# Why Pick Stocks for the Competition?
# The Economics of Mutual Fund Sub-advisory Contracts

Diane Del Guercio, Jonathan Reuter, and Paula A. Tkac

*First Draft*
*October 24, 2007*

Diane Del Guercio
Lundquist College of Business
1208 University of Oregon
Eugene, OR 97403-1208
541-346-5179
dianedg@uoregon.edu

Jonathan Reuter
Lundquist College of Business
1208 University of Oregon
Eugene, OR 97403-1208
541-346-3140
jreuter@uoregon.edu

Paula A. Tkac
Research Department
Federal Reserve Bank of Atlanta
1000 Peachtree St. NE
Atlanta, GA 30309
404-498-8813
paula.tkac@atl.frb.org

We would like to thank seminar participants at the Pacific Northwest Finance Conference, University of Arkansas, and Cal State Fullerton for helpful comments. Del Guercio and Reuter would like to acknowledge support from the Securities Analysis Center at the University of Oregon. We thank Steven Green for excellent research assistance and Deb Weatherbee at Financial Research Corporation for generously providing data on distribution channels.

## I. Introduction

The business of offering mutual funds to the investing public has changed substantially over the last few decades as the industry has grown and matured. Most notably, the retail mutual fund industry is dominated, in terms of assets under management, by the larger organizations (fund families) that offer a host of ancillary products and services including investment information and advice, recordkeeping, and other services, along with the traditional portfolio management or stock-picking functions. Parallel to this industry trend toward larger scale and scope in offerings is the trend toward outsourcing portfolio management to another advisory firm: the rise of sub-advising. In 1996, only 8.3% of U.S. domestic equity mutual funds were outsourced to outside sub-advisors, by 2002 this fraction rose to 18.4% and has since remained stable.

In this paper, we analyze the economics underlying the practice and evolution of outsourcing in the mutual fund industry. Because sub-advising represents a voluntary contractual relationship between two parties, the observed growth in this practice implies that both sides are benefiting. A goal of this paper is to quantify and understand the nature of these benefits for both the sub-advisory firm and the advisory firm that hires them. The advisory firm's economic benefits from outsourcing portfolio management are relatively straightforward. Outsourcing will be more profitable than in-house production when there are cost-asymmetries (the sub-advisor can provide the portfolio management at a lower cost) or when it raises the willingness to pay on the part of retail investors due to some additional surplus created by the interaction of the two firms (e.g., the sub-advisor has high name recognition or reputation with the retail investors). For example, for a family that currently specializes in value funds, starting a new growth fund involves fixed start-up costs of employing new types of trading techniques,

research, etc. This implies that it may be cheaper for the family to outsource the growth fund to another firm rather than manage this portfolio internally.

The benefits that accrue to the typical sub-advisory firm, however, are somewhat less obvious, mainly due to the empirical fact that the "typical" sub-advisor has changed over time. In 1996, the typical sub-advisor is an institutional advisory firm that exclusively serves separate-account clients (e.g., pension funds and endowments). In 2002, the typical sub-advisor is a mutual fund family that has its own retail mutual fund offerings. The economic benefits to a separate account sub-advisor are intuitive. Rather than expend resources on developing a mutual fund infrastructure, sub-advising allows the separate account manager to specialize in portfolio management, and thereby reap any resulting gains in reputation, performance, or efficiency. Thus, the sub-advisor can access a whole new set of potential clients, without incurring the high cost of retail distribution. As long as the sub-advisory fee exceeds the separate account manager's cost of portfolio management, sub-advising increases profits.

This intuition, however, is less clear in the case of a sub-advisor with its own retail mutual fund offerings. Sub-advising for other fund families might cannibalize sales of their own investment products, and it is not immediately obvious why it is not more profitable for the sub-advisor to target the advisors' investors directly, rather than indirectly as the sub-advisor. In short, we are left with the question: why would these sub-advisors choose to 'pick stocks for the competition'? We argue that the answer lies in a more sophisticated view of the competitive nature of the mutual fund marketplace. In short, sub-advising for other mutual fund families will be profitable if the family is able to serve a new clientele that would be too costly to reach directly. In other words, a family would be willing to 'pick stocks for the competition' if hired by a family that is not really 'the competition' in the traditional economic sense. Fund families

serving retail fund investor clienteles that differ based on their financial sophistication, demand for investment advice and other services might well find mutual beneficial outcomes from a sub-advisory relationship.

In the first part of the paper, we outline economic motivations for a fund family to outsource portfolio management and document the heterogeneity in sub-advisor arrangements. For example, we observe arrangements ranging from outsourcing a single fund in a large family of internally-managed funds to outsourcing all of the funds in the family to outside firms. As an example of the latter, in 2002 Frank Russell funds had $13 billion in retail mutual fund assets, all of which was outsourced to sub-advisors. Using comprehensive, hand-collected data on sub-advisory relationships in both 1996 and 2002, we provide evidence supportive of the cost-asymmetry and product differentiation motives for sub-advising. For example, we find that families that sub-advise offer a greater variety of investment styles to their investors than families than manage all of their funds internally, consistent with an ability to offer a wider variety of products at lower cost via sub-advising. For example, in 2002, 48% of families that sub-advise at least one actively-managed domestic equity fund offer 5 or more different categories of Morningstar fund styles to investors. In contrast, only 14% of families that do not sub-advise any of their funds offer 5 or more different style categories of funds.

In the second part of the paper, we turn to the analysis of the fund families that rent out their portfolio management expertise for other fund families to sell. Using the economic logic that a sub-advisor will choose to serve a clientele indirectly through sub-advising rather than offering their services directly to these same investors when it is more profitable to do so, we arrive at predictions about the nature of competition in this industry. Specifically, we do not expect to observe a sub-advisor pairing with an advisor that offers a similar bundle of services to

the same clientele. Using data on distribution channels from Financial Research Corporation (first used in Bergstresser, Chalmers, and Tufano (2007)), we show that an advisor is substantially less likely to hire a sub-advisor that offers its funds through the same distribution channel. Extrapolating from evidence of home bias in other asset classes, we also explore whether advisors are less likely to hire sub-advisors located in the same geographic region. Here, however, the evidence is mixed, leading us to conclude that distribution channel better captures the degree of competition between mutual funds than geographic location.

