Quinn and Hilmer, 1994). Therefore, the core competency of a company is an important strategic component of outsourcing decisions (as Quinn and Hilmer (1994) noted). For many years, companies have been motivated to identify and focus on core competencies - the skills, knowledge and technologies a company must possess to be competitive (Hamel and Prahalad, 1990).

Prahalad and Hamel (1990) define a core competency as "a harmonized combination of multiple resources and skills that distinguish a firm in the marketplace." Core competencies must provide potential access to a wide variety of markets, make a significant contribution to the perceived customer benefits of the final product and be difficult to imitate by competitors. For investment companies, the core competency is clearly portfolio management, which is more important than any other activity performed by the company (such as accounting and marketing). However, many investment companies manage different types of mutual funds (in some cases, this can be explained by the desire of a firm to provide a superior menu of options for its customers to retain them (Massa, 2003)), but the investment company specializes in only one of these types (which includes most of its funds and/or where it employs the largest number of managers). In this paper, the core competency of a fund family is defined as the most common investment style among all the assets under their management.[2] We hypothesize that by outsourcing the funds that are not within their core investment style, fund families can

[2] For example, our dataset indicates that in 2011, AMERICAN BEACON ADVISORS, INC. managed a total of $14.038 million, of which $11.077 million was in equity funds, $666,000 in debt funds, $959,000 in balance funds and $1.335 million in international funds. In this case, the core competency is the management of equity funds, in which the company is more experienced.

focus their efforts and skills on managing funds in which they have a competitive advantage to maximize performance while benefiting from the cost savings of outsourcing agreements.

In this paper, we analyze the role of core competencies in outsourcing decisions in the mutual fund industry and consider whether these explain the growth of outsourcing in this industry over the last decade. In the first part of this paper, we examine whether the advisor's core competency affects the selection decision of which funds are managed externally and whether the subadvisors are chosen based on their core competencies. The results indicate that core competencies affect both decisions. Specifically, our results are consistent with previous research on industrial organization, i.e., an advisor is more likely to outsource the management of funds outside his core competency and keep funds that are within his core competency in-house. The core competency of the subadvisor selected to manage an outsourced fund is likely to be consistent with that fund.

In the second part of this paper, we examine whether the performance of the mutual fund industry has improved due to the outsourcing of portfolio management to explain the high growth rate of this practice over the last decade. We indeed observe that funds managed by external companies specializing in that investment style achieve better performance. Additionally, advisors who outsourced the management of funds that exceeded their core competency improved the performance of the funds managed internally compared to investment companies that maintained in-house management of such funds. This improvement in the performance of in-house funds is consistent with the body of literature on industrial organization and explains the growth in outsourcing of funds that seems complicated (irrational) if we solely consider previous research that suggests that externally managed funds underperform internally managed funds.

In the final part of this study, we demonstrate that the core competency remains an important factor in firm outsourcing decisions even when other factors are involved, such as pre-existing commercial relationships. Previous studies (e.g., Poppo and Zenger, 2002) indicate the importance of previous interactions between companies in subsequent agreements or contracts. In addition, in the fund industry, Kuhnen (2009) observes that a firm is more likely to subcontract to companies when connections between the boards of directors exist.

The remainder of this paper is organized as follows. Section 2 reviews the extant literature and formulates our hypotheses. Section 3 presents the data, summary statistics and preliminary results. Section 4 reports the empirical results for fund family decisions about outsourcing. Section 5 examines the importance of core competencies for fund performance. Section 6 analyzes the consequences of past commercial relations on outsourcing decisions, and Section 7 concludes.

2. Hypothesis Development

Recent studies of family decisions in mutual funds indicate that families face incentives to increase the menu of funds offered to customers, increasing both the number of funds and the investment objectives. Massa (2003) noted that fund proliferation is a tool used by fund families to increase market coverage and limit competition given the free-switching options offered to investors (that is, firms allow switching across funds belonging to the same family at no cost). Gallaher et al. (2006) observes that the more investment strategies a mutual fund family offers, the larger the flows of funds received. Additionally, Khorana and Servaes (2012) find that families that offer a wider range of products and differentiated funds relative to the competition are characterized by higher market shares. They observe that price competition and product differentiation are both effective strategies to increase market share in the mutual fund industry.

Prior research in management has noted that outsourcing decisions play a key role in the overall performance of an organization by improving resource allocation. Thus, activities that are not within the core competencies of a firm should be outsourced (e.g., Hamel and Prahalad, 1990; Venkatesan, 1992; Quinn and Hilmer, 1994; Baden-Fuller and Hunt, 2000; Díaz et al., 2000 and Wu et al., 2003)[3] to allow the firm to focus on a limited set of strategically important tasks. This, in turn, leads to the continuous development of core competencies (Quinn 1992; Kotable 1990 and Venkatraman 1989). Prior research demonstrates that by specializing on a limited activity structure, companies that outsource are

[3] Some other surveys of this literature on outsourcing, from a variety of perspectives, include Joskow (1988) or Shelanski and Klein (1995) and more recent Grossman and Helpman (2002).

able to improve the performance of their in-house activities (Quinn, 1992 and Ellram and Billington, 2001).

Siggelkow (2003) demonstrates that U.S. mutual funds that belong to focused fund providers outperform similar funds offered by diversified providers. Focusing on a few investment objectives allows management companies to manage funds more effectively and improve fund performance. However, a negative effect of this focused strategy arises. Fund families will reduce cash inflows, thus affecting profitability, because they do not benefit from the demand externalities generated by a broad product offering. Fund families benefit from offering a wide array of funds, as noted in the body of literature discussed above (Massa, 2003; Gallaher et al., 2006 and Khorana and Servaes, 2012). Siggelkow (2003) described the organizational solution to this duality in the mutual fund industry as follows: fund providers could outsource the investment management of funds that are not consistent with the investment culture of the fund family to improve the performance of funds managed in-house without reducing the growth opportunities provided by new funds and investment styles.

In this paper, we analyze whether the rapid growth of outsourcing in the mutual fund industry over the last decade is consistent with this explanation. Outsourcing the activities beyond the core competency of the family improves the performance of funds managed internally without preventing the growth and diversification families require. Our hypotheses are as follows:

HYPOTHESIS 1: Management companies are more likely to outsource the management of funds outside their core competency.

HYPOTHESIS 2: Outsourced mutual funds are more likely to be allocated to subadvisors with a high level of experience in the mutual fund's investment objective or class of investment.

HYPOTHESIS 3: The closer the core competency of a subadvisor to the investment style of the outsourced fund (i.e., the higher the subadvisor expertise), the better the performance of the outsourced mutual fund.

HYPOTHESIS 4: Families outsourcing the management of funds outside of their core competency show better in-house fund performance than families that do not outsource.

The industrial organization literature has noted that the performance (or efficiency) of outsourced activities (outside a firm's core competency) will improve when performed by an external specialist. However, in the case of the outsourcing of mutual funds, previous research (e.g., Chuprinin *et al*., 2012; Moreno *et al.*, 2012) has demonstrated that externally managed mutual funds underperform regarding in-house funds, which seems to contradict the postulates of the organization literature. This research has demonstrated that management firms tend to favor their own funds to the detriment of subadvised funds through preferential treatment of IPO allocations (Chen at al., 2013 or Duong, 2010) and other unobserved actions (Chuprinin et al 2012). This includes abnormal cross-trading activity between in-house and external funds, especially when the in-house fund must sell some assets quickly, or offering preferential information to the in-house funds. Chen et al. (2013) argue that funds managed externally significantly underperform those managed internally due to contractual externalities and firm boundaries that make it difficult to extract performance from an outsourcing relationship. Considering only funds managed by advisors that have both in-house and subadvised funds, Duong (2010) finds that the latter underperform in-house managed funds, which suggests possible conflicts of interest for management firms. For instance, Moreno et al. (2012) argue that management companies favor their own funds by transferring relatively poorly performing portfolio managers to outsourced funds, which explains the underperformance of external funds. Alternatively, Chuprinin et al. (2012) suggest that in-house funds benefit from the subsidization of outsourced funds as part of the incentive compensation of the subadvisory company.

To analyze the influence of core competencies (expertise) on the performance of mutual funds more deeply, we next consider the extreme case in which the principal advisor has null experience (which is defined as core competency assigned a value lower than 0.05). We expect that when the outsourced fund is very far from the core competency of the advisor, outsourcing could help improve the mutual fund's performance. This distance represents a special case in which fund families face incentives to outsource and provides another explanation of the increased outsourcing of mutual funds over the last decade.

HYPOTHESIS 5: When the advisor's core competency is very far from the mutual fund style of investment, outsourcing portfolio management will positively affect performance.

Our final hypothesis is related to the hiring of subadvisors based not only on their core competency and compatibility with the fund style but also on previous business relationships between the fund family and subadvisor.[4] A previous business relationship between the advisor and subadvisor reduces the cost of establishing the agreement and decreases uncertainty about the subadvisor's behavior in an outsourcing contract. Kuhnen (2009) analyzes how outsourcing decisions are influenced by connections between the boards of directors and finds that subadvising contracts are more likely when such relationships are strong. To the best of our knowledge, no previous research addresses the influence of commercial relationships in outsourcing decisions in the mutual fund industry. We hypothesize that commercial relationships are relevant but that the subadvisor's core competency is also a critical factor in deciding which external firm is hired to manage funds. Selecting a subadvisor with experience in a specific investment style and firms with an existing commercial relationship will positively affect performance. In these cases, the advisor possesses information about the subadvisor from previous contracts that can be used to improve the performance of the outsourced funds and to select an advisor with a compatible core competency. Consequently, a combination of these two factors produces the optimal arrangement.

HYPOTHESIS 6: A strong commercial relationship between a fund family and a subadvisor will be relevant in selecting a subadvisor for portfolio management. However, selecting a subadvisor based on both core competency and previous commercial relationships should improve performance more than basing the decision on only one of these factors.

[4] In a different industry, Poppo and Zenger (2002) highlighted the importance of previous business relationships in contract arrangements.

3. Data Description and Summary Statistics

3.1. Data Sources

We examine actively managed U.S. mutual funds during the period 1996-2011. The data were obtained from two main sources: Security Exchange Commission (SEC) filings and the Center for Research in Security Prices (CRSP) mutual funds database. Data on subadvisors, advisory arrangements, fund investment styles and fees were obtained from the Form NSAR filings. Fund returns, total net assets, turnover, expenses and other available fund characteristics were obtained from CRSP.

Under the Investment Act of 1940, every investment company must register with the SEC. All U.S. mutual funds and other regulated investment management companies are required to file Form NSAR (along with other documents) on a semi-annual basis. Form NSAR-A covers the first six months of the fiscal year for an individual investment management company, while Form NSAR-B covers the full year. A mutual fund family, also known as a family complex, is composed of several mutual fund series, each of which (also known as a fund trust) may consist of several mutual funds. Each mutual fund series is legally formed as an investment company. Thus, each family complex may file several NSAR forms for each fund trust along with detailed information about each mutual fund.

To create our database, we first downloaded and parsed all NSAR-B filings available from the SEC's EDGAR database, comprising a total of 55,315 files. Although certain funds voluntarily filed their reports prior to the mandatory disclosure period (some were filings available by 1993), the data were consistently reported beginning in 1996. To mitigate selection bias among early filers, our sample begins with 1996 data. The initial dataset includes the population of U.S. open-ended mutual funds from 1996 to 2011.[5]

Mutual fund returns and characteristics are obtained from the CRSP Survivorship-Bias-Free U.S. mutual fund database for the same period (1996-2011). The CRSP database contains 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

[5] Of the initial 55,315 filings, we exclude filings for 1994 and 1995 and filings in which no names for the trust appear, resulting in 43,537 filings. In addition, we exclude index funds and funds missing an advisor name.

the fee structure. Our observations are made at the class level. We group data by observations at the fund level, consistent with the literature (e.g., Gaspar et al. (2006) or Nanda et al. (2004)). We aggregate returns, weighting each class by total net assets (TNA). We compute the TNA of the fund as the sum of all TNA over all classes. Turnover and expenses are aggregated at the fund level by weighting each class by its total net assets; to determine fund age, we select the oldest class. To merge the CRSP and NSAR data, we utilize a fuzzy match procedure with Weighted Jaccard Distances (for details about this procedure, see Moreno et al. (2012)).

3.2. Summary statistics and preliminary results

Table 1 reports the number of funds collected in our sample after accounting for the share classes described in the previous section. Table 1 is divided into two different panels based on whether funds are categorized by asset class (Panel A) or investment objective (Panel B).[6] Panel A groups the funds into four asset classes by whether the fund primarily invest in equity, fixed income, a mix of equity and fixed income (balance) or international assets. Before 2000, the sample was dominated by debt funds but subsequently by equity funds. The bottom row of Table 1 presents the average annual percentages representing each asset class or objective. Equity funds, at 43.6%, are the largest group, followed closely by debt funds at 39%. Balance and international funds represent only 4.9% and 12.5% of our sample, respectively.

Panel B of Table 1 classifies the main groups of funds, equity and debt, according to the investment objective indicated on their NSAR forms. Equity mutual funds include seven groups: aggressive capital appreciation, capital appreciation, growth, growth and income, income and total return assets. We preserve the growth and total return categories from the filings, but due to the small number of observations and the similarity between aggressive capital appreciation and capital appreciation and between growth and income and income objectives, we combine them into capital appreciation and income, respectively. Debt funds include government long-term, government short-term and corporate debt. Capital

[6] More detailed information about the methodology used to create this dataset can be found in Moreno et al. (2012), http://ssrn.com/abstract=2138998.

appreciation dominates the sample of equity funds, with a time series average of 47.5%, while government long-term dominates debt funds, representing 55.9%.

[Insert Table 1 here]

The Table 2 reports some summary statistics for advisor and subadvisor expertise for all funds in our sample. Panel A examines the advisor expertise for two different groups of funds: in-house managed funds and outsourced funds. Panel B examines subadvisor expertise for outsourced funds. Advisor (subadvisor) expertise is defined as the percentage of their TNA for that particular asset class or investment objective over the total TNA managed by the advisor (subadvisor). Table 2 also presents the proportion of funds managed by fully experienced (FullExp) and non-experienced (NonExp) companies. The figures indicate that, for all asset classes and investment objectives, advisor expertise in funds managed in-house is greater than their expertise in outsourced funds. This fact yields a first insight: management companies manage in-house funds from styles in which they have more experience and outsource those in which they have less expertise.