Finally, we analyze the measureable outcome of the advisor-sub-advisor contract, the return to investors in these funds. We document that sub-advised funds earn lower returns than internally managed funds within the same investment category. This finding is similar to findings in contemporaneous papers by Chen, Hong, and Kubik (2006) and Cashman and Deli (2006). When we distinguish between funds with a single mutual fund manager, single separate account manager, or multiple sub-advisors, however, we find that the level of underperformance is largest for funds hiring single sub-advisors with their own mutual fund families and zero for funds hiring a single separate account manager. Moreover, when we introduce family-level controls for the use of sub-advisors, we find that all of the funds in families hiring sub-advisors underperform—not just their sub-advised funds.

While Cashman and Deli find that the performance of sub-advised funds is better than it would have been if the funds were managed in-house, we continue to find that funds hiring sub-advisors with their own mutual funds earn lower returns than internally managed funds in families that do not hire any sub-advisors. To shed light on these lower returns, we link sub-advised funds with a mutual fund sub-advisor to 'twin' funds within the sub-advisors' families. While agency conflicts between advisors and sub-advisors might predict that sub-advisors will

favor twin funds over sub-advised funds, we find evidence consistent with twin funds also underperforming their peers. In the next version of this paper, we intend to explicitly test for return differences between sub-advised funds and their twins, as well as several possible explanations for the underperformance of twin funds, ranging from diseconomies of scale to favoritism.

## II. Background on the Economic Foundations of Sub-advisory Relationships

### *A. Why hire a sub-advisor?*

A mutual fund can be thought of as a bundled product of investment services that includes portfolio management, recordkeeping, distribution, investment advice, etc. A fund family ultimately provides this bundle to investors but is not constrained to produce all of these services in-house; each fund family can choose, on a fund-by-fund basis, to outsource one or more of these services by contracting with external firms. In this paper, we are specifically interested in the decision to outsource the portfolio management, or stock-picking, function to a hired sub-advisor. A fund family that uses its own employees as portfolio managers can be termed 'vertically integrated' or 'internally managed.' In practice, among families choosing to contract with sub-advisors we observe a broad spectrum of their use ranging from outsourcing the portfolio management of every fund in the family, to outsourcing a single fund in a large family of internally managed funds.

There are several competing theories in the industrial organization literature of these make-or-buy decisions predicting when a firm will choose to outsource production rather than remain fully integrated. Outsourcing may be more profitable than in-house production in the case of cost-asymmetries (when the sub-contractor can provide the good or service at a lower cost) or when it raises the willingness to pay on the part of retail customers due to some

additional surplus created by the interaction of the two firms (e.g., the sub-contractor may have high name recognition or reputation with the final product's customers). The division of these profits is typically resolved through bargaining between the firms, influenced by the competitiveness of the markets for both the input and the final product.

One advantage to studying portfolio management as the potentially outsourced production is that the nature of this service avoids some of the issues that commonly complicate the make-or-buy decision. For example, studies of outsourcing components in the computer or automobile manufacturing industries are complicated by the classic 'hold-up' problem that prevents firms from outsourcing production to a supplier that can produce the input more cheaply. Computer or automobile parts are often built to exacting specifications that make them much less valuable in alternative uses. Thus, otherwise profitable sub-contracting may not be undertaken because the sub-contractor is unwilling to invest in the specific assets that improve the bargaining position of the other firm. In the mutual fund industry, the liquidity of portfolio assets implies that the potential for 'hold up' problems when hiring a sub-advisor is virtually nonexistent. In short, the mutual fund industry setting more cleanly predicts that the outsourcing decision hinges on a cost savings or an enhanced ability to offer a truly differentiated product.

In the mutual fund context, the most obvious factors driving a cost asymmetry between a fund family and an outside sub-advisor are fixed costs and economies of scale. For example, if a mutual fund family does not currently offer a particular investment style, there may be large fixed costs associated with the start-up of such a fund. These costs include hiring new portfolio managers, developing new risk evaluation and monitoring procedures, obtaining new sources of equity research, extensive testing of the portfolio strategy, as well as the opportunity costs associated with accomplishing all of these tasks. Perhaps the clearest example of potentially

high fixed costs occurs when a family wants to offer an international fund, but does not currently have any expertise in this area.

For a new fund start-up with relatively modest assets under management, these fixed costs imply that the family's average cost per dollar invested for producing this fund is very high. In contrast, an asset manager with processes and employees already in place servicing existing portfolios could achieve lower average cost if hired as a sub-advisor. When portfolio assets are small, the existence of economies of scale and the cost advantages to outsourcing to an established manager with excess capacity is uncontroversial. However, it is not clear whether these economies extend to larger portfolios. There is very little empirical evidence as to whether the average cost per dollar invested of managing a $500 million portfolio is higher than the cost of a $1 billion portfolio. Warner and Wu (2006) provide evidence that large changes in fund assets are followed by decreases in management fees, suggestive of economies of scale. Berk and Green (2004) assume the opposite, that there are diseconomies of scale, which is supported by recent evidence in Pollet and Wilson (2007) and Edelen, Evans, and Kadlec (2007). For our purposes, the potential for economies of scale is important to keep in mind, and we can test whether sub-advising practices appear to be consistent with their existence.

In addition to potential cost efficiencies from managing more assets in a particular investment style, there may also be further gains to specialization in portfolio management. While this is an empirical question, we suggest that many asset management firms specialize in a particular style of investing (e.g., small-cap or value), and that this results in their being able to achieve lower average costs in this style. Analyzing the sub-advisors who we observe to be attractive to families in particular investment styles can provide evidence consistent with gains from specialization in portfolio management style.

Labor markets for portfolio managers might also play a role in driving cost asymmetries and tilting the decision toward outsourcing relative to internal management. It is relatively common for a talented portfolio manager employed by a mutual fund family to venture out and start her own advisory firm. In these cases, the fund family could hire the manager as a sub-advisor, providing continuity for the fund and minimizing both the explicit costs of hiring a new manager and the consequent portfolio turnover costs. Alternatively, it may be the family's geographic location that raises the cost of attracting and retaining talented managers; mutual fund families far from financial centers may find it cheaper to hire sub-advisors than to pay in-house portfolios managers a premium to entice them to live in that locale.

Another motivation to sub-advise arises if a mutual fund family can increase demand for their services by offering a fund that investors perceive to be of higher quality than what they could produce internally. Perceived quality could relate to investment performance, or to some form of reputation or brand name for which investors are willing to pay a premium. Some very well-known asset managers, such as Tom Marsico, Mario Gabelli, or Bill Miller, could not be hired as employees of a mutual fund family to run a portfolio (i.e., the cost would be so high as to be effectively infinite). However, if a family believes investors value the ability to invest in a portfolio run by one of these managers, a sub-advisory arrangement is the least cost way to implement this offering. In this case, the sub-advisor is providing access to their brand name reputation in addition to their portfolio management services, increasing the profitability of the fund offering above what the mutual fund family could achieve on its own.

The regulatory requirements for families that choose to outsource portfolio management are not much different from those that manage internally. The SEC requires that the fund disclose pertinent details of the contract between the family and the sub-advisor, including

portfolio management fees. Although the fund must disclose any change in sub-advisor or change in contract terms to investors, the SEC exempts most families from the requirement for fund shareholders to vote on the matter. Thus, changing sub-advisors, or going from internally-managed to sub-advised is not much more onerous than changing portfolio managers within the family's own employees.

*B. Why sub-advise for mutual funds?*

Outsourcing agreements must be beneficial to both parties: the mutual fund family and the sub-advisor. Because sub-advisors are paid a percentage of the assets under management, it would seem that as long as fund families are willing to pay fees above the sub-advisor's cost, sub-advising additional assets is a profit increasing strategy. The less obvious issue to be addressed is why these sub-advisors are not already serving these same investors, or, whether sub-advising for others cannibalize sales of their own investment products. In short, why would sub-advisors choose to 'pick stocks for the competition'?

If mutual fund families and their sub-advisors were true competitors, serving the same target pool of clients with the same set of fund offerings, then we would not expect to see much sub-advising in this industry. Thus, one possible explanation for observing an active sub-advisor market is that mutual fund families and their sub-advisors are not competitors in a traditional sense, and in fact operate in different segments of the market. Related to this, a mutual fund family might prefer to serve a clientele indirectly as a sub-advisor rather than directly as the advisor because it is more profitable to do so. This might be the case if retail distribution entails high fixed costs, or if the sub-advisor faces greater diseconomies of scale in the provision of shareholder services than in portfolio management.

Both of these explanations readily applies to the case of a separate account sub-advisor, a label we define as a firm that has institutional clients such as pension funds and endowments, but does not offer retail mutual funds. Separate account sub-advisors can expand their pool of assets and clients by sub-advising mutual funds, without concern for losing existing or potential clients to the mutual fund family due to the segmentation of these markets. In addition, the pure separate account manager faces high fixed-costs in targeting retail mutual fund investors directly, such that expanding into that market would not be as profitable as sub-advising.

In fact, the decision by a separate account manager to offer sub-advisory services to mutual fund families can be viewed analogously to the families' decision to hire a sub-advisor. In this case, the sub-advisor outsources the distribution and marketing, record-keeping, and regulatory compliance functions to another firm. There are certainly large economies of scale in the production of these services that gives an established fund family a production cost advantage over a manager with no current mutual fund offerings. Rather than expend resources on developing a retail mutual fund infrastructure, sub-advising allows the separate account manager to specialize in portfolio management, and thereby reap any resulting gains in reputation, performance, or efficiency.

The more puzzling motivation to sub-advise for others involves sub-advisors that clearly have their own access to, and reputation among, retail investors, namely sub-advisors with their own mutual fund family. For example, in 2002 Janus Capital offered 26 equity mutual funds to investors under their own family name and an additional 12 equity mutual funds as sub-advisor to eight different mutual fund families. However, this example can be viewed as a less extreme version of the separate account manager case. First, it may be that Janus is not truly competing for the same investors as the families that they sub-advise for. In other words, even within the

retail mutual fund market, there may be sufficient segmentation that different fund families essentially serve different clientele. For example, if the fund family is an insurance company that uses an exclusive set of brokers to distribute its products while the sub-advisor's family directly markets to individual investors in a no-load structure, there is little risk of cannibalizing sales to their target investors. In short, the two families may have little overlap in the primary distribution channels they use to market their funds to the public.

Another way to view this same situation is that the insurance company clients demand a total bundle of services that are not cost-effective for the sub-advisor to deliver directly. In other words, the insurance company's clients typically demand the financial planning and insurance advice that is not available in the direct, do-it-yourself investor channel. For the sub-advisor to attract these same customers directly, they must provide new advice and hand-holding services that they are not currently equipped to provide. It is more profitable to instead serve this market indirectly by hiring themselves out as sub-advisors. In general, we do not expect to observe mutual fund families sub-advising for their close competitors, including those families that operate through the same distribution channel, target the same clients, or offer a similar bundle of investor services (e.g., advice *and* portfolio management).