The proportion of advisors without experience managing a particular style or asset class is a key figure. For example, for all balance funds that were outsourced, 70% of advisors had no experience in this asset class. For outsourced international funds, 61% of advisors had no experience. It seems reasonable that experience managing a particular asset class of is one of the main drivers of outsourcing decisions. Equally informative is that, for in-house funds, there are no cases where advisors manage funds internally without experience. Among funds that have been outsourced, we observe that subadvisor experience in a particular asset class or objective is always higher than the experience of the advisor (e.g., equity funds are outsourced by principal advisors that have only 46% of experience while are managed by subadvisors with a 78% of expertise). Similar results are obtained for funds across asset classes and investment objectives. Therefore, these results illuminate the importance of core competencies in outsourcing decisions.

[Insert Table 2 here]

4. Fund Family Decisions: Fund Outsourcing and Subadvisor Selection.

4.1 Principal Advisor Expertise and Fund Outsourcing

This section empirically analyzes whether the core competency of a management company affects the selection of outsourced funds to test whether management companies outsource funds in which they are less experienced while maintaining in-house management of funds within the core competency. To test the first hypothesis, we estimate the following cross-sectional logistic model specification on a yearly basis for all U.S. mutual funds included in the dataset:[7]

$$Prob(y_{i,t,s} = 1) = \frac{\exp(\beta_j z_i)}{1+\exp(\beta_j z_i)} \qquad \text{for } s \in S, \qquad [1]$$

where $\beta_j z_i = (\beta_0 + \beta_1 E_{i,t} + \beta_2 x_{i,t-1} + \delta_t + \varepsilon_{it})$. The dependent variable $y_{i,t,s}$ takes the value 1 if fund *i* is selected for outsourcing to an unaffiliated company in year *t* and 0 otherwise.[8] These regressions are estimated separately for each style *s*. β_0 represents the constant term, and $E_{i,t}$ represents the main variable of interest, defined as advisor expertise on fund *i*'s style in year *t*.[9] This variable is measured as follows:

$$E_{i,t} = \frac{\text{TNA sum of "fund i" style funds managed by its principal advisor during year "t"}}{\text{TNA sum of all funds managed by the principal advisor of fund "i" during year "t"}} \qquad [2]$$

Thus, for a given fund *i*, the total net assets managed by the management company within its style includes funds from the family the advisor manages and the funds the advisor manages as the subadvisor to other families (if any) minus all the funds the advisor has outsourced to external firms (if any).[10]

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[7] This specification will contain only the subsample of funds that are classified within a given style *s*.

[8] Note that our dependent variable is selection and not subadvising because we will consider only funds from families that also have in-house managed funds as subadvised funds. In other words, these funds have been selected for subadvising among the full set of funds.

[9] We measure expertise using TNA instead of past performance because we are interested in capturing not only management skills but also how investors react to this performance (flows). TNA captures both features.

[10] We measure the expertise in relative terms (e.g., Equity TNA=principal advisor equity TNA/total principal advisor TNA), where principal advisor equity TNA is the total asset of funds that primarily invest in equity that

x_{it-1} is a set of one period lagged control variables, such as fund size, advisor size, advisor funds, fund age, fund turnover, fund expenses, fund flows and past performance. *Fund size* is the natural logarithm of the TNA under management in millions of dollars. *Advisor size* is the logarithm of all funds' TNA of the advisor, excluding the fund itself. *Advisor funds* is the natural logarithm of the number of funds of that advisor, excluding the fund itself. *Fund age* is the number of years since fund inception. *Fund turnover* is the minimum of aggregate purchases and sales of securities divided by the average TNA over the calendar year. *Fund expenses* are the total annual expenses and fees dividend by the year-end TNA. *Fund flows* represents the new inflows over the previous year. *Past return* is the past years' fund return. We also include time dummies for each year (δ_t). Standard errors (SE) are clustered at the fund level.[11] We also report standard deviations and average marginal effects.

Although the principal advisor or management company decides whether to outsource a fund, a fund family complex with more than one advisor (or affiliated subadvisor) might allocate their funds to other advisors without hiring an external company. For instance, if an advisor is not an expert in a given style, but another advisor (or affiliated subadvisor) in the same family is, then this fund would be allocated to an affiliated firm but not be considered management outsourcing per se. This could be easily the case because, in our sample, 34% of families have more than one principal advisor. Therefore, we also measure the core competency by fund family expertise rather than principal advisor expertise; the main results remain unchanged.[12]

Table 3 presents the estimates of the logistic model [2] for each fund in our sample belonging to one of four asset classes. Each column reports coefficients, t-statistics, marginal effects and standard deviations of the variables. According our first hypothesis, the expected sign of *Class Adv Expertise*, our expertise variable for the advisor in each asset class, should

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the advisor is managing, and total principal advisor TNA is the sum of all funds' TNA that advisor is managing. As a robustness check, we also measured expertise in absolute terms (advisor TNA managed on the given style), and main results are unchanged.

[11] We apply the Petersen (2009) approach to estimate the standard errors of our regression efficiently. The SEs clustered by fund are dramatically larger than the white SEs, while the SEs clustered by year are only slightly larger than the white SE. Clustering by fund and year produces similar results to clustering only by fund. Therefore, the importance of time (after including dummies) is small, and, in the presence of a fund effect, White and Fama-MacBeth SEs are significantly biased.

[12] These tables are not reported to save space, but they are available upon request.

be negative to indicate that higher advisor expertise decreases the probability of the fund being outsourced. Our results confirm this negative relationship in all cases. For instance, for the equity funds group, the marginal effect is -0.213, which suggests that an increase of one standard deviation (STD) in the expertise of the equity funds advisor (0.344) decreases the likelihood of equity funds being outsourced by 7.3% (0.213*0.344). The baseline predicted probability (the unconditional probability) that an equity fund is outsourced is 14.5%, suggesting that equity funds managed by advisors with one STD less of equity expertise (-0.344*-0.213/0.145) are approximately 50.5% more likely to be outsourced than other funds.[13] Similarly, debt, balance and international funds with principal advisors less experienced (one STD lower) in each asset class are 30.4%, 83.4% and 83.5% more likely to be outsourced than other funds in their asset class, respectively. Our results indicate that the control variables size and expense ratio are positively related to outsourcing, while the number of funds of the principal advisor and the number of years the fund has been offered are negatively related to outsourcing. We argue that principal advisors with larger and newer holdings are more likely to outsource.

[Insert Table 3 here]

We also estimate the logistic regression by fund style. In this case, we consider advisor expertise in the investment objectives rather than the asset class. Table 4 provides the estimation. Again, advisor expertise is negatively related to outsourced funds and is statistically significant at the 1% level across the seven equity and debt investment styles. Therefore, consistent with our hypothesis, greater advisor expertise in some styles or asset classes reduces the likelihood that a fund of that objective/class is outsourced to an unaffiliated company. Specifically, for equity funds (objectives (1) to (4) in Table 4), a one STD increase in expertise decreases the likelihood of being outsourced by 7.8% to 11.8%, depending on the objective. Additionally, with an increase of one STD in advisor expertise, the fund is approximately 60.8% to 79.6% less likely to be outsourced than other funds with the same investment objective. For debt funds (objectives from (5) to (7)), advisor expertise also affects outsourcing decisions. An increase of one STD in advisor expertise decreases the likelihood of

[13] Our results are consistent with Cashman and Deli (2010), who find that although equity funds are more likely to be outsourced, when the advisor concentrates on managing equity funds, the likelihood of subadvising decreases.

being outsourced by 2.1%, 2.9% and 7% for government short-term, government long-term and corporate funds, respectively, whereas when we consider the baseline probability that a fund of a specific style is outsourced, this increased expertise makes funds 36%, 40% and 54%, respectively, less likely to be outsourced than other funds.

[Insert Table 4 here]

As a robustness check of the relationship between core competency and outsourcing, we conduct several additional tests. In particular, to assess the overall effect of expertise on outsourcing, we estimate equation [1] for the entire sample instead of using different regressions for each fund class and objective subsample. The results presented in Table 5 exhibit the same overall pattern, that is, funds within the core competency of their principal advisors are less likely to be outsourced. Because portfolio management outsourcing decisions are made at the family level, they might be driven by unobservable characteristics of families. Models (3) and (4) in Table 5 repeat the prior analysis, adding fund family fixed effects that allows us to compare differences in the effect of expertise on outsourcing decisions within the same firm. Again, advisor expertise is negatively related to portfolio management outsourcing.

[Insert Table 5 here]

Next, we consider whether advisor expertise affects outsourcing decisions in a linear manner. In particular, we compute two dummy variables, high and low, that equal 1 if the advisor expertise is at the 5^{th} or 1^{st} quintile, respectively. While the highest quintile of expertise makes funds 62.5% (for asset class) and 70% (for investment objective) less likely to be outsourced, the lowest quintile makes these funds 82% (for asset class) and 90% (for investment objective) more likely to be outsourced. We also observe that the probability of a fund being outsourced when the advisor possesses a low level of expertise is higher than the probability of in-house management when advisor is experience is high. This pattern may occur because other factors affect outsourcing a portfolio besides the core competency, such as past commercial relationships. Overall, these results suggest that the core competency of the principal advisors matters and that this effect is robust to different approaches. In particular, management companies base their outsourcing decisions on advisor expertise, outsourcing those funds in which they are less experienced. These results are consistent with Sigglekow

(2003), who finds that fund families often lack the expertise to hire and evaluate managers beyond their core styles.

[Insert Table 6 here]

4.2 Subadvisor Expertise and Selection

In this section, we test whether outsourced funds are more likely to be managed by experienced subadvisors. Subadvisor expertise is measured as the concentration of assets managed in a fund style.[14] We estimate the following cross-sectional logistic regression specification for all subadvised U.S. mutual funds in our dataset across the period 1996-2011 on a yearly basis:

$$Prob(z_{i,t} = 1) = \frac{\exp(\beta_j z_i)}{1+\exp(\beta_j z_i)} \qquad \text{for } s \in S, \qquad [4]$$

where $\beta_j z_i = (\beta_0 + \beta_1 E_{i,t} + \beta_2 x_{i,t-1} + \delta_t + \varepsilon_{it})$. The dependent variable $z_{i,t,s}$ is a dummy that takes the value 1 if the subadvised fund *i* belongs to style *s* in year *t* and 0 otherwise. β_0 represents the constant term, and $E_{i,t}$ is the main variable of interest, defined as subadvisor expertise in a specific style. Thus, β_1 will capture how subadvisor expertise for a given style affects the probability that this subadvisor manages an external fund in that style. For example, a positive β_1 for equity expertise means that a subadvisor with higher experience is more likely to manage an equity fund than a fund of any other asset class. Further control variables at the subadvisor level include subadvisor size, measured as the logarithm of all funds' TNA of the subadvisor excluding the fund itself, and subadvisor funds, measured as the natural logarithm of the number of funds in that subadvisor excluding the fund itself.

Note that by estimating [4], we do not consider causality between subadvisor expertise and fund style but simple correlation controlling for other factors. Consequently, this approach allows us to examine whether subadvisor expertise in a given style is related to the style of the

[14] Note that, as in principal advisor expertise, to properly assess subadvisor expertise, we consider assets from their own internal funds and discount any assets from funds the subadvisor has outsourced to a different company.

fund selected for outsourcing and whether that management company will allocate outsourced funds to highly experienced subadvisors.

Subadvisor expertise measured at the asset class level seems relevant to the subadvisor choice, as illustrated in model (1) of Table 7. A one STD increase in subadvisor expertise for equity funds increases the likelihood that the fund managed by that subadvisor is equity by 52%. These subadvisors are twice as likely to be assigned to equity funds as other subadvisors. The results are similar across categories (models (2), (3) and (4)), indicating that subadvisors with expertise one STD higher are 62.4%, 46% and 90% more likely to be assigned to debt, balance and international funds, respectively, than to other subadvised funds.

[Insert Table 7 here]

Overall, the results presented in Table 8 highlight the importance of subadvisor expertise on a given investment objective when management companies hire an unaffiliated firm to manage their outsourced equity funds. For instance, model 1 indicates that a subadvisor with one STD more capital expertise is approximately 107.4% more likely to be assigned a capital fund than other equity funds. Similarly, under an equivalent increase in expertise, the subadvisor is 63%, 20.7% or 40.9% more likely to manage a growth, income or total return fund, respectively. These findings remain unchanged when we examine debt funds, and the results are similar across the three models presented. An increase of one STD in subadvisor expertise in Gov ST, Gov LT or Corporate makes the subadvisor 3.4%, 38.5% and 30.2% more likely to manage Gov ST, Gov LT or Corporate debt funds, respectively, than other debt funds.

[Insert Table 8 here]

By testing the second part of our first hypothesis, we realize that although the results are similar across all categories, the magnitude of the effect of expertise on the investment objective of the fund outsourced varies by specification. In particular, we observe that for both asset classes, subadvisor expertise has a stronger effect on riskier investment objectives, that is, capital appreciation and growth for equity funds and government long-term and corporate for debt funds. One interpretation of this result is provided in the Descriptive Appendix. Capital appreciation funds that invest in high-risk securities or growth funds with a moderate

degree of risk are more difficult to price than other less risky funds and, therefore, might require managers who are more experienced. Similarly, assets from long-term government and corporate funds are more difficult to price than short-term government securities, especially corporate debt assets that might carry default risk.

As an additional check, we examine whether high and low levels of subadvisor expertise and affect fund style allocation equivalently. We observe mixed evidence. While the positive impact of high expertise in equity funds is stronger than the negative impact of low expertise, for debt and international funds, low levels of expertise exert greater effects than high levels. When expertise is measured in terms of investment objectives, except for capital appreciation and government short-term debt funds (which appear to exhibit a linear relation), low levels of expertise have a stronger negative impact than the positive effect of high levels. Overall, these results suggest that while experience positively affects the allocation of a fund, a lack of expertise in a given style is more heavily penalized, which makes the allocation of those funds to a subadvisor highly unlikely, providing more evidence of the importance of the core competency. [15]

5. Core competency and fund performance

5.1. Subadvisor Expertise and Fund Performance

Next, we investigate whether the level of subadvisor specialization in the fund asset class or investment objective affects fund performance. Tables 9 and 10 report the pooled OLS estimates of the following equation:

$$\alpha_{it} = \beta_0 + \beta_1 Sub_{it} + \beta_2 Sub\ Expertise_{it} + \beta_3 X_{it-12} + \theta_s + \delta_t + \varepsilon_{it}, \qquad [5]$$

where α_{it} is the alpha of fund *i* in month *t* adjusted by different risk factors. β_0 is the intercept of the model. Sub_{it} is a dummy variable indicating whether fund *i* was subadvised in month *t*. $Sub\ Expertise_{it}$ is defined as subadvisor expertise and measures the proportion of fund TNA the subadvisor has in fund *i*'s style with respect to the general TNA of that subadvisor. X_{it-12}

[15] To save space, we do not report these tables, but they are available upon request.

is a set of control variables as previously defined.[16] θ_s is a set of dummy variables for each fund style *s*, δ_t is the time fixed effect for each period *t*, and ε_{it} is an error term that is uncorrelated with all other independent variables. By including these dummy variables, we allow the coefficient of the subadvised fund to measure the effect of external firm outsourcing on fund performance relative to other funds in the same period and within the same style. We also cluster the standard errors to allow correlation of the error term of each fund over time.

To analyze performance, we utilize monthly fund returns from CRSP and convert all variables extracted from NSAR-B filings into monthly data. We conduct a regular analysis of all U.S. open-ended mutual funds from our sample (from 1996 to 2011). Following prior research, we use the four-factor model developed by Carhart (1997) to estimate the abnormal returns, where the fund's alpha, α_i, captures the fund's before-fee risk-adjusted performance.[17] As a robustness check, we also consider the CAPM and Fama-French (1993) three-factor models. Because we also consider international, balance and fixed income funds, we use two additional performance models. The first is a four-factor model (Carhart 1997) augmented by the MSCI World Index and U.S. Aggregate Bond Index returns in excess of the risk-free rate. The second model is a 9-Factor model, which includes the four-factor model (Carhart 1997) and the following five additional risk factors: Barclays US Treasury Bill 1-3 Months, Barclays US Treasury 1-3 Years, Barclays US Government Long, U.S. Corporate High-Yield and U.S. Corporate AAA. For every month from 1996 to 2011, we regress fund gross excess returns (before expenses and subtracting the risk-free rate) on the risk factors over the previous 24 months (which requires a minimum of 20 observations).[18]

The estimates presented in Table 9 are similar across all models. Several conclusions can be drawn about the importance of subadvisor core competency on the performance of outsourced funds. First, as illustrated in Table 9, the coefficient of *Subadvised* is negative and statistically significant at the 1% level. This result is consistent with prior research that indicates the underperformance of outsourced funds. In particular, a subadvised fund

[16] Note that, unlike prior measures of expertise and control variables, these variables are defined on a monthly rather than annual basis.

[17] The data for the Fama-French and momentum factors were obtained from the Kenneth French website.

[18] The main results remain unchanged when using a wider window of 36 months instead of 24 to estimate fund performance.

underperforms by an average of 23 to 58 bps per year compared to their in-house managed peers, depending on the performance measure. We hypothesize that expertise positively affects performance, and thus, outsourced funds gain from being managed by highly experienced subadvisors. An outsourced fund managed by a subadvisor who manages only funds of a given asset class outperform those managed by inexperienced managers by 35 to 52 bps per year. Overall, being managed by a fully experienced subadvisor is insufficient for funds to outperform their in-house managed peers. However, this difference helps offset the underperformance of outsourced funds that prior research attributed as being due to firm boundaries (Chen *et al.* 2013) or conflicts of interest (Chuprinin *et al.* 2013, Moreno *et al.* 2012).

[Insert Table 9 here]

Table 10 presents the repeated performance analysis by investment objective rather than asset class expertise. As in Table 9, the subadvised coefficient is negative and statistically significant, while expertise in a particular investment objective positively affects performance. A subadvised fund, on average, underperforms by 32 to 59 bps per year compared to their in-house managed peers, but an outsourced fund managed by a subadvisor that exclusively manages a given objective outperforms inexperienced managers by 34 to 100 bps per year.[19]

[Insert Table 10 here]

5.2. The efficiency of portfolio management outsourcing

In this section, we address the consequences for advisory companies and in-house funds of outsourcing the portfolio management of some funds. Prior research has demonstrated that outsourced funds underperform their in-house peers due to firm boundaries (Chen et al., 2013) or conflicts of interest within management companies that tend to favor their internal funds (Chuprining et al., 2012, Duong 2010, and Moreno et al., 2012). However, some authors claim that the efficiency of these outsourcing agreements depends on the underlying economics need to externalize such tasks (Cashman and Deli, 2009) or when certain mechanisms are specified

[19] The results reported so far do not vary because the core competency (or experience) is defined by asset classes or investment objectives. To save space, we will utilize only the definitions of asset classes.

in the subadvisory contract (Moreno et al., 2012). Moreover, the literature on organizational theory suggest that allowing outside specialist organizations to concentrate on certain tasks increases firm performance by allowing them to focus on the tasks they perform best (Quinn (1992), Quinn and Hilmer, 1994; Ellram and Billington, 2001). We hypothesize that internal funds should have a positive impact on performance after a company outsources a high proportion of the funds they were managing.

5.2.1 T-test analysis

To examine whether in-house funds benefit from the specialization of a management company that outsources many of its funds, we perform a t-test analysis to compare the overall performance of advisors who increase or decrease their proportion of outsourced funds. For an advisor, the proportion of outsourced funds is computed by dividing the number of outsourced funds and the number of total funds the advisor is currently offering. To consider different outsourcing policies, we adjust the ratio computing the percentage change with respect to the previous twelve months[20]. We select a twelve-month period because our subadvisory contract data are provided on an annual basis. We can assume that there will be very few cases in which advisory contracts change more than once a year.

In Panel A of Table 11, we present a t-test analysis to compare differences in advisor performance for positive and negative changes in the proportion of outsourced funds during the previous year (the first row). The second row tests differences in performance between companies in the top decile (the highest increase in the proportion of outsourced funds) and the bottom decile (the largest decrease). The third and fourth rows consider only those outsourced funds that are not within the advisor's core competency, where the core competency of the advisor is defined by the maximum asset class expertise (simple majority) or at least 50% expertise (absolute majority). The advisor performance is measured as the TNA-weighted averages of the corresponding fund-level alpha from Carhart's model augmented by 3 government bond indexes and 2 corporate indexes (FF9). We use the fund alpha of in-house funds (first two columns), in-house funds within the simple majority core

[20] There might exist firms with non-outsourcing policies, others that have been outsourcing frequently, or even virtual families that only distribute funds and hire external firms to manage all their funds. To correct for these possibilities, we first exclude virtual families and then adjust the ratio by calculating the percentage change.

(3rd and 4th columns), and in-house funds within the absolute majority core (5th and 6th columns).

The results presented in the first two columns of Panel A indicate that the performance of in-house funds of advisory companies that increased the proportion of outsourced funds during the past twelve months (outsourcing firms hereafter) is approximately 23.7 bps higher per year than that of funds from advisory companies that increased the proportion of in-house funds (integrating firms hereafter). In the second row of Panel A, we examine the difference between the top and bottom deciles rather than simple positive and negative changes. The advisor performance of in-house funds that are within the core competency is approximately 80.5 bps per year higher for outsourcing firms than for integrating firms. We observe that such differences are systematically higher across the table. Thus, we argue that not only is the sign important but also the magnitude of such changes. When examining the difference between outsourcing and integrating firms of non-core funds, we find that the general advisor performance of the former is between 37 bps and 58 bps higher than that of integrating firms. To demonstrate the economic significance of these figures, we note that the average advisor performance is approximately 82.6 bps per year. Thus, by increasing the proportion of non-core outsourced funds, these firms experience performance gains of 43% to 63% over an average firm.

[Insert Table 11 here]

5.2.2 Propensity Score Matching

In-house funds from outsourcing firms might perform better because fund subadvising affects other advisor characteristics that lead to higher efficiency. In this section, we employ a propensity score matching procedure using a nearest neighbor algorithm developed by Rosenbaum and Rubin (1983) and stratified sampling described by Hunt and Tyrrell (2001) to identify a control sample of integrating firms that exhibit no observable differences in characteristics relative to outsourcing firms. Thus, each pair of matched advisors is similar, except for the main variable of interest: changes in the proportion of outsourced funds. We then compare the advisory performance (the alpha from the 9-factor model previously defined) of the two groups for any in-house managed funds and for funds managed in-house within the

advisor's core competency. Because the control advisors are restricted to a set of peers who are similar in terms of observable characteristics, funds from outsourcing firms are expected to exhibit the same performance as funds from integrating firms. The same analysis with a similar intuition was conducted for a restricted group of funds that are managed by outsourcing firms that externalize the portfolio management of their non-core funds.

To implement this methodology, we first calculate the probability (i.e., the propensity score) that an advisor with particular characteristics is an outsourcing firm. The propensity score is calculated using advisor characteristics. Specifically, this probability is estimated as a function of the number of funds per advisor and total advisor size as well as age, turnover and expenses defined as the TNA-weighted averages of the corresponding fund-level measures. To ensure that the characteristics in the control sample (integrating firms) are sufficiently similar to those of outsourcing firms, we require that the maximum difference between the propensity score of these firms and that of its matching peer does not exceed 0.1% in absolute value.

Panel B of Table 11 compares the advisor performance of matched outsourcing and integrating firms and reports the value of the difference and significance level using bootstrapped standard errors. We observe that, independent of the type of funds managed and the approach used, the advisor performance of outsourcing firms is between 18 bps and 43 bps higher per year than that of integrating firms. When we restrict our analysis to only outsourcing firms that increased the proportion of non-core outsourced funds, the difference is as high as 66 bps per year. These results confirm that even when holding observable advisor characteristics of outsourcing and integrating firms constant, in-house funds of the former tend to be better managed than the latter.[21]

5.2.3 Regression Analysis

To test the hypothesis that in-house funds are better managed when their advisory firms increase the proportion of outsourced funds, we estimate the following regression model:

$$Performance_{i,t} = a_0 + a_1 Outsourcing\ Firms_{i,t-12} + a_2 X_{i,t} + A_{i,t} + e_{i,t}\,, \qquad [6]$$

[21] These results are also robust to the use of radius and kernel matching methods.

where $Performance_{i,t}$ is advisor performance measured by the TNA-weighted averages of the corresponding fund-level alpha using the 9-factor model previously described. $Outsourcing\ Firms_{i,t}$ is a dummy variable that equals 1 if fund i is internally managed by an advisor who increased the proportion of outsourced funds in month t-12. X is a vector of advisor-specific control variables, including Advisor Age, Advisor Expenses, Advisor Turnover, Advisor Flows and Advisor Past Returns. These variables are defined as the TNA-weighted averages of the corresponding fund-level measures. Advisor Size is the logarithm of the TNA of all advisor funds excluding the fund itself, and Advisor Funds is the natural logarithm of the number of advisor funds. Control variables are lagged by 12 months. We estimate [6] using an advisor fixed effect ($A_{i,t}$) regression model to determine how the main variable of interest affects performance within the same advisory firm over time. We clustered the standard errors at the advisory firm level.

Table 12 displays the estimation of [6] for all U.S. advisory firms managing mutual funds from 1996 to 2011. The first row specifies the fund type used to calculate the dependent variable, advisory performance, and the second row classifies the main variable, outsourcing firm, based on the type of fund the firm has outsourced. We find that outsourcing any type of funds does not affect advisor performance, while outsourcing funds that are not within the core competency of the firm has a considerable effect. This positive impact on performance is more significant for in-house funds that those within the core competency of the firm. This finding is statistically significant across every specification. In economic terms, we can conclude that outsourcing firms that increased the proportion of outsourced funds that were not within their core competency experienced an increase in the performance of their core in-house managed funds, outperforming those of integrating firms by 24.6 to 34.6 bps per year.

[Insert Table 12]

5.3. Subadvisor Expertise and Fund Performance

In this section, we investigate the apparent inconsistency between the investment fund industry and other industries regarding the improved results that are achieved if activities beyond the core competency are outsourced. As we noted in Section 2, the mutual fund literature on subadvising demonstrates underperformance. However, these studies did not

consider the importance of the firm's core competency. To explore our fifth hypothesis, that an advisor's core competence that differs from the fund style positively affects outsourcing, we re-estimate equation [5] limiting the sample to the following groups: 1) funds managed in-house by a non-specialist advisor and 2) outsourced funds. [22]

As indicated in Table 13, *Subadvised* is not statistically significant (except in model 1), suggesting that there is no significant difference in fund performance between managing a fund in-house when the principal advisor is not an expert and outsourcing the fund to an external company. However, consistent with the previous hypothesis, as the selected subadvisor obtains more expertise in the fund asset class, the outsourced fund outperforms its in-house managed peer. In particular, Model 5 suggests that a fund managed by a fully experienced subadvisor (Sub-expertise class variable equal to 100%) in the fund's asset class will outperform a fund managed internally by a non-specialist advisor by approximately 43.4 bps per year.

[Insert Table 13 here]

Therefore, when the principal advisor is not familiar with some aspects of the fund style, it is not suboptimal to outsource that fund to an external firm. Moreover, if that subadvisor is highly experienced in that specific fund style, this outsourcing decision will improve performance. Overall, subadvisor specialization seems to exert a significant and positive economic impact on mutual fund performance.

6. Core competencies and Advisor-Subadvisor business relationships

6.1 Commercial Relationships and Outsourcing decisions

In this final section, we examine the role of core competencies in outsourcing decisions accounting for the existence of business connections among fund families and subadvisors. To that end, we re-estimate model [4], which examined the relationship between outsourced fund style and subadvisor expertise, but we now include a new variable, *High Relation*, which

[22] A fund managed by a non-specialist advisor is managed by firms that mostly manage (at least 95%) funds of other types. An outsourced fund with a conflict of interest is a fund managed by an unaffiliated firm that also manages and distribute its own funds.

captures the special case where a fund family that has outsourced a high proportion of funds to the same subadvisor.