## III. Data

Our data on sub-advisory relationships are hand-collected from filings available on the SEC's EDGAR database at two points in time, 1996 and 2002. Specifically, we conduct text searches of all N-30D filings for variants of the word 'sub-advisor' or sub-advisory' to identify the relevant filings. Within these, we identify the names of all funds in that filing that outsource the portfolio management to an outside sub-advisory firm. In some cases, the filing will identify

that a sub-advisor manages the portfolio, but also discloses that the sub-advisor is an affiliate of the family, typically indicating that the sub-advisory firm is legally a subsidiary, or has a common owner. We distinguish affiliated sub-advisors from independent, unaffiliated sub-advisors, and present statistics for the two types separately. Because the affiliated sub-advisory agreements do not reflect the same economic decision or market forces described above, we focus our analysis on the sample of unaffiliated sub-advisors.

The list of sub-advised funds is then linked with the CRSP Survivorship-free mutual fund database. Any fund that we did not identify as being sub-advised is assumed to be managed in-house by employees of the family.[1] In sum, in 1996 and 2002 we assign all funds in the CRSP mutual fund universe to one of three categories according to who manages the fund: sub-advised, sub-advised by an affiliate of the fund family, and in-house.

For the sub-sample of actively managed domestic equity funds we also collect Morningstar style categories, which puts funds into one of nine investment style categories (e.g., large-cap value). We use Morningstar's categorization rather than CRSP objectives because they are closer to that used by institutional investors to choose and evaluate portfolio managers. We obtain data on fund distribution channels studied in Bergstresser, Chalmers, and Tufano (2006), originally from Financial Research Corporation (FRC).[2] Finally, for the sub-sample of domestic equity funds managed by an unaffiliated sub-advisor, we collect additional detailed information on the contractual sub-advisory relationship from the Statement of Additional Information

[1] In addition, we compare our sample of sub-advised funds to a list generously provided by Deb Weatherbee of Financial Research Corporation. If the fund appeared as sub-advised in FRC's listing, we consulted the fund's SEC filing to verify the sub-advisory relationship. Most cases missed by our original text search algorithm involve funds that refer to sub-advisors using different terminology. A well-known example fits in this category. Vanguard does not use the term 'sub-advisor' in their annual report (they refer to the sub-advisors as advisors), and thus are not picked up by our text search algorithm. However, a careful reading of their filings clearly indicates which of their funds are managed by outside firms.

[2] We thank these authors and FRC for providing us with the distribution code data.

(485BPOS filings). Specifically, we collect the sub-advisory firm name(s), the city and state they operate in, and the beginning and ending date of the sub-advisory relationship.

*A. Summary Statistics*

In this section, we present some general statistics on the prevalence of outsourcing in the mutual fund industry in 1996 and 2002. Table 1 contains fund-level statistics on the percentage of funds managed in-house versus sub-advised by broad fund investment objective. In 1996, 83.6% of 4,640 mutual funds are managed in-house, 8.2% by affiliated sub-advisors, and 8.2% by unaffiliated sub-advisors. In 2002, 76.8% of 5,750 mutual funds are managed in-house, 8.9% by affiliated sub-advisors, and 14.3% by unaffiliated sub-advisors. Sub-advised funds represent $340 billion in 1996 and $755 billion in 2002, which is approximately 15% and 21% of mutual fund industry assets in 1996 and 2002 (not reported).

The highest incidence of sub-advised funds is in the global category. Here, only 73% of global funds use in-house managers in 1996, falling further to 67% in 2002. As described in the earlier section, it may be cheaper to buy than to make when it comes to the additional knowledge and infrastructure needed for international portfolio management. Focusing on the unaffiliated sub-advisor columns, the biggest growth in contracting with unaffiliated sub-advisors is in the domestic equity objective. In 1996 only 120 funds, or 8.3% of domestic equity funds, are sub-advised, while in 2002 there are 429 funds (18.4%), indicating that the rate of sub-advising among domestic equity funds more than doubled over this period. In the remainder of the paper, we focus exclusively on actively-managed domestic equity funds. In addition, any further references to sub-advisors pertain solely to unaffiliated sub-advisors.

Table 2 contains family-level statistics on the use of sub-advisors for families offering one or more domestic equity funds. Panel A shows that in 1996, 55 fund families, or 13.3%, sub-advise at least one domestic equity fund, while 109, or 24.9%, sub-advise in 2002. In both years, larger families are more likely to sub-advise their funds than are smaller families. The average family TNA is nearly twice as large among families that hire sub-advisors than in families that manage all of their funds internally. Panel B reports the percentage of the families' funds sub-advised by equally-sized family TNA quintiles. Only 9.6% of families in the smallest quintile outsource their funds in 1996, versus 15.7% of families in the largest quintile. The corresponding numbers for 2002 show that the percentage of families outsourcing increased from 1996 in almost every size quintile, but the largest increase by far is among the largest families. Specifically, 42% of families in the largest quintile outsourced at least one domestic equity fund in 2002.

## IV. Evidence on why families hire sub-advisors

As stated earlier, there are two main economic motivations for a fund family to outsource portfolio management to a sub-advisor: cost-savings or because it provides an efficient way to offer a differentiated product. In this section, we present evidence consistent with families choosing to outsource for these two reasons.

### *A. Cost asymmetries*

While it follows from profit maximization that a fund family will choose to sub-advise if it is the lower cost alternative, we are not able to observe and compare a family's costs if they sub-advise relative to their costs if they were to internally manage that same portfolio (the counterfactual). However, applying economic logic does allow us to narrow the sample of sub-

advised funds to those most likely to reflect cost asymmetries between the fund family and the lower cost provider of the portfolio (sub-advisor).

*1. Cost asymmetries: new entrants to the mutual fund industry*

The most extreme version of a sub-advising strategy is to outsource all (or nearly all) of the portfolio management to outside firms via a sub-advisory contract. The entire business model of these 'virtual families' is to specialize in the distribution, marketing, and manager selection aspect of the mutual fund business. Defining a virtual family as one that outsources more than 80% of their actively-managed domestic equity funds to sub-advisors, we find 22 families in 1996 and 48 families in 2002 that fit this definition. This strategy is a nontrivial portion of sub-advisory activity, representing 40% and 44% respectively of the full sample of families that sub-advise at least one fund. See Appendix A for a list of these families.

Complete outsourcing of the portfolio management to outside firms makes intuitive sense if the families' comparative advantage lies in the other functions necessary to profitably operate a mutual fund business. For example, some families that fit this profile entered the mutual fund business as an outgrowth of the other financial products they already offer. Examples include American Skandia (ASAF funds) and ING, both of which primarily offer insurance products, and through this business have a large set of customers who can now be offered mutual fund products as well. Other examples of this type include AFBA funds and the USAA funds, both of which are exclusively distributed to the military. These firms clearly have a comparative advantage in distribution and already serve a well-established set of clients, implying that they have the client servicing, record-keeping, and similar services in place. In other cases, the comparative advantage may lie in the manager selection function. Examples include SEI and

Frank Russell, both of which had well-established consulting businesses in monitoring, evaluating, and selecting separate account portfolio managers prior to their entry into the retail mutual fund market. Finally, some families' comparative advantage lies in a unique understanding of marketing to a highly specialized clientele, such as the socially-responsible Calvert Funds and the Women's Equity Fund. The common element to these cases is that entry into the mutual fund market was aided by outsourcing the portfolio management capabilities that they lacked in their primary business.

Given the high fixed costs and potential economies of scale of starting up a portfolio management operation from scratch, hiring sub-advisors is quite reasonably the cost-effective solution for these families.[3] In short, sub-advising portfolio management might be thought of as a mechanism for removing a barrier to entry. The next case we consider is an analogous, but much less extreme example of such a barrier, families that wish to offer a fund in an investment style for which they do not currently have in-house expertise.

*2. Cost asymmetries: new entrants to an investment style category*

The most common sub-advising strategy among mutual fund families is to outsource the portfolio management of only a few funds out of a large line-up of internally managed funds. For example, in 2002 the Glenmede Funds outsourced the Glenmede Small Cap Growth fund and managed its six other stock and bond funds internally. Table 3 shows that a large percentage of the families that sub-advise fit the profile of the Glenmede funds. Fifty two out of the 109 (48%) families that sub-advise at least one domestic equity fund in 2002 outsource less than 60%

[3] An alternative strategy for banks and insurance companies wanting to enter the mutual fund business is to acquire an asset management firm. Anecdotal evidence in the business press suggests that these mergers often fail due to the cultural clash between conglomerate banks and insurers and entrepreneurial asset managers. For example, see *American Banker* 12/9/98 and *Business Week* 6/27/05 "Citi Gets a Legg Up"

of their domestic equity offerings and manage the rest internally. In terms of the average number of sub-advised funds per family, these families typically outsource 2 to 3 domestic equity funds in the family.

In analyzing the underlying motivation to outsource versus internally manage a portfolio we take the families' desire to offer a fund of a particular investment style as given. Khorana and Servaes (1999), Mamaysky and Spiegel (2001), and Massa (2003) study the incentives of fund families to start new funds in a variety of investment styles. We suggest that the ability to outsource portfolio management to a sub-advisor allows families to accomplish this goal in a cost-effective manner. For example, if value investing requires research, personnel and expertise that substantially differ from those involved in managing growth portfolios, then a mutual fund family with only value offerings might rationally seek out a sub-advisor to manage their growth fund. If there are indeed large style-specific costs in the production of portfolio management, families will sub-advise to cost-effectively fill the gaps in their stable of fund offerings, where a gap is defined as a Morningstar style category for which a family does not offer any funds. Consistent with a 'gap-filling' motivation, we find that 78% of sub-advised funds are in Morningstar style categories where the family does not also offer an internally-managed fund as well.

We find that families that sub-advise offer a greater variety of investment styles to their investors than families than manage all of their funds internally. For example, in 2002, 48% of families that sub-advise at least one actively-managed domestic equity fund offer 5 or more different categories of Morningstar fund styles to investors. In contrast, only 14% of families that do not sub-advise any of their funds offer 5 or more different style categories of funds. Another statistic similar in spirit is that 74% of families that sub-advise at least one fund offer a

global equity fund to their investors, versus 27% of families that do not sub-advise any funds. This is at least suggestive that a common motivation to sub-advise is for families to fill gaps in their fund line-up.

*B. Product Differentiation*

Alternatively, some fund families may be primarily motivated to employ sub-advisors not because of potential cost-savings, but to strategically differentiate their mutual fund offerings from their competitors. These families rely on the uniqueness of their offerings to attract clients, often marketing their funds as providing retail mutual fund investors with privileged access to otherwise unavailable separate account managers. An aptly named family with this strategy is the Undiscovered Managers family of funds. In these cases, the fund family's role is to provide retail investors with a differentiated product of professional management normally only available to clients with $5 million or more to invest. Similarly, 'manager of manager' funds are marketed as the retail investor's version of what defined benefit plan sponsors have been doing for decades, namely delegating their assets among the 'best' portfolio managers across the industry in every style, rather than rely on one firm to invest all of the assets. Examples of families with this strategy are the Masters Select Funds and SEI Institutional Funds.

Another group of funds objectively fit under the product differentiation motivation as well. Fund families that simultaneously offer an internally managed fund and a sub-advised fund in the same Morningstar style category do not logically fit the profile of a family sub-advising for cost reasons. If sub-advising is the cheaper alternative in this investment style, then why is the family not hiring sub-advisors for both of the portfolios they offer? Of the 495 sub-advised funds with non-missing Morningstar style categories in our data, we identify 111 (22.4%) in

which the fund family has both internally-managed and sub-advised funds in the same style category.