High Relation is a dummy variable that equals 1 if the number of funds the subadvisor manages for the family out of the total number of funds the family has currently outsourced is greater than the median and 0 otherwise. For example, suppose a fund family has outsourced 100 funds to three different subadvisors. The first subadvisor manages 10 funds, the second manages 30 the third manages 50. Because the median is 30, *High Relation* is coded 1 for the funds outsourced to the third subadvisor and 0 for the funds outsourced to the other firms.[23] We also include an interaction term between the variables *High Relation* and *Subadvisor expertise* to test whether the expertise of the subadvisor still significantly determines subadvisor selection under a high commercial relationship.

Table 14 provides the estimates of the logistic specification by asset class. We must allow the marginal effect of subadvisor expertise to be conditioned by the type of commercial relationship. In particular, the marginal effect of subadvisor expertise is described as follows:

$$\frac{\partial Fund\ Asset\ Class}{\partial Class\ Sub\ Expertise} = \widehat{Mfx}_{sub\ expertise} + \widehat{Mfx}_{high\ relation*sub\ expertise} * High\ Relation \qquad [7]$$

Thus, for equity subadvised funds, $\widehat{Mfx}_{sub\ expertise} = 1.427$ and $\widehat{Mfx}_{high\ relation*sub\ expertise} = -0.398$. Therefore, an increase of one standard deviation in *Class* (*equity) sub expertise* (0.418) implies a subadvisor with a high relation ((1.427-0.398)*0.418) who is 43% more likely to be optimally assigned to an equity fund (in terms of expertise). However, without such a strong relationship between companies, the same increase in expertise leads to an increase of 59.6% in the likelihood of optimal fund allocation. Thus, business relationships between management companies might create friction between the core competency and outsourcing decisions. This result is similar across the other three asset classes.

[Insert Table 14 here]

[23] In our proxy variable for the commercial relationship, we assume that the management company only performs management tasks, so the only way of having some business relations with other management companies is that they have somehow been sharing the management of some of their portfolios.

Table 15 presents the results when subadvisor expertise is based on investment objectives. Overall, the main results remain unchanged. For instance, increasing the capital appreciation expertise of a subadvisor without a strong relationship to the fund family by one standard deviation makes such a subadvisor 5.7% more likely to be correctly assigned to a capital appreciation fund than if it had such relationship with the family. Commercial relationships also significantly diminish the effect of subadvisor expertise for government long-term funds and corporate debts. However, this effect was weak for government short-term funds, which had a negative but non-significant interaction term coefficient. For the other models, an increase of one standard deviation in expertise increases the likelihood of a subadvisor without a commercial relationship being properly assigned compared to a subadvisor with a strong relationship with the fund family.

[Insert Table 15 here]

Overall, the results presented in this section indicate that when there is a strong relationship between the subadvisor and fund family, in the sense that the subadvisor manages a substantial number of funds for that family, the core competency and subadvisor expertise had weaker effects on subadvisor appointment. Therefore, a subadvisor might not manage the funds in which they are more experienced but rather those from families that are highly dependent on the subadvisor.

Note that the effect of these business connections differs across fund objectives. In particular, the effect is stronger for capital appreciation and growth equity funds as well as government long-term and corporate debt funds.

6.2 Commercial Relationships, expertise and outsourcing decision effects on fund performance

We have demonstrated the joint significance of subadvisor expertise and family-subadvisor business connections on subadvisor selection. In this section, we analyze the impact on fund performance of both aspects of outsourcing decisions. In particular, we compare the time series average of risk-adjusted fund performance using the 9-factor model previously described across four groups of outsourced funds. First, we classify funds by *High*

or *Low Style Expertise* (Subadvisor Expertise is in the fifth (high) or first (low) quintile in terms of investment objective). Second, for each of these groups, we classify the funds based on their level of commercial relationship for volume (number of funds) (Panel A) and length of contracts (Panel B). High (low) levels of volume of contracts are in funds with above (below) median ratios of the number of advisor funds managed by the same fund subadvisor compared to the total advisor funds. Long (short) contracts are relationships between the family and subadvisor greater (shorter) than 3 years. Third, we compare four portfolios of funds.

To determine the significance of the differences, we perform a Portfolio Analysis (Two-group mean-comparison Test). Table 16 Panel A indicates that for both low and high commercial relationships, high style expertise funds make the greatest difference. Whereas funds with high subadvisor expertise are characterized by an alpha 48 bps higher per year for either high or low levels of commercial relationships, funds with strong commercial relationships barely gain 2.4 bps for low levels of expertise and 28 bps for high levels of expertise. In Panel B, we observe the same general pattern in terms of the length of the contract. Overall, these results suggest that choosing a subadvisor based on expertise has a greater impact on fund performance than a selection based on commercial relations (in terms of both volume and length of the agreement). Therefore, we once again demonstrate the importance of core competency in management decisions. [24]

[Insert Table 16 here]

7. Conclusions

Despite the rapid growth of outsourcing in the mutual fund industry, there has been relatively little research on how outsourcing portfolio management decisions are made in this industry. Studies of this new business model for mutual funds have focused on the performance of outsourced funds compared to the performance of funds managed in-house,

[24] The variable used to measure commercial relationships might capture the current family-subadvisor relationship and not past connections. Thus, in the last part of the empirical analysis, we construct a proxy for a past commercial relationship. This measure contains the average number of funds managed by the same subadvisor among the total number of funds the family has outsourced over the last two years. The main results are consistent. The results of this last section are not reported to save space but are available upon request.

demonstrating that externally managed funds significantly underperform internally managed funds. This negative effect of outsourcing in the mutual fund industry has not explained why mutual fund families have used outsourcing so widely over the past decade. In this paper, we analyze the role of core competencies in explaining both outsourcing decisions and the growth of outsourcing in the mutual fund industry over the last decade.

In the first part of this paper, we examine whether the advisor's core competency affects which funds are managed externally and whether the subadvisor is chosen based on their core competency. We observe that fund families mainly outsource funds that fall outside their core competency. This result is consistent with previous research on mutual funds that noted that families wish to provide a wider menu of funds to investors to maximize net inflows. Furthermore, subadvisors are more likely to be assigned to manage the funds styles in which they are more experienced. This result is also consistent with prior industrial organization research, which claims that to improve results, companies should focus on activities that represent their core competency and outsource other activities or tasks to companies that specialize in those activities.

In a second part of this paper, we examine whether mutual fund performance has improved due to the outsourcing of portfolio management activities and whether this explains the rapid growth of this practice over the last decade. Our hypothesis, based on the industrial organization literature, is that outsourcing the portfolio management of funds that fall outside a family's core competency allows the company to focus on its core competency and improve the performance of funds managed in-house. In addition, outsourcing the funds outside of its core competencies allows the family to achieve a wider (more diversified) portfolio of mutual funds to offer its customers (which, according to recent research on family organization, also attracts greater net inflows).

Advisors who outsource the management of funds that are beyond their core competency improve the performance of the funds managed internally compared with investment companies that maintain in-house management of such funds. The improved performance of funds managed in-house is consistent with the literature on industrial organization and helps explain the growth of outsourcing, which seems complicated (irrational) if we only consider previous studies suggesting that externally managed funds underperformed in-house managed

funds. Another result that helps explain the use of outsourcing over the last decade is a special case in which the advisor has no experience in a fund style. In this situation, there is no significant difference in fund performance between funds managed in-house by a non-specialist advisor and funds managed externally. However, if the subadvisor is highly experienced in managing those funds (i.e., the fund is within its core competency), the performance of the outsourced fund will exceed that of a fund managed in-house by a non-specialist. This result is consistent with prior industrial organization research that claims that by allowing outside specialist organizations to concentrate on certain tasks, firms can improve their performance by focusing on the things they do best.

Examining whether commercial relationships among fund families and subadvisors affect outsourcing decisions and fund performance is another important contribution of this study. We examine how subadvisor expertise affects subadvisor selection conditional on how many family funds have been managed by the same subadvisor and the length of the contracts. Our results suggest that either higher volume or longer subadvisory contracts reduce the effect of firm expertise when selecting a subadvisor. Thus, we argue that when fund families select a subadvisor to manage their funds, they can rely not only on core competencies but also on past and current commercial relationships to avoid the risks associated with a new business relationship. We also consider how selecting a subadvisor based on either expertise or past relationships affects fund performance. Contracting with a subadvisor based on its core competency has a greater impact on performance than decisions based on the volume or length of the subadvisory agreement between a fund family and subadvisor. In addition, our findings suggest that the optimal way of making such decisions is to consider both expertise and business relationships.

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TABLE 1: NUMBER OF FUNDS PER YEAR, ASSET CLASS AND INVESTMENT OBJECTIVE

Table 1 reports the number of funds in our sample after accounting for the different classes. Panel A classifies funds by asset class selected on the NSAR form, equity, debt, balance and international funds, that is, whether the fund primarily invests in equity, debt, both equity and debt or foreign assets, respectively. Panel B groups these funds by the investment objective for equity and debt asset class funds (balance and international funds are excluded). Among the equity classes, there are four objectives: capital appreciation (aggressive capital appreciation and capital appreciation are indicated on the NSAR form), growth, income (growth & income and income as classified on the NSAR form) and total returns. Investment objectives among debt funds are government short-term maturity, government long-term maturity and corporate debt according to the NSAR form. The bottom row presents the average annual percentage for each asset class or objective.

Number of Funds	Panel A: Asset Class				Panel B: Investment Objective						
					Equity Asset Class Funds				Debt Asset Class Funds		
Year	Equity	Debt	Balance	International	Capital Appreciation	Growth	Income	Total Return	Gov ST	Gov LT	Corporate
1996	822	1275	105	310	336	208	214	64	420	739	116
1997	944	1359	135	350	391	253	215	85	443	789	127
1998	1240	1402	171	452	550	319	255	116	478	760	164
1999	1234	1387	171	449	568	324	240	102	434	777	176
2000	1884	1805	232	609	893	479	315	197	481	1102	222
2001	2026	1624	208	561	1004	543	302	177	382	1012	230
2002	2235	1920	214	582	1137	616	299	183	679	1015	226
2003	2218	2081	224	532	1098	671	282	167	720	1112	249
2004	2211	2036	230	515	1079	643	284	205	713	1091	232
2005	2125	1941	243	514	1056	603	261	205	647	1087	207
2006	2071	1834	238	498	1040	562	254	215	639	998	197
2007	2136	1825	239	513	1059	550	255	272	613	1009	203
2008	2715	1848	274	646	1314	687	356	358	623	999	226
2009	3471	1998	365	968	1649	879	498	445	652	1034	312
2010	3215	1874	331	939	1507	797	458	453	578	969	327
2011	1992	1220	186	616	976	483	258	275	238	744	238
Average Percentage	43.6%	39%	4.9%	12.5%	47.5%	26.5%	15.7%	10.3%	31.5%	55.9%	12.6%

TABLE 2: SUMMARY STATISTICS – EXPERTISE PER YEAR, ASSET CLASS AND INVESTMENT OBJECTIVE

Table 2 reports summary statistics for advisor and subadvisor expertise. Panel A examines advisor expertise for two groups of funds: funds managed in-house and funds that have been outsourced to other companies. Panel B examines subadvisor expertise for funds subadvised by an affiliated company. The advisor (subadvisor) expertise is defined as the percentage of their TNA in that particular asset class or investment objective over the total TNA managed by the advisor (subadvisor). The table also presents the proportion of funds managed by fully experienced (FullExp) and non-experienced (NonExp) companies.

	Statistic	Fund Asset Class				Investment Objective (Balance and International funds excluded)						
						Equity Asset Class				Debt Asset Class		
		Equity	Debt	Balance	Internat.	Capital	Growth	Income	Return	Gov ST	Gov LT	Corporate
Panel A: Advisor Expertise												
Inhouse Funds	Mean	60.88	64.68	21.88	38.20	46.28	41.26	30.24	36.32	59.11	35.02	20.11
	Median	62.83	71.65	7.67	19.44	32.32	32.64	15.09	17.50	66.32	21.84	7.11
	Std Dev	33.15	31.02	29.47	38.12	37.26	34.59	33.60	38.11	34.16	32.60	27.68
	NonExp	0.00	0.01	0.07	0.06	0.02	0.05	0.10	0.04	0.09	0.01	0.04
Outsourced Funds	Mean	46.53	41.34	4.23	7.06	16.28	22.33	9.51	12.60	12.72	23.58	3.35
	Median	37.81	30.19	0.00	0.00	2.40	4.44	0.00	0.00	0.00	0.00	0.00
	Std Dev	38.97	41.31	13.56	19.69	27.69	32.64	20.50	27.60	27.57	36.97	10.77
	NonExp	15.25	36.06	70.53	61.94	39.18	35.42	58.51	59.85	74.25	54.99	75.75
Panel B: Subadvisor Expertise												
Outsourced Funds	Mean	78.03	75.25	39.00	67.83	63.73	61.16	46.34	60.95	62.81	56.01	49.47
	Median	99.70	92.56	20.62	100.00	78.79	72.69	34.74	82.79	80.59	61.19	41.41
	Std Dev	30.31	32.53	39.07	40.20	38.70	38.73	40.54	42.04	37.94	39.44	40.34
	FullExp	48.47	40.78	22.52	52.47	41.44	36.69	27.44	44.50	31.46	30.59	29.03

TABLE 3: ASSET CLASS ADVISOR EXPERTISE

Table 3 presents the results of a cross-sectional time series logistic regression model [2] of the probability of a fund being selected for outsourcing to an unaffiliated company. The sample contains all U.S. mutual funds from 1996 to 2011 classified by their asset class. The dependent variable is an indicator variable of whether the fund has been outsourced. *Class Adv Expertise* measures the expertise of the advisor in each asset class computed as the ratio of Advisor TNA on a fund's asset class over all Advisor TNA. *Fund Size* is the natural logarithm of the total net assets (TNA) under management in millions of dollars. *Advisor Size* is the logarithm of all the advisor's fund TNA, excluding the fund itself. *Advisor Funds* is the natural logarithm of the number of funds in that advisor, excluding the fund itself. *Fund Age* is the number of years since the fund's inception. *Fund Turnover* is the minimum of aggregate purchases and sales of securities divided by the average TNA over the calendar year. *Fund Expenses* are the total annual expenses and fees dividend by the year-end TNA. *Fund Flows* represents the new inflows of the fund over the previous year. *Past Return* is the cumulative past year's fund return. Control variables are lagged by one year. The constant term has been omitted. Standard errors are clustered at the fund level; t-statistics are reported in parentheses. * denotes significance at the 10% level, ** at the 5% level and *** at the 1% level.