Upon close inspection of funds with this characteristic, we find suggestive evidence that a product differentiation motive is likely. For example, two families with multiple 'duplicate' offerings are SunAmerica Funds and AXP Funds. In both cases, they offer an entire line of sub-advised funds to complement their internally managed offerings, and signal that they are different from their in-house funds by using a different name: SunAmerica Focused Funds and AXP Partners Funds. Similarly, Vanguard offers two Large-Cap Blend funds, but one carries only the Vanguard moniker, Vanguard Growth and Income Fund, while the other uses the name of the sub-advisor in the fund name, Vanguard PRIMECAP fund. Thus, in most of these cases we can observe an objective characteristic of a product differentiation strategy, a fund name that is distinct from other funds in the family.

*C. Cost-asymmetry versus Product Differentiation Classification*

In practice, a family might very well have both cost-savings and product differentiation motivations behind the decision to outsource portfolio management and as a result, the motivations might best be viewed as a spectrum. At one end, families that have no in-house expertise in portfolio management, either in the family as a whole or in a particular investment style, can most easily be classified as having a cost motivation for sub-advising. At the other extreme, we can logically classify all sub-advised funds with an internally managed fund in the same investment style category as motivated by product differentiation.

As illustrated in Figure 1, some cases fall somewhere in the middle. For example, although virtual families likely choose to outsource portfolio management to overcome a fixed

cost barrier to entry, some of these families specifically market their funds as having unique access to institutional managers. As a result, these families are potentially better classified as primarily motivated by product differentiation.

*D. Evidence that families increasingly hire sub-advisors who also manage their own retail mutual funds*

Table 4 contains summary statistics of the use of sub-advisors in our full sample across nine Morningstar investment styles in 1996 and 2002. This table shows that the growth in sub-advising extends to every investment style, and that, in 2002, the percentage of sub-advised funds is quite similar across styles, with small-cap growth having a somewhat higher value. Another trend over this period is evident in the bottom row of the table, a shift in the type of sub-advisor that families hire. When a family outsources portfolio management to a sub-advisor, they can choose to either hire a separate account sub-advisor or a sub-advisor who also offers their own retail mutual funds. The bottom row of Table 4 suggests a shift over this period from hiring separate account managers toward hiring sub-advisors with their own retail fund family. Specifically, the percentage of sub-advised funds with a mutual fund sub-advisor increased from 36% of funds in 1996 to 50% in 2002. Across style categories in 2002, the tendency to hire mutual fund sub-advisors is strongest in large-cap and mid-cap growth funds.

Table 5 contains additional evidence on the trends toward greater amounts of outsourcing and greater use of sub-advisors who have their own retail mutual fund families. Here we identify all new start-up funds over the 1997 to 2002 period and calculate the percentage of funds that outsource portfolio management, and the percentage of outsourced funds that hire a mutual fund

family as sub-advisor.[4] Table 5 Panel A confirms that these trends accelerated in recent years. In 2000 to 2002, the percentage of sub-advised funds ranges from 24% to 40% of all new funds, and the percentage of these funds that hire mutual fund families as sub-advisors ranges from 63% to 68%. Panel B reveals that the tendency to hire mutual fund families as sub-advisors is most pronounced in large-cap funds.

## V. Who picks stocks for the competition?

In the remainder of the paper, we focus on these hired sub-advisory firms that seemingly 'pick stocks for the competition' in that they offer their portfolio management services to other mutual fund families. Table 6 provides some summary statistics in 2002 contrasting mutual fund families that buy and sell sub-advisory services with those that do not participate in the sub-advisory market. Specifically, we divide the universe of families offering at least one actively managed domestic equity fund into five mutually exclusive groups: buyers of sub-advisory services (100% outsourced), buyers of sub-advisory services (<100% outsourced), sellers of sub-advisory services, families that both buy and sell simultaneously, and families that do neither.

Table 6 shows that nearly 40% of fund families participate as either a buyer or seller in the sub-advisory market, but only 3.5% of families participate in both sides of the market simultaneously. Families that sub-advise 100% of their domestic equity funds tend to be smaller than other buyers of sub-advisory services, with the median family having only $400 million in assets. In contrast, families that sub-advise less than 100% are comparable in size to families that sell their sub-advisory services. The median family TNA is $3.2 billion for selling families

[4] For the majority of the sample, we only have information on whether or not a fund is sub-advised in 1996 and in 2002. Thus, in Table 5 we assume that a fund that is sub-advised in 2002, but started up in 1997, was sub-advised from inception. This will be a false assumption whenever a fund began as an internally-managed fund and is only later switched to a sub-advised fund. We have complete information on the start and stop date of the sub-advisory relationship only for the sub-sample of funds with a single mutual fund sub-advisor.

and $2.7 billion for buying families. The families that both buy and sell sub-advisory services tend to be the very largest families, with a median of 36 funds and $9.1 billion in assets. The starkest contrast, however, is between families that participate in the sub-advisory market and those that do not. The median non-participating family has only 3 funds and $0.1 billion in assets under management.

If sub-advising is driven in part by style-specific cost-asymmetries then we would expect sub-advisors to specialize in certain investment styles. That is, we would expect them to sub-advise in only a few styles (not all nine) and that these styles would account for a large share of their own internally managed fund offerings (i.e., their specialty). We examine this by computing a Herfindahl index for each family that measures its focus on a particular Morningstar style, where an index value close to 1 indicates a high concentration of the family's assets in one style category.

For each family, we first compute this index by defining the family's TNA as it would be aggregated in CRSP, and then re-compute the index after adjusting for sub-advised assets. In other words, for families that buy sub-advisory services we first compute it using all the funds they offer to the public under their family name, both internally-managed and sub-advised (CRSP definition of family). We then compute an adjusted-Herfindahl index by excluding funds outsourced to sub-advisors in the calculation. For families that sell sub-advisory services, the CRSP aggregation ignores the funds the family manages as a sub-advisor for others, while the adjusted-Herfindahl includes these sub-advised assets in the calculation.

The last two columns of Table 6 contain the Herfindahl statistics for the five types of families. Not surprisingly, the mean and median adjusted index is larger than the unadjusted index for buyers (0.63 versus 0.46), consistent with the gap-filling motivation for buyers. Sub-

advising allows buyers to become much less concentrated in the styles they offer relative to internally managing all of their funds, consistent with our earlier evidence. The adjusted Herfindahl index is undefined for the families that outsource 100% of their assets, since these families have no assets under management after subtracting the TNA of their sub-advised funds.

More surprising are the statistics for sellers. The unadjusted index is 0.59 while the adjusted index that includes assets sub-advised for other families is 0.53, indicating less concentration of style when accounting for sub-advised assets. The differences in the indices are significantly different from zero at the 1% level for both buyers and sellers. Furthermore, the patterns are similar if style is defined more broadly (e.g., small, mid, and large-cap) before computing the index. This suggests that the typical seller is not sub-advising assets, across styles, in the same proportions as it is managing funds for its own retail clients; a finding somewhat inconsistent with a style specialization argument. However, because we do not have data on the assets these sub-advisors manage for separate account clients, we cannot rule out that they are sub-advising in style categories they specialize in within their separate account business.

The adjusted and unadjusted index is not significantly different for families that simultaneously buy and sell sub-advisory services. These families tend to be the least concentrated overall, while families that don't participate in the sub-advisory market tend to be the most concentrated. This is consistent with the least concentrated families being the largest families, which offer the most funds and styles, and the most concentrated families being the smallest families, which offer a much smaller number of funds and styles.

*A. Who is 'the competition'?*

The degree of competition among any group of mutual fund families can be fundamentally defined as the extent to which their product offerings are substitutable in the eyes of investors. The relevant 'product' over which firms compete in this industry is really a bundle of services that includes portfolio management, record-keeping, information, advice, and access to other complementary financial products. Thus mutual fund families compete with one another to the extent that they offer the same bundle of services to the same potential customers, not necessarily just the same type of mutual fund (e.g., small-cap growth equity fund). Because both sides must benefit in order to enter a sub-advisory contract, we would not expect to observe pairs of advisors and sub-advisors that are true competitors. Thus, examining outcomes of who pairs with whom may shed new light on the nature of competition in this industry.

One possibility is that competition is defined by geographic location. If investors have a tendency to favor mutual fund families that operate in their own state, for example, then we would not expect to see advisor-sub-advisor pairs from the same state since they would be competing for the same potential customers. We are not aware of any direct evidence on this, but evidence in Huberman (2001), Zhu (2002), and Ivkovich and Weisbenner (2005) suggests that individual investors display a local bias in choosing their stock investments. Extrapolating these results to choices over mutual funds predicts a tendency for families to avoid pairing with other families in the same state.

Alternatively, competition might be better defined by families offering very similar bundles of services that attract a particular clientele. For example, mutual fund customers of an insurance company might highly value the bundled service of advice, financial planning,

handholding, and one-stop shopping convenience of satisfying their insurance and investment needs through a single advisor. In contrast, the do-it-yourself investor is unwilling to pay for the advice or ancillary products that they do not want or need. As a result, we would not expect the insurance company and the family who sells direct to investors to be competing for the same investors.

As a proxy for this type of competition we use FRC distribution channels. The implicit assumption is either that different distribution channels serve different clienteles, or that bundles of services are closer substitutes within distribution channels than across distribution channels. In other words, we expect that an investor purchasing mutual funds through an insurance agent is much more likely to switch to another firm's insurance agent than to switch to the direct channel. In support of this, Christoffersen, Evans, and Musto (2005) report significant differences in the sensitivity of investor flow to past performance across distribution channels, suggesting that different clienteles populate different channels. Thus, we expect to see the most pairings between different distribution channels that have little to no overlap in clientele.

To test these notions of competition, we examine all advisor-sub-advisor pairs in 1996 and 2002 and test whether they display the hypothesized tendencies to avoid partners operating in the same state or in the same distribution channel. Since manager-of-manager funds employ multiple sub-advisors, often in different locations, we restrict the sample to single advisor-sub-advisor pairs. The sample contains 370 pairs; 197 of these are advisors pairing with separate account sub-advisors, while the other 173 are advisors pairing with other mutual fund families.

The first task in comparing the sub-advisor's distribution channel to that of the advisor is to identify which fund in the sub-advisory firm's family of funds is the relevant 'twin' to the sub-advised fund. (Since we lack data on the investment products offered by separate account

managers, we are unable to identify any twins for the separate account sub-advisors.) For example, in 2002, the portfolio management of the USAA Aggressive Growth fund is outsourced to Marsico Capital management. Thus, we first need to identify which of the Marsico funds is most similar to this particular USAA fund. We define the twin to the sub-advised fund as that fund in the sub-advisor's family whose (before-expense ratio) returns have the maximum pairwise correlation with the (before-expense ratio) returns of the sub-advised fund. We compute the correlation over the 60 months surrounding 1996 or 2002 (year 0), or from the start to end of the sub-advisory relationship, whichever is shorter. The average pairwise correlation between the sub-advised fund and its twin is 0.97. For comparison, the average pairwise correlation between the sub-advised fund and the other actively-managed domestic equity funds within the sub-advisor's family is 0.84.

FRC assigns distribution codes at the share class level, and we asset-weight each share class to arrive at a fund-level code. The advisor's distribution channel is equal to one for a particular distribution channel if 75% or more of the sub-advised fund's assets are distributed through that channel and is zero otherwise. Funds that are distributed through multiple distribution channels such that no one channel has 75% of the fund's assets are considered unclassified. The distribution channel of the sub-advisor's twin fund is defined analogously and represents the distribution channel through which the sub-advisor offers its portfolio management services directly to its own family's customers.