	(1)		**(2)**		**(3)**		**(4)**	
	Equity Funds		Debt Funds		Balance Funds		International Funds	
	Coef/t	Mfx/Std	Coef/t	Mfx/Std	Coef/t	Mfx/Std	Coef/t	Mfx/Std
Class Adv Expertise	-2.723***	-0.213***	-2.168***	-0.076***	-10.930**	-0.338**	-7.512***	-0.431***
	(-18.476)	0.344	(-9.063)	0.324	(-2.376)	0.284	(-9.944)	0.374
Fund Size	0.110***	0.009***	0.155***	0.005***	0.452***	0.014***	0.185***	0.011***
	(4.057)	2.182	(3.136)	1.928	(3.315)	2.198	(2.972)	2.167
Advisor Size	0.004	0.000	0.096*	0.003*	-0.169	-0.005	-0.171**	-0.010**
	(0.152)	3.463	(1.837)	2.646	(-1.199)	3.001	(-1.970)	3.429
Advisor Funds	-0.883***	-0.069***	-1.182***	-0.042***	-0.887***	-0.027***	-1.231***	-0.071***
	(-11.902)	1.485	(-10.005)	1.212	(-3.256)	1.333	(-6.669)	1.494
Fund Age	-0.031***	-0.002***	-0.046***	-0.002***	-0.005	-0.000	-0.029*	-0.002*
	(-3.522)	10.203	(-3.276)	7.091	(-0.411)	11.729	(-1.707)	6.232
Fund Turnover	-0.007	-0.001	0.106***	0.004***	0.184*	0.006*	0.078*	0.004*
	(-0.419)	2.248	(2.767)	1.872	(1.753)	0.871	(1.945)	1.826
Fund Expenses	0.355***	0.028***	0.287*	0.010*	0.911***	0.028***	0.252	0.014
	(4.129)	0.549	(1.688)	0.422	(3.424)	0.556	(1.358)	0.582
Fund Flows	0.004	0.000	0.009	0.000	-0.005	-0.000	-0.010	-0.001
	(0.528)	2.621	(0.474)	2.043	(-0.119)	1.606	(-0.348)	2.062
Past Return	-0.284	-0.022	-0.398	-0.014	3.100**	0.096**	0.384	0.022
	(-1.313)	0.199	(-0.456)	0.051	(2.134)	0.108	(1.144)	0.233
Observations	16947		12229		1995		4818	
Pseudo R2	0.236		0.278		0.341		0.535	
Baseline predicted probability	0.145		0.081		0.115		0.193	
Time dummies	Yes		Yes		Yes		Yes	

TABLE 4: INVESTMENT OBJECTIVE ADVISOR EXPERTISE

Table 4 presents the results of cross-sectional time series logistic regression model [2] of the probability of a fund being outsourced to an unaffiliated company. The sample contains U.S. equity and debt mutual funds from 1996 to 2011 classified by their investment objectives. The dependent variable is an indicator variable for whether the fund has been outsourced. *Objective Adv Expertise* measures advisor expertise in terms of investment objective computed as the ratio of Advisor TNA on the fund's objective over all Advisor TNA. *Fund Size* is the natural logarithm of the total net assets (TNA) under management in millions of dollars. *Advisor Size* is the logarithm of all the advisor's fund TNA, excluding the fund itself. *Advisor Funds* is the natural logarithm of the number of funds in that advisor, excluding the fund itself. *Fund Age* is the number of years since the fund's inception. *Fund Turnover* is the minimum of aggregate purchases and sales of securities divided by the average TNA over the calendar year. *Fund Expenses* is the total annual expenses and fees dividend by the year-end TNA. *Fund Flows* represents the new inflows of the fund over the previous year. *Past Return* is the cumulative past year's fund return. Control variables are lagged by one year. The constant term has been omitted. Standard errors are clustered at the fund level; t-statistics are reported in parentheses. * denotes significance at the 10% level, ** at the 5% level and *** at the 1% level.

	(1) Capital Funds		(2) Growth Funds		(3) Income Funds		(4) Return Funds		(5) Gov ST Funds		(6) Gov LT Funds		(7) Corporate Funds	
	Coef/t	Mfx/Std	Coef/t	Mfx/Std	Coef/t	Mfx/Std	Coef/t	Mfx/Std	Coef/t	Mfx/Std	Coef/t	Mfx/Std	Coef/t	Mfx/Std
Objective Adv Expertise	-5.022***	-0.324***	-4.385***	-0.256***	-7.363***	-0.242***	-6.436***	-0.277***	-4.850***	-0.060***	-3.058***	-0.088***	-15.925***	-0.268***
	(-16.54)	0.364	(-10.58)	0.342	(-3.991)	0.322	(-7.364)	0.380	(-4.960)	0.356	(-5.495)	0.325	(-3.867)	0.262
Fund Size	0.213***	0.014***	0.138***	0.008***	0.396***	0.013***	0.203**	0.009**	0.446***	0.006***	0.254***	0.007***	0.394***	0.007***
	(4.893)	2.094	(2.605)	2.190	(3.524)	2.299	(2.303)	2.227	(2.597)	2.044	(3.914)	1.890	(2.839)	1.950
Advisor Size	-0.081	-0.005	-0.137**	-0.008**	-0.284**	-0.009**	-0.478***	-0.021***	-0.080	-0.001	-0.057	-0.002	-0.240	-0.004
	(-1.572)	3.489	(-2.068)	3.324	(-2.545)	3.351	(-3.287)	3.776	(-0.450)	2.653	(-0.753)	2.565	(-1.247)	2.968
Advisor Funds	-0.951***	-0.061***	-0.888***	-0.052***	-0.618***	-0.020***	-0.626**	-0.027**	-1.219***	-0.015***	-1.045***	-0.030***	-1.361***	-0.023***
	(-8.169)	1.512	(-5.813)	1.433	(-3.006)	1.417	(-2.271)	1.570	(-3.078)	1.191	(-7.376)	1.185	(-4.189)	1.281
Fund Age	-0.033**	-0.002**	-0.050***	-0.003***	-0.015	-0.000	0.007	0.000	-0.046	-0.001	-0.035**	-0.001**	-0.063*	-0.001*
	(-2.186)	7.943	(-3.409)	10.990	(-0.905)	15.326	(0.268)	7.520	(-1.368)	6.277	(-2.039)	6.557	(-1.955)	9.360
Fund Turnover	0.022	0.001	-0.067	-0.004	-0.029	-0.001	0.007	0.000	0.112	0.001	0.137**	0.004**	0.271***	0.005***
	(1.038)	2.729	(-1.426)	1.425	(-0.384)	1.034	(0.428)	2.553	(1.091)	1.810	(2.466)	1.859	(4.055)	1.947
Fund Expenses	0.217	0.014	0.471**	0.027**	0.492*	0.016*	0.274	0.012	0.969	0.012	0.551**	0.016**	0.016	0.000
	(1.446)	0.542	(2.520)	0.526	(1.934)	0.505	(1.033)	0.595	(1.252)	0.382	(2.468)	0.416	(0.053)	0.425
Fund Flows	0.023	0.001	-0.004	-0.000	-0.079*	-0.003*	0.017	0.001	-0.320	-0.004	0.025	0.001	0.060***	0.001***
	(1.098)	1.976	(-0.169)	2.124	(-1.713)	4.302	(1.423)	3.331	(-0.987)	2.430	(1.606)	1.709	(3.180)	3.112
Past Return	-0.253	-0.016	-0.282	-0.016	-0.699	-0.023	1.139	0.049	-1.351	-0.017	-0.565	-0.016	-0.265	-0.004
	(-0.815)	0.214	(-0.578)	0.201	(-0.643)	0.156	(1.337)	0.169	(-0.421)	0.068	(-0.479)	0.044	(-0.161)	0.069
Observations	8288		4542		2410		1707		693		9472		1986	
Pseudo R2	0.359		0.337		0.343		0.487		0.391		0.290		0.502	
Baseline Predicted Probability	0.158		0.144		0.098		0.152		0.059		0.073		0.130	
Time dummies	Yes		Yes		Yes		Yes		Yes		Yes		Yes	

TABLE 5: CORE COMPETENCY AND ADVISOR EXPERTISE

Table 5 presents the results of cross-sectional time series logistic regression models of the probability of a fund being selected for outsourcing to an unaffiliated company. The sample contains all U.S. mutual funds from 1996 to 2011. The dependent variable is an indicator variable for whether the fund has been selected to be subadvised. Explanatory variables are *Class Adv Expertise* and *Objective Adv Expertise*, which measure advisor expertise in terms of asset class (ratio of Advisor TNA on fund's asset class over all Advisor TNA) and investment objective (ratio of Advisor TNA on fund's investment objective over all Advisor TNA), respectively. The control variables are defined in previous tables. Control variables are lagged by one year. The constant term has been omitted. Standard errors are clustered at the fund level; t-statistics are reported in parentheses. * denotes significance at the 10% level, ** at the 5% level and *** at the 1% level.

	(1)		(2)		(3)		(4)	
	All Funds-Asset Class		All Funds-Investment Objective		All Funds-Asset Class		All Funds-Investment Objective	
	Coef/t	Mfx/Std	Coef/t	Mfx/Std	Coef/t	Mfx/Std	Coef/t	Mfx/Std
Class Adv Expertise	-2.933***	-0.174***			-2.722***	-0.088***		
	(-25.036)	0.359			(-7.362)	0.353		
Objective Adv Expertise			-4.630***	-0.207***			-3.742***	-0.096***
			(-20.621)	0.346			(-4.096)	0.335
Fund Size	0.117***	0.007***	0.227***	0.010***	0.059	0.002	0.080*	0.002*
	(5.714)	2.099	(8.563)	2.081	(1.524)	2.092	(1.780)	2.077
Advisor Size	-0.100	-0.003	-0.119***	-0.005***	0.192**	0.006**	0.136	0.004
	(-0.015)	3.209	(-3.667)	3.183	(2.407)	3.124	(1.252)	3.075
Advisor Funds	-0.970***	-0.058***	-0.938***	-0.042***	-1.849***	-0.060***	-1.823***	-0.047***
	(-17.799)	1.407	(-13.686)	1.394	(-9.923)	1.405	(-8.569)	1.381
Fund Age	-0.029***	-0.002***	-0.035***	-0.002***	-0.014	-0.000	-0.015	-0.000
	(-4.697)	8.912	(-4.498)	9.039	(-1.353)	8.619	(-1.165)	8.665
Fund Turnover	0.054***	0.003***	0.054***	0.002***	0.022	0.001	0.032	0.001
	(5.000)	2.015	(3.549)	2.099	(0.757)	2.225	(0.949)	2.351
Fund Expenses	0.289***	0.017***	0.419***	0.019***	0.670***	0.022***	0.853***	0.022***
	(4.701)	0.560	(5.295)	0.535	(3.479)	0.537	(3.414)	0.508
Fund Flows	0.004	0.000	0.005	0.000	0.017	0.001	0.028**	0.001**
	(0.547)	2.316	(0.822)	2.396	(1.444)	2.018	(2.027)	2.052
Past Return	-0.035	-0.002	0.038	0.002	0.218	0.007	0.309	0.008
	(-0.249)	0.166	(0.202)	0.155	(0.666)	0.163	(0.815)	0.152
Observations	36025		29204		21039		16147	
Pseudo R2	0.282		0.341		0.563		0.590	
Baseline predicted probability	0.128		0.118		0.184		0.179	
Time dummies	Yes		Yes		Yes		Yes	
Family F.E.	No		No		Yes		Yes	

TABLE 6: CORE COMPETENCY AND SUBADVISING

Table 6 presents the results of cross-sectional time series logistic regression models of the probability of a fund being selected for outsourcing to an unaffiliated company. The sample contains all U.S. mutual funds from 1996 to 2011. The dependent variable is an indicator variable for whether the fund has been selected to be subadvised. The main explanatory variables are *High Class Adv Expertise*, *Low Class Adv Expertise*, *High Objective Adv Expertise* and *Low Objective Adv Expertise*, which are indicator variables that equal 1 if the advisor expertise is in the fifth (high) or first (low) quintile in terms of asset class (ratio of Advisor TNA on fund's asset class over all Advisor TNA) and investment objective (ratio of Advisor TNA on fund's investment objective over all Advisor TNA), respectively. The control variables have ben previously defined. Control variables are lagged by one year. The constant term has been omitted. Standard errors are clustered at the fund level; t-statistics are reported in parentheses. * denotes significance at the 10% level, ** at the 5% level and *** at the 1% level.

	(1)		**(2)**	
	All Funds-Asset Class		All Funds-Investment Objective	
	Coef/t	Mfx/Std	Coef/t	Mfx/Std
High Class Adv Expertise	-1.322***	-0.080***		
	(-10.998)	0.382		
Low Class Adv Expertise	1.731***	0.105***		
	(24.860)	0.406		
High Objective Adv Expertise			-1.894***	-0.083***
			(-10.928)	0.371
Low Objective Adv Expertise			2.414***	0.106***
			(28.289)	0.399
Fund Size	0.108***	0.007***	0.227***	0.010***
	(5.397)	2.099	(8.659)	2.081
Advisor Size	-0.014	-0.001	-0.099***	-0.004***
	(-0.643)	3.209	(-3.283)	3.183
Advisor Funds	-0.926***	-0.056***	-0.832***	-0.036***
	(-16.361)	1.407	(-12.686)	1.394
Fund Age	-0.029***	-0.002***	-0.034***	-0.001***
	(-4.720)	8.912	(-4.431)	9.039
Fund Turnover	0.052***	0.003***	0.053***	0.002***
	(4.680)	2.015	(4.360)	2.099
Fund Expenses	0.251***	0.015***	0.385***	0.017***
	(4.069)	0.560	(4.996)	0.535
Fund Flows	0.004	0.000	0.005	0.000
	(0.532)	2.316	(0.686)	2.396
Past Return	-0.064	-0.004	0.097	0.004
	(-0.455)	0.166	(0.501)	0.155
Observations	36025		29204	
Pseudo R2	0.283		0.360	
Baseline predicted probability	0.128		0.118	
Time dummies	Yes		Yes	

TABLE 7: ASSET CLASS EXPERTISE AND SUBADVISOR CHOICE

Table 7 presents the results of cross-sectional time series logistic regression models of the probability of a fund belonging to one of four asset class categories. For the 4 models, the sample contains all U.S. outsourced mutual funds from 1996 to 2011, or 5644 observations. The dependent variable is an indicator variable of whether the subadvised fund belongs to the equity, debt, balance or international class in each three-column panel. The explanatory variables are *Class Sub Expertise*, which measures subadvisor expertise (ratio of Subdvisor TNA on a particular asset class over all Subadvisor TNA) in a specific asset class. For example, column (1) measures subadvisor expertise in the equity asset class. *Fund Size* is the natural logarithm of the total net assets (TNA) under management in millions of dollars. *Subadvisor size* is the logarithm of all the subadvisor's fund TNA, excluding the fund itself. *Subadvisor Funds* is the natural logarithm of the number of funds in that subadvisor, excluding the fund itself. *Fund Age* is the number of years since the fund inception. *Fund Turnover* is the minimum of aggregate purchases and sales of securities divided by the average TNA over the calendar year. *Fund Expenses* are the total annual expenses and fees dividend by the year-end TNA. *Fund Flows* represents the new inflows of the fund over the previous year. *Past Return* is the cumulative past years' fund return. Control variables are lagged one year. The constant term has been omitted. Standard errors are clustered at the fund level; t-statistics are reported in parentheses. * denotes significance at the 10% level, ** at the 5% level and *** at the 1% level.

	(1) Subadvised Funds (Equity)		**(2)** Subadvised Funds (Debt)		**(3)** Subadvised Funds (Balance)		**(4)** Subadvised Funds (International)	
	Coef/t	Mfx/Std	Coef/t	Mfx/Std	Coef/t	Mfx/Std	Coef/t	Mfx/Std
Class Sub Expertise	4.940***	1.229***	5.234***	0.389***	7.127***	0.158***	7.043***	0.503***
	(30.876)	0.424	(23.189)	0.366	(14.763)	0.151	(27.470)	0.326
Fund Size	0.098**	0.024**	-0.216***	-0.016***	-0.150**	-0.003**	0.087*	0.006*
	(2.411)	1.948	(-4.158)	1.948	(-2.113)	1.948	(1.690)	1.948
Subadvisor Size	-0.041	-0.010	0.042	0.003	0.187*	0.004*	0.165***	0.012***
	(-0.713)	3.776	(0.579)	3.776	(1.859)	3.774	(2.745)	3.776
Subadvisor Funds	0.217	0.054	-0.018	-0.001	-0.086	-0.002	0.158	0.011
	(1.424)	1.344	(-0.094)	1.344	(-0.340)	1.344	(1.030)	1.344
Fund Age	-0.023*	-0.006*	0.029**	0.002**	0.045***	0.001***	-0.007	-0.001
	(-1.657)	7.466	(1.978)	7.466	(3.473)	7.463	(-0.577)	7.466
Fund Turnover	-0.111***	-0.028***	-0.020	-0.001	-0.032	-0.001	0.040**	0.003**
	(-3.446)	2.093	(-0.851)	2.093	(-0.542)	2.094	(2.277)	2.093
Fund Expenses	0.642***	0.160***	-2.319***	-0.172***	-0.365	-0.008	1.001***	0.071***
	(4.496)	0.557	(-9.592)	0.557	(-1.118)	0.557	(4.249)	0.557
Fund Flows	-0.018	-0.005	0.039***	0.003***	-0.098	-0.002	-0.002	-0.000
	(-1.473)	2.585	(3.080)	2.585	(-1.250)	2.586	(-0.132)	2.585
Past Performance	-0.719**	-0.179**	-0.066	-0.005	-0.400	-0.009	1.580***	0.113***
	(-2.361)	0.174	(-0.179)	0.174	(-0.839)	0.174	(3.919)	0.174
Observations	5644		5644		5644		5644	
Pseudo R2	0.471		0.582		0.368		0.586	
Baseline predicted probability	0.518		0.228		0.052		0.182	
Time dummies	Yes		Yes		Yes		Yes	

TABLE 8: INVESTMENT OBJECTIVE EXPERTISE AND SUBADVISOR CHOICE

Table 8 presents the results of cross-sectional time series logistic regression models of the probability of a fund being one of seven equity and debt investment objective categories. The sample contains the equity and debt U.S. outsourced mutual funds from 1996 to 2011. The dependent variable is an indicator variable for whether the equity subadvised fund belongs to capital, growth, income, return, government short term, government long term or corporate bond investment objective in each two-column panel. The explanatory variables include *Objec Sub Expertise*, which measures subadvisor expertise (ratio of Subdvisor TNA on a particular investment objective over all Subadvisor TNA) in a specific investment objective in each column (for example, for column (1), the variable measures subadvisor expertise in capital investment). The set of control variables is defined in previous tables. The constant term has been omitted. Standard errors are clustered at the fund level; t-statistics are reported in parentheses. * denotes significance at the 10% level, ** at the 5% level and *** at the 1% level.

	(1) Subadvised Funds (Capital)		**(2)** Subadvised Funds (Growth)		**(3)** Subadvised Funds (Income)		**(4)** Subadvised Funds (Return)		**(5)** Subadvised Funds (Gov ST)		**(6)** Subadvised Funds (Gov LT)		**(7)** Subadvised Funds (Corporate)	
	Coef/t	Mfx/Std	Coef/t	Mfx/Std	Coef/t	Mfx/Std	Coef/t	Mfx/Std	Coef/t	Mfx/Std	Coef/t	Mfx/Std	Coef/t	Mfx/Std
Objec Sub Expertise	5.292***	0.816***	5.534***	0.370***	6.810***	0.102***	7.586***	0.105***	6.172***	0.009***	5.980***	0.257***	6.581***	0.116***
	(27.884)	0.354	(24.417)	0.287	(15.423)	0.164	(19.217)	0.191	(6.684)	0.153	(18.119)	0.286	(16.074)	0.177
Fund Size	0.028	0.004	0.042	0.003	0.103	0.002	-0.035	-0.000	0.045	0.000	-0.241***	-0.010***	-0.133*	-0.002*
	(0.661)	1.948	(0.910)	1.948	(1.106)	1.948	(-0.442)	1.948	(0.384)	1.971	(-4.663)	1.948	(-1.653)	1.948
Subadvisor Size	0.168***	0.026***	-0.052	-0.003	-0.090	-0.001	0.018	0.000	-0.048	-0.000	0.034	0.001	0.125	0.002
	(3.319)	3.776	(-0.780)	3.776	(-0.966)	3.774	(0.168)	3.774	(-0.331)	3.800	(0.526)	3.776	(1.241)	3.774
Subadvisor Funds	-0.080	-0.012	0.322*	0.022*	0.674***	0.010***	0.243	0.003	0.129	0.000	0.375**	0.016**	-0.061	-0.001
	(-0.600)	1.344	(1.779)	1.344	(2.740)	1.344	(0.839)	1.344	(0.264)	1.348	(2.192)	1.344	(-0.235)	1.344
Fund Age	-0.023	-0.004	-0.028*	-0.002*	0.022	0.000	0.010	0.000	0.038**	0.000**	0.044***	0.002***	-0.032	-0.001
	(-1.460)	7.466	(-1.840)	7.466	(1.563)	7.463	(0.513)	7.463	(2.424)	7.434	(3.580)	7.466	(-1.575)	7.463
Fund Turnover	-0.038	-0.006	-0.082	-0.006	-0.614***	-0.009***	-0.397*	-0.005*	0.070***	0.000***	-0.033	-0.001	-0.073	-0.001
	(-1.461)	2.093	(-1.509)	2.093	(-3.401)	2.094	(-1.943)	2.094	(2.711)	2.233	(-1.389)	2.093	(-1.372)	2.094
Fund Expenses	0.414***	0.064***	0.408***	0.027***	0.037	0.001	0.046	0.001	-1.520**	-0.002**	-2.344***	-0.101***	-1.708***	-0.030***
	(2.668)	0.557	(2.821)	0.557	(0.145)	0.557	(0.108)	0.557	(-2.386)	0.557	(-8.975)	0.557	(-6.207)	0.557
Fund Flows	-0.032**	-0.005**	-0.006	-0.000	-0.090*	-0.001*	0.035**	0.000**	0.059	0.000	-0.025	-0.001	0.043***	0.001***
	(-2.124)	2.585	(-0.298)	2.585	(-1.759)	2.586	(2.007)	2.586	(1.222)	2.599	(-0.706)	2.585	(3.035)	2.586
Past Return	-0.621*	-0.096*	-0.649	-0.043	0.187	0.003	0.385	0.005	-4.569***	-0.007***	-0.223	-0.010	0.898**	0.016**
	(-1.776)	0.174	(-1.331)	0.174	(0.303)	0.174	(0.547)	0.174	(-3.069)	0.171	(-0.580)	0.174	(2.237)	0.174
Observations	5644		5644		5644		5644		5644		5644		5644	
Pseudo R2	0.422		0.451		0.412		0.573		0.492		0.561		0.423	
Baseline predicted probability	0.269		0.167		0.081		0.049		0.040		0.191		0.068	
Time dummies	Yes		Yes		Yes		Yes		Yes		Yes		Yes	

TABLE 9: SUBADVISOR CLASS EXPERTISE AND FUND PERFORMANCE

Table 9 presents the results of the monthly panel regressions of risk-adjusted returns on fund characteristics. The sample contains all U.S. mutual funds from 1996 to 2011. Fund returns are calculated before deducting fees and expenses (gross return). The dependent variable is fund performance, which is measured by the alpha from CAPM, Fama-French three factors (FF3), Carhart's 4 factors (FF4) model, te Carhart's model augmented by an international index and a global bond index (FF6) and Carhart's model augmented by 3 government bond indexes and 2 corporate indexes (FF9). Subadvised is a dummy variable that equals 1 if the fund is subadvised to an unaffiliated firm. Class Sub Expertise measures the subadvisor expertise in terms of fund asset class (ratio of Subadvisor TNA on fund's asset class over all Subadvisor TNA). Fund Size is the natural logarithm of the total net assets (TNA) under management in millions of dollars. Advisor size is the logarithm of all the advisor's fund TNA, excluding the fund itself. Advisor Funds is the natural logarithm of the number of funds in that advisor, excluding the fund itself. Subadvisor size is the logarithm of all funds TNA of the Subadvisor, excluding the fund itself. Subadvisor Funds is the natural logarithm of the number of funds in that Subadvisor, excluding the fund itself. Fund Age is the number of years since the fund inception. Fund Turnover is the minimum of aggregate purchases and sales of securities divided by the average TNA over the calendar year. Fund Expenses are the total annual expenses and fees dividend by the year-end TNA. Fund Flows represents the new inflows of the fund over the previous year. Past Return is the percentage of cumulative past years' fund return. Control variables are lagged 12 months. Time and investment objective dummies are included but not reported; the constant term has also been omitted. Standard errors are clustered at the fund level; t-statistics are reported in parentheses. * denotes significance at the 10% level, ** at the 5% level and *** at the 1% level.

	(1) CAPM	**(2)** FF3	**(3)** FF4	**(4)** FF6	**(5)** FF9
Subadvised	-0.0381***	-0.0218**	-0.0193*	-0.0309***	-0.0483***
	(-2.82)	(-1.99)	(-1.78)	(-2.70)	(-3.51)
Class Sub Expertise	0.0380***	0.0416***	0.0434***	0.0295***	0.0339***
	(3.51)	(4.39)	(4.54)	(3.04)	(3.07)
Fund Size	-0.0005	0.0011	-0.0001	-0.0010	-0.0015
	(-0.16)	(0.40)	(-0.05)	(-0.36)	(-0.49)
Advisor Size	-0.0034	-0.0036	-0.0035	-0.0020	0.0041
	(-0.69)	(-0.90)	(-0.87)	(-0.44)	(0.79)
Advisor Funds	0.0487**	0.0692***	0.0801***	0.0526**	0.0312
	(2.02)	(3.44)	(4.07)	(2.53)	(1.37)
Subadvisor Size	0.0174***	0.0208***	0.0200***	0.0149***	0.0153**
	(2.87)	(4.09)	(3.96)	(2.68)	(2.39)
Subadvisor Funds	-0.0701***	-0.0871***	-0.0968***	-0.0684***	-0.0632***
	(-2.99)	(-4.39)	(-4.98)	(-3.30)	(-2.86)
Fund Age	0.0002	-0.0005	-0.0003	-0.0002	-0.0000
	(0.25)	(-1.11)	(-0.69)	(-0.48)	(-0.01)
Fund Expenses	0.0435**	0.0295**	0.0252*	0.0434***	0.0572***
	(2.40)	(2.06)	(1.73)	(3.27)	(3.98)
Fund Turnover	0.0021	0.0033	0.0052**	-0.0020	-0.0049*
	(0.94)	(1.43)	(2.07)	(-0.75)	(-1.81)
Fund Flows	0.0048***	0.0041***	0.0042***	0.0046***	0.0055***
	(3.74)	(4.08)	(4.18)	(4.60)	(4.22)
Past Return	0.0117***	0.0105***	0.0100***	0.0090***	0.0074***
	(34.51)	(35.39)	(34.71)	(29.24)	(18.79)
Observations	140155	140155	140155	140155	140155
Adjusted R^2	0.211	0.194	0.177	0.170	0.090
Time dummies	Yes	Yes	Yes	Yes	Yes
Investment Objective dummies	Yes	Yes	Yes	Yes	Yes

TABLE 10: SUBADVISOR OBJECTIVE EXPERTISE AND FUND PERFORMANCE

Table 10 presents the results of the monthly panel regressions of risk-adjusted returns on fund characteristics. The sample contains all U.S. mutual funds from 1996 to 2011. Fund returns are calculated before deducting fees and expenses (gross return). The dependent variable is fund performance, which is measured by the alpha for CAPM, Fama-French three factors (FF3), Carhart's 4 factors (FF4) model, Carhart's model augmented by an international index and a global bond index (FF6) and Carhart's model augmented by 3 government bond indexes and 2 corporate indexes (FF9). Subadvised is a dummy variable that equals 1 if the fund is subadvised to an unaffiliated firm. Class Sub Expertise measures the subadvisor expertise in terms of fund asset class (ratio of Subadvisor TNA on fund's asset class over all Subadvisor TNA). Fund Size is the natural logarithm of the total net assets (TNA) under management in millions of dollars. Advisor size is the logarithm of all the advisor's fund TNA, excluding the fund itself. Advisor Funds is the natural logarithm of the number of funds in that advisor, excluding the fund itself. Subadvisor size is the logarithm of all funds TNA of the Subadvisor, excluding the fund itself. Subadvisor Funds is the natural logarithm of the number of funds in that Subadvisor, excluding the fund itself. Fund Age is the number of years since fund inception. Fund Turnover is the minimum of aggregate purchases and sales of securities divided by the average TNA over the calendar year. Fund Expenses are the total annual expenses and fees dividend by the year-end TNA. Fund Flows represents the new inflows of the fund over the previous year. Past Return is the percentage cumulative past year's fund return. Control variables are lagged by 12 months. Time and investment objective dummies are included but not reported; the constant term has also been omitted. Standard errors are clustered at the fund level; t-statistics are reported in parentheses. * denotes significance at the 10% level, ** at the 5% level and *** at the 1% level.

	(1) CAPM	**(2)** FF3	**(3)** FF4	**(4)** FF6	**(5)** FF9
Subadvised	-0.0273*	-0.0306**	-0.0288**	-0.0493***	-0.0493***
	(-1.83)	(-2.48)	(-2.37)	(-3.83)	(-3.34)
Objective Sub Expertise	-0.0182	0.0417***	0.0465***	0.0834***	0.0284*
	(-1.12)	(3.19)	(3.66)	(6.11)	(1.81)
Fund Size	-0.0110***	-0.0092***	-0.0099***	-0.0057**	-0.0044
	(-3.19)	(-3.26)	(-3.57)	(-1.99)	(-1.40)
Advisor Size	-0.0098*	-0.0093**	-0.0083*	-0.0050	0.0021
	(-1.72)	(-2.02)	(-1.84)	(-1.05)	(0.38)
Advisor Funds	0.0526*	0.0815***	0.0929***	0.0707***	0.0358
	(1.93)	(3.65)	(4.30)	(3.18)	(1.49)
Subadvisor Size	0.0209***	0.0240***	0.0230***	0.0167***	0.0185***
	(3.04)	(4.23)	(4.14)	(2.89)	(2.78)
Subadvisor Funds	-0.0594**	-0.0831***	-0.0951***	-0.0786***	-0.0673***
	(-2.23)	(-3.75)	(-4.42)	(-3.54)	(-2.90)
Fund Age	0.0007	0.0004	0.0006	-0.0001	-0.0003
	(1.09)	(0.78)	(0.99)	(-0.23)	(-0.52)
Fund Expenses	-0.0343**	-0.0494***	-0.0509***	-0.0055	0.0327**
	(-2.01)	(-3.52)	(-3.63)	(-0.46)	(2.46)
Fund Turnover	0.0059**	0.0084***	0.0100***	-0.0009	-0.0027
	(2.38)	(3.45)	(3.79)	(-0.33)	(-1.02)
Fund Flows	0.0046***	0.0036***	0.0037***	0.0046***	0.0048***
	(3.36)	(3.59)	(3.69)	(4.29)	(3.63)
Past Return	1.2370***	1.0878***	1.0213***	0.9044***	0.7586***
	(30.22)	(31.48)	(31.33)	(26.99)	(17.55)
Observations	135790	135790	135790	135790	135790
Adjusted R^2	0.193	0.175	0.162	0.155	0.088
Time dummies	Yes	Yes	Yes	Yes	Yes
Investment Objective dummies	Yes	Yes	Yes	Yes	Yes

TABLE 11. THE EFFICIENCY OF OUTSOURCING (I)

Panel A of Table 11 presents a t-test analysis of the differences in advisor performance between positive and negative changes in the proportion of the outsourced funds of a given advisor during the prior year (the first row). The second row test differences in performance between companies in the top decile (the highest increase in the proportion of outsourced funds) and the bottom decile (the largest drop). The third and fourth rows consider only outsourced funds that are not within the advisor's core competency, where the core competency of the advisor is defined by the maximum asset class expertise (simply majority) or at least 50% of expertise (absolute majority). The advisor performance is the TNA-weighted averages of the corresponding fund-level alpha from Carhart's model augmented by 3 government bond indexes and 2 corporate indexes (FF9). We use the fund alpha of in-house funds (first two columns), in-house funds within the simple majority core (3rd and 4th columns), and in-house funds within the absolute majority core (5th and 6th columns). In Panel B, we identify a treatment group of firms that increased the proportion of outsourced funds and a control sample of advisors employing two different propensity score matching procedures: a nearest neighbor algorithm by Rosenbaum and Rubin (1983) and stratified sampling by Hunt and Tyrrell (2001). The propensity score is estimated using the number of funds per advisor and total advisor size as well as age, turnover and expenses of the advisor defined as the TNA-weighted averages of the corresponding fund-level measures. We require that the difference between the propensity score of advisors that increased the number of external funds and its matching peer not exceed 0.1 in absolute value. We then compare the performance between the two groups and report the difference. * denotes significance at the 10% level, ** at the 5% level and *** at the 1% level. The sample period is 1996-2011.

Panel A: T-Test Analysis

	All In house funds		In house funds in the CORE Max		In house funds in the CORE (50)	
	Diff Adv Performance	p-value	Diff Adv Performance	p-value	Diff Adv Performance	p-value
Outsourced any funds	0.0198	0.02	0.0108	0.23	0.0194	0.04
Top Decile- Bottom Decile	0.0668	0.00	0.0545	0.00	0.0671	0.00
Outsourced NON CORE (MAX) funds	0.0483	0.00	0.0322	0.00	0.0310	0.01
Outsourced NON CORE (50%) funds	0.0479	0.00	0.0441	0.00	0.0448	0.00

Panel B: Propensity Score Matching

	All In house funds		In house funds in the CORE (MAX)		In house funds in the CORE (50)	
	Nearest Neighbor	Stratified Sampling	Nearest Neighbor	Stratified Sampling	Nearest Neighbor	Stratified Sampling
Outsourced any funds	0.036***	0.028***	0.022***	0.020***	0.033***	0.032***
Outsourced NON CORE (MAX) funds	0.035**	0.038***	0.025**	0.037***	0.022**	0.029**
Outsourced NON CORE (50%) funds	0.047***	0.052***	0.037**	0.055***	0.038***	0.053***

TABLE 12. THE EFFICIENCY OF OUTSOURCING (II)

Table 12 presents the results for advisor fixed effect estimates of risk-adjusted returns on the proportion of outsourced funds and other advisor characteristics. The dependent variable is advisor performance measured by the TNA-weighted averages of the corresponding fund-level alpha using the 9-factor model previously described (FF9). Advisor performance is calculated using either all in-house funds or only in-house funds that are within the core competency of the advisor. Outsourcing firms is a dummy variable that equals 1 if the advisor increased the proportion of outsourced funds during the prior year and 0 otherwise. We also classified this measure using any outsourced funds or only outsourced funds that are not within the core competency of the advisor. The core competency of the advisor is defined as the maximum asset class expertise (Max) or at least 50% expertise. Advisor Age, Advisor Expenses, Advisor Turnover, Advisor Flows and Advisor Past Returns are defined as the TNA-weighted averages of the corresponding fund-level measures. Advisor Size is the logarithm of TNA of all funds in the advisor, excluding the fund itself, and Advisor Funds is the natural logarithm of the number of funds in the advisor. Control variables are lagged by 12 months. The sample contains observations for all U.S. advisory firms from 1996 to 2011. The constant term has been omitted. Standard errors are clustered at the advisor level; t-statistics are reported in parentheses. * denotes significance at the 10% level, ** at the 5% level and *** at the 1% level.

	All In house funds			In house funds in the CORE (Max)			In house funds in the CORE (50%)		
Advisor Performance	Any Outsourced	Outsourced Non-core (max)	Outsourced Non-core (50)	Any Outsourced	Outsourced Non-core (max)	Outsourced Non-core (50%)	Any Outsourced	Outsourced Non-core (max)	Outsourced Non-core (50%)
Outsourcing Firms	0.0048	0.0192**	0.0151*	0.0039	0.0253***	0.0252**	0.0155*	0.0205**	0.0288***
	(0.68)	(2.50)	(1.66)	(0.48)	(2.95)	(2.56)	(1.90)	(2.29)	(2.96)
Advisor Age	0.0077***	0.0059***	0.0061***	0.0075***	0.0058***	0.0059***	0.0062***	0.0047***	0.0046***
	(7.13)	(5.45)	(4.73)	(5.63)	(4.20)	(3.76)	(4.31)	(3.23)	(2.85)
Advisor Expenses	0.0179	-0.0336	-0.0332	0.0554*	-0.0130	0.0159	0.0827***	-0.0030	0.0070
	(0.77)	(-1.28)	(-1.07)	(1.96)	(-0.40)	(0.46)	(2.95)	(-0.10)	(0.22)
Advisor Turnover	-0.0003***	-0.0002***	-0.0002***	-0.0003***	-0.0002***	-0.0001**	-0.0002***	-0.0001**	-0.0001
	(-4.91)	(-3.32)	(-3.14)	(-4.80)	(-3.28)	(-2.17)	(-4.23)	(-2.20)	(-1.62)
Advisor Flows	0.0081	-0.0005	-0.0037	0.0076*	-0.0010	-0.0029	0.0035	-0.0039	-0.0043
	(1.61)	(-0.07)	(-0.51)	(1.78)	(-0.13)	(-0.38)	(0.95)	(-0.53)	(-0.57)
Advisor Past Returns	0.2520***	0.3162***	0.2158***	0.3269***	0.4098***	0.2936***	0.3154***	0.4201***	0.3074***
	(4.96)	(5.80)	(3.23)	(5.54)	(6.41)	(4.05)	(4.91)	(6.17)	(4.06)
Advisor Size	-0.0414***	-0.0195***	-0.0292***	-0.0383***	-0.0110	-0.0086	-0.0350***	-0.0066	-0.0054
	(-6.14)	(-2.67)	(-3.16)	(-4.78)	(-1.22)	(-0.83)	(-3.96)	(-0.70)	(-0.52)
Advisor Funds	0.0005**	-0.0001	0.0004	0.0010***	0.0001	0.0000	0.0012***	0.0002	0.0001
	(2.05)	(-0.49)	(1.04)	(3.07)	(0.20)	(0.09)	(3.63)	(0.41)	(0.34)
Observations	9485	7549	5854	8855	6979	5472	7951	6170	5154
Adjusted R^2	0.344	0.388	0.426	0.335	0.378	0.426	0.381	0.444	0.455

TABLE 13: PERFORMANCE OF OUTSOURCING WHEN THE ADVISOR HAS NO EXPERIENCE WITH THE GIVEN FUND TYPE

This table presents the results of the monthly panel regressions of risk-adjusted returns on fund characteristics. The sample contains U.S. mutual funds from 1996 to 2011 that are either subadvised to an unaffiliated firm or managed in-house by an advisor that is not experienced in the fund style (less than 5 on the ratio of Advisor TNA on fund's asset class over all Advisor TNA). Fund returns are calculated before deducting fees and expenses (gross return). The dependent variable is fund performance, which is measured by the alpha from the CAPM, Fama-French three factors (FF3), Carhart's 4 factors (FF4) model, Carhart's model augmented by an international index and a global bond index (FF6) and Carhart's model augmented by 3 government bond indexes and 2 corporate indexes (FF9). Subadvised is a dummy variable that equals 1 if the fund is subadvised to an unaffiliated firm and 0 if it is managed in-house by an advisor without expertise. Class Sub Expertise measures subadvisor expertise in terms of fund asset class (ratio of Subadvisor TNA on fund's asset class over all Subadvisor TNA). The set of control variables has been previously defined. Time and investment objective dummies are included but not reported; the constant term has also been omitted. Standard errors are clustered at the fund level; t-statistics are reported in parentheses. * denotes significance at the 10% level, ** at the 5% level and *** at the 1% level.

	(1) CAPM	**(2)** FF3	**(3)** FF4	**(4)** FF6	**(5)** FF9
Subadvised	-0.0463*	-0.0279	-0.0255	0.0012	-0.0328
	(-1.82)	(-1.19)	(-1.10)	(0.06)	(-1.37)
Class Sub Expertise	0.0431***	0.0600***	0.0579***	0.0421***	0.0362***
	(2.76)	(4.58)	(4.42)	(3.43)	(2.61)
Fund Size	-0.0113**	-0.0104**	-0.0104**	-0.0127***	-0.0103**
	(-2.17)	(-2.41)	(-2.45)	(-2.90)	(-2.17)
Advisor Size	-0.0039	-0.0020	-0.0014	-0.0019	0.0049
	(-0.62)	(-0.37)	(-0.28)	(-0.35)	(0.82)
Advisor Funds	0.0856**	0.0958***	0.1104***	0.0839***	0.0445
	(2.50)	(3.46)	(4.13)	(2.94)	(1.49)
Subadvisor Size	0.0191**	0.0190***	0.0167***	0.0170**	0.0217***
	(2.39)	(2.88)	(2.59)	(2.48)	(2.83)
Subadvisor Funds	-0.1090***	-0.1133***	-0.1247***	-0.1019***	-0.0878***
	(-3.25)	(-4.12)	(-4.69)	(-3.55)	(-2.98)
Fund Age	0.0009	0.0009	0.0011	0.0004	0.0003
	(0.87)	(1.01)	(1.13)	(0.46)	(0.32)
Fund Expenses	-0.0440*	-0.0648***	-0.0663***	-0.0337*	0.0233
	(-1.77)	(-3.13)	(-3.19)	(-1.96)	(1.24)
Fund Turnover	0.0087***	0.0107***	0.0118***	-0.0017	-0.0031
	(3.04)	(3.52)	(3.46)	(-0.45)	(-0.95)
Fund Flows	0.0056***	0.0044***	0.0045***	0.0042***	0.0066***
	(3.81)	(3.41)	(3.30)	(2.69)	(4.09)
Past Return	1.2900***	1.0852***	1.0168***	0.9213***	0.7903***
	(23.61)	(23.85)	(23.41)	(20.22)	(14.60)
Observations	79554	79554	79554	79554	79554
Adjusted R^2	0.195	0.175	0.164	0.158	0.102
Time dummies	Yes	Yes	Yes	Yes	Yes
Investment Objective dummies	Yes	Yes	Yes	Yes	Yes

TABLE 14: ASSET CLASS EXPERTISE, SUBADVISOR CHOICE AND COMMERCIAL RELATIONS

Table 14 presents the results of cross-sectional time series logistic regression models of the probability of a fund belonging to one of four asset classes. The sample contains all U.S. outsourced mutual funds from 1996 to 2011. The dependent variable is an indicator variable for whether the subadvised fund belongs to the equity, debt, balance or international class in each three-column panel. The explanatory variable is High Relation, which equals 1 if the ratio between the number of funds managed by the same fund subadvisor and total advisor funds is above the median. The remaining variables have been previously defined. Interaction terms between High Relation and the Subadvisor Expertise of the fund class are also included. The constant term has been omitted. Standard errors are clustered at fund level; t-statistics are reported in parentheses. * denotes significance at the 10% level, ** at the 5% level and *** at the 1% level.

	(1) Subadvised Funds (Equity)		**(2)** Subadvised Funds (Debt)		**(3)** Subadvised Funds (Balance)		**(4)** Subadvised Funds (International)	
	Coef/t	Mfx/Std	Coef/t	Mfx/Std	Coef/t	Mfx/Std	Coef/t	Mfx/Std
High Relation	0.635***	0.157***	0.706***	0.048***	0.301	0.007	0.249	0.018
	(3.056)	0.500	(2.898)	0.500	(0.958)	0.500	(0.993)	0.500
Class Sub Expertise	5.764***	1.427***	6.645***	0.456***	8.453***	0.204***	7.347***	0.522***
	(25.407)	0.418	(17.120)	0.359	(7.903)	0.146	(21.909)	0.319
High Relation*Class Sub Expertise	-1.609***	-0.398***	-1.983***	-0.136***	-2.419**	-0.058**	-1.228***	-0.087***
	(-5.653)	0.356	(-4.465)	0.280	(-2.013)	0.113	(-2.860)	0.209
Fund Size	0.083**	0.021**	-0.226***	-0.016***	-0.130	-0.003	0.118**	0.008**
	(1.979)	1.989	(-4.026)	1.989	(-1.630)	1.990	(2.212)	1.989
Subadvisor Size	-0.096	-0.024	0.127	0.009	0.157	0.004	0.158**	0.011**
	(-1.622)	3.771	(1.538)	3.771	(1.360)	3.768	(2.422)	3.771
Subadvisor Funds	0.361**	0.089**	-0.130	-0.009	-0.105	-0.003	0.126	0.009
	(2.332)	1.360	(-0.614)	1.360	(-0.371)	1.360	(0.728)	1.360
Fund Age	-0.018	-0.004	0.028*	0.002*	0.043***	0.001***	-0.010	-0.001
	(-1.285)	7.882	(1.729)	7.882	(3.418)	7.878	(-0.767)	7.882
Fund Turnover	-0.110***	-0.027***	-0.029	-0.002	-0.006	-0.000	0.043**	0.003**
	(-3.255)	2.227	(-1.565)	2.27	(-0.178)	2.228	(2.435)	2.227
Fund Expenses	0.664***	0.164***	-2.399***	-0.165***	-0.171	-0.004	1.172***	0.083***
	(4.292)	0.539	(-9.397)	0.539	(-0.523)	0.539	(4.932)	0.539
Fund Flows	-0.019	-0.005	0.041***	0.003***	-0.076	-0.002	0.001	0.000
	(-1.551)	2.810	(2.956)	2.810	(-1.149)	2.812	(0.038)	2.810
Past Return	-1.099***	-0.272***	0.605	0.042	-0.601	-0.015	1.637***	0.116***
	(-3.232)	0.173	(1.442)	0.173	(-1.168)	0.173	(3.714)	0.173
Observations	4716		4716		4716		4716	
Pseudo R2	0.466		0.591		0.339		0.561	
Baseline predicted probability	0.522		0.233		0.051		0.178	
Time dummies	Yes		Yes		Yes		Yes	

TABLE 15: INVESTMENT OBJECTIVE EXPERTISE, SUBADVISOR CHOICE AND COMMERCIAL RELATIONS

Table 15 presents the results of cross-sectional time series logistic regression models of the probability of a fund belonging to one of seven equity and debt investment objective categories. The sample contains equity and debt U.S. mutual funds outsourced from 1996 to 2011. The dependent variable is an indicator variable for whether the subadvised fund belongs to capital, growth, income, return investment, government short-term (ST), government long-term (LT) or corporate fund objectives in each two-column panel. The explanatory variable is High Relation, which equals 1 if the ratio between the number of funds managed by the same fund subadvisor and total advisor funds is above the median. The remaining variables have been previously defined. Interation terms between High Relation and the Subadvisor Expertise of the fund invesment objective are also included. The constant term has been omitted. Standard errors are clustered at the fund level; t-statistics are reported in parentheses. * denotes significance at the 10% level, ** at the 5% level and *** at the 1% level.

	(1) Subadvised Funds (Capital)		**(2)** Subadvised Funds (Growth)		**(3)** Subadvised Funds (Income)		**(4)** Subadvised Funds (Return)		(5) Subadvised Funds (Gov ST)		(6) Subadvised Funds (Gov LT)		(7) Subadvised Funds (Corporate)	
	Coef/t	Mfx/Std	Coef/t	Mfx/Std	Coef/t	Mfx/Std	Coef/t	Mfx/Std	Coef/t	Mfx/Std	Coef/t	Mfx/Std	Coef/t	Mfx/Std
High Relation	-0.036	-0.006	0.613***	0.041***	0.156	0.002	-0.144	-0.002	0.269	0.000	0.759***	0.031***	0.709**	0.013**
	(-0.178)	0.500	(2.691)	0.500	(0.417)	0.500	(-0.409)	0.500	(0.481)	0.500	(3.200)	0.500	(2.425)	0.500
Objective Sub Expertise	5.655***	0.926***	5.777***	0.384***	7.772***	0.113***	8.643***	0.098***	8.487***	0.009***	7.233***	0.292***	8.444***	0.155***
	(21.041)	0.349	(18.844)	0.285	(10.521)	0.163	(13.245)	0.186	(7.225)	0.136	(13.989)	0.277	(7.383)	0.177
High Relation*Objective Sub Expertise	-0.993***	-0.163***	-0.557	-0.037	-1.818**	-0.026**	-1.555**	-0.018**	-2.793	-0.003	-2.589***	-0.105***	-3.141***	-0.058***
	(-2.734)	0.226	(-1.281)	0.199	(-2.102)	0.095	(-2.066)	0.126	(-1.541)	0.119	(-4.323)	0.193	(-2.628)	0.127
Fund Size	-0.005	-0.001	0.070	0.005	0.072	0.001	-0.049	-0.001	0.002	0.000	-0.261***	-0.011***	-0.092	-0.002
	(-0.122)	1.989	(1.430)	1.989	(0.745)	1.990	(-0.567)	1.990	(0.016)	2.013	(-4.907)	1.989	(-1.066)	1.990
Subadvisor Size	0.200***	0.033***	-0.128**	-0.009**	-0.091	-0.001	-0.113	-0.001	-0.069	-0.000	0.044	0.002	0.157	0.003
	(3.711)	3.771	(-2.078)	3.771	(-0.820)	3.768	(-1.008)	3.768	(-0.393)	3.784	(0.594)	3.771	(1.366)	3.768
Subadvisor Funds	-0.134	-0.022	0.486***	0.032***	0.710**	0.010**	0.597*	0.007*	0.520	0.001	0.384**	0.016**	-0.206	-0.004
	(-0.934)	1.360	(2.855)	1.360	(2.532)	1.360	(1.772)	1.360	(1.052)	1.363	(2.013)	1.360	(-0.720)	1.360
Fund Age	-0.019	-0.003	-0.031*	-0.002*	0.028**	0.000**	0.015	0.000	0.038**	0.000**	0.042***	0.002***	-0.028	-0.001
	(-1.221)	7.882	(-1.926)	7.882	(2.041)	7.878	(0.727)	7.878	(2.197)	7.836	(3.354)	7.882	(-1.345)	7.878
Fund Turnover	-0.037	-0.006	-0.077	-0.005	-0.613***	-0.009***	-0.490**	-0.006**	0.041	0.000	-0.029	-0.001	-0.096	-0.002
	(-1.412)	2.227	(-1.420)	2.227	(-3.103)	2.228	(-2.307)	2.228	(0.918)	2.376	(-1.300)	2.227	(-1.616)	2.228
Fund Expenses	0.363**	0.059**	0.448**	0.030**	-0.024	-0.000	0.302	0.003	-2.049***	-0.002***	-2.340***	-0.095***	-1.665***	-0.030***
	(2.133)	0.539	(2.315)	0.539	(-0.084)	0.539	(0.698)	0.539	(-2.822)	0.532	(-8.163)	0.539	(-5.634)	0.539
Fund Flows	-0.035**	-0.006**	-0.010	-0.001	-0.072	-0.001	0.036**	0.000**	0.062	0.000	-0.028	-0.001	0.043***	0.001***
	(-2.233)	2.810	(-0.485)	2.810	(-1.248)	2.812	(2.405)	2.812	(1.482)	2.825	(-1.028)	2.810	(3.122)	2.812
Past Return	-0.478	-0.078	-1.146**	-0.076**	0.070	0.001	0.443	0.005	-6.443***	-0.007***	0.423	0.017	0.990**	0.018**
	(-1.193)	0.173	(-2.391)	0.173	(0.098)	0.173	(0.669)	0.173	(-3.739)	0.170	(1.050)	0.173	(2.120)	0.173
Observations	4716		4716		4716		4716		4716		4716		4716	
Pseudo R2	0.405		0.436		0.422		0.579		0.475		0.547		0.423	
Baseline predicted probability	0.284		0.147		0.049		0.046		0.030		0.151		0.058	
Time dummies	Yes		Yes		Yes		Yes		Yes		Yes		Yes	

TABLE 16: SUBADVISOR EXPERTISE, COMMERCIAL REALTIONS AND FUND PERFORMANCE

Table 16 presents the monthly average of risk-adjusted fund performance using the 4-factors Carhart model augmented by 5 factors (Short-Term, Intermediate and Long-Term Government Bonds Indexes, and High Yield and Investment Grade Corporate Bonds) for all U.S mutual funds that were outsourced from 1996 to 2011. High or Low Objective Expertise equals 1 if Subadvisor Expertise is in the fifth (high) or first (low) quintile in terms of Investment Objective (ratio of Subadvisor TNA on fund's investment objective over all Subadvisor TNA). Panel A summarizes average fund performance noting the Objective Expertise of the subadvisor and the volume of the Commercial Relation between the principal advisor and fund subadvisor (High and Low Commercial Relation equals 1 if the ratio of the number of advisor funds managed by the same fund subadvisor and total advisor funds is above or below the median, respectively). Panel B summarizes the average fund performance, noting the Objective Expertise of the subadvisor and the length of the Commercial Relation between the principal advisor and fund subadvisor (Long and Short Commercial Relation is equal is 1 if there is a relation between advisor and subadvisor greater or shorter than 3 years, respectively). To determine the significance of the differences, we perform a t-test across groups. * denotes significance at the 10% level, ** at the 5% level and *** at the 1% level.

Panel A: Commercial Relations in terms of volume of agreements

Average Alpha 9-F	Low Objective Expertise (obs)	High Objective Expertise (obs)	Difference T-test
Low Commercial Relation (obs)	-.01574 (26238)	.02537 (20472)	.04111 ***
High Commercial Relation (obs)	.00753 (38484)	.04789 (11619)	.04035 ***
Difference t-test	.00189 ***	.02251 ***	

Panel B: Commercial Relations in terms of the length of the agreements

Average Alpha 9-F	Low Objective Expertise (obs)	High Objective Expertise (obs)	Difference T-test
Short Commercial Relation (obs)	-.00442 (18227)	.02200 (7207)	.02642 ***
Long Commercial Relation (obs)	-.00075 (47317)	.03680 (24912)	.03756 ***
Difference t-test	.00366	.01480**	

APPENDIX: DEFINITIONS OF ASSET CLASSES AND INVESTMENT OJECTIVES

Under the Investment Act of 1940, an investment company must register with the Securities and Exchange Commission (SEC). All U.S. mutual fund and other regulated investment management companies are required to file Form NSAR (along with other documents) on a semi-annual basis. According to this form, funds must be classified into different asset classes and the investment objective. A summary of definitions for these categories is provided by the SEC to registrants, which we used to classify the funds (for a detailed description, see https://www.sec.gov/about/forms/formn-sar.pdf)

ASSET CLASS

- **Equity**: invests in equity securities, options and futures on equity securities, indices of equity securities or securities convertible into equity securities.
- **Debt**: invests primarily in debt securities, including convertible debt securities, options and futures on debt securities or indices of debt securities.
- **Balance**: at least 25% of the value of the fund should be invested in debt securities, preferred stock, or a combination of both. If convertible senior securities are included in the required 25%, only the portion of their value attributable to their fixed income characteristics may be used to calculate the 25% figure.
- **International**: more than 50% of its net assets at the end of the current period must be invested in securities located primarily in countries other than the United States.

INVESTMENT OBJECTIVE

Equity Funds

- **Aggressive Capital Appreciation**: primarily and regularly seeks short-term appreciation through high-risk investment with little or no concern for receipt of income.
- **Capital Appreciation**: primarily and regularly invests in an intermediate-term return by investing in moderate to high-risk securities with little or no concern for receipt of income.
- **Growth**: seeks long-term growth with a moderate degree of risk. Receipt of income may be considered to some degree in selecting investments.
- **Growth and Income**: primarily and regularly makes low risk investments with the objective of capital growth and income production.
- **Income**: the receipt of income is the primary reason for selecting portfolio securities.
- **Total Return**: portfolio includes a varying mix of equity and debt securities.

Debt Funds

- **Government Short-Term**: Short-Term Maturities of U.S. Treasury, U.S. Government Agency and State and municipal tax-free funds.
- **Government Long-Term**: Intermediate and Long-Term Maturities of U.S. Treasury, U.S. Government Agency, State and Municipal tax-free funds.
- **Corporate**: Intermediate and Long-Term Maturities of Corporate assets.

For purposes of the NSAR Form, short-term maturities are defined as securities with maturities of 12 months or less. Securities with variable or floating interest rates or that are subject to a demand feature should be considered short-term if the interest rate adjustment period or demand period is 12 months or less. Intermediate and long-term maturities include all other debt securities.