Table 7 contains a cross-tabulation of the distribution channel across all of the advisor-sub-advisor pairings in our sample. Thus, the 15 in the insurance-direct cell indicates that 15 sub-advised funds with an advisor that primarily distributes through the insurance channel hired sub-advisors whose twin funds are primarily distributed through the direct channel to do-it-

yourself investors. Under the assumption that families in the same distribution channel are the closest competitors, we expect to find no pairings of families in the same distribution channel, or, no observations along the table's diagonal. Table 7 shows that this is generally the case, with only 25 exceptions out of 370. In addition, a chi-square test rejects equal distribution of the advisor-sub-advisor pairs across the 56 cells at the 1% level. Restricting the sample to the 49 cells in the mutual fund sub-advisor channels (and ignoring separate account sub-advisors), also rejects equal distribution at the 1% level.[5]

The last column contains the 197 sub-advised funds that pair with separate account managers. The large number of pairings here is not surprising, and is consistent with these sub-advisors finding stock-picking for others more profitable than trying to enter the mutual fund market themselves. The trend over the last two decades whereby corporations switched from defined-benefit to defined-contribution 401k plans likely fueled sub-advisory activity on the part of separate account managers. During this time, management of retirement assets migrated away from separate accounts toward mutual funds. Participating in the sub-advisory market has allowed these firms to regain some of this lost market share without incurring the high cost of retail distribution.

The evidence in Table 8 is a first look at whether families avoid contracting with another family operating in the same geographic location. We obtain the advisor and sub-advisor's city and state from the Statement of Additional Information and compute the frequency of both families operating in the same state. As a benchmark for the family-family pairs, we also report the same statistics for family-separate account manager pairs. Panel A computes frequencies

[5] Since this table depends on identifying an appropriate 'twin' fund, we conduct a robustness check using broader distribution channel data. Specifically, we replace the distribution channel of the 'twin' fund with the asset-weighted distribution channel for all funds the sub-advisor manages in the same Morningstar category as the sub-advised fund. The results are quantitatively similar and all inferences are supported.

using the full sample, while Panel B re-computes frequencies for the sub-sample of pairs where at least one other mutual fund family and one separate account manager offers sub-advisory services in the advisor's state. The results in both panels suggest that mutual fund families are less likely to pair if they operate in the same state, relative to family-separate account pairs. Specifically, 22% of separate account sub-advisors operate in the same state as the advisor that hired them, whereas the corresponding number for family-family pairs is only 11%. Thus, there is some support for families perceiving other families in the same state as competitors.

To examine this further, in Table 9 we report a probit regression predicting whether the advisor-sub-advisor pair operates in the same state, using the same sample as in Table 8 Panel B. Marginal effects are reported in the table. Consistent with Table 8, we find that the pair is 9% less likely to operate in the same state if the sub-advisor has its own mutual fund family relative to the sub-advisor managing only separate accounts, significant at the 10% level. The probability is lower still by 13% if the advisor uses the other family's name in the fund name (e.g., ASAF Marsico Capital Growth Fund). Assuming advisors have already made the decisions whether to hire another mutual fund family or separate account manager, and whether to include the sub-advisor's name in the fund name, we can interpret the results as consistent with mutual fund advisors avoiding partnering with other mutual fund families operating in the same state. Thus, geographic location also appears to define competition. We now turn to examining both location and distribution channel in a multivariate setting.

### *B. Choosing a sub-advisor with its own mutual fund family*

We now examine in more detail the decision to 'pick stocks for the competition' by focusing on the subset of advisor-sub-advisor pairs that represent family-family pairs. Because

both sides of the contract operate mutual funds in this sub-sample, we can use the CRSP mutual fund database to test additional hypotheses about who is likely to pair with whom. Specifically, in addition to testing whether the tendency to avoid pairing with families in the same state or in the same distribution channel holds in a multivariate setting, we can also test whether the observed pairs are consistent with diseconomies of scale and style specialization being considered in the decision.

The spirit of the test is to explain the factors considered by the advisor in choosing the sub-advisor (or, considered by the sub-advisor in offering their services to that particular advisor) by observing who they ultimately pair with *among all other potential mutual fund sub-advisors*. Thus, in this section, we are implicitly assuming that the decision to hire a mutual fund sub-advisor (versus a separate account sub-advisor) has already been made. For each observation, we attempt to identify all potential sub-advisors that were not chosen, but who offer an actively managed fund in the same Morningstar category as the chosen sub-advisor's fund (the twin fund). If the family sub-advises for any other family in the sample in that style category, we assume they are a potential sub-advisor (potential twin). Thus, the number of potential sub-advisors varies with each observation because the number of sub-advisors varies across Morningstar style categories. On average, in 2002, there are 110 potential twins for each sub-advised fund.

Because we would like to measure the factors that influence the advisor's revealed preferred choice of sub-advisor among potential alternatives, we estimate a conditional logit model, similar to Kuhnen (2007). The dependent variable equals one for sub-advised fund *i*'s twin fund, and zero for each of its other potential twins. We include an indicator variable equal to one if the advisor-potential twin operate in the *same state*, and zero otherwise. We also

include indicator variables for each distribution channel. For example, *same bank channel* equals one if FRC indicates that both the advisor and its potential twin distribute their fund through the bank distribution channel, and zero otherwise. We also examine whether CRSP-defined distribution channels (no-load, load, and institutional) better describe investor clienteles than FRC channels. We define a fund as institutional if 75% or more of the fund's assets are in the institutional share class. Thus, *same CRSP channel* equals one if both the advisor and its potential twin distribute their fund through the same CRSP channel, and zero otherwise.

We include four proxy variables intended to capture potential considerations of diseconomies of scale and specialization. First, for each fund-potential-twin observation, we compute *sub-advised fund's relative size*, equal to the TNA of the sub-advised fund divided by the sum of the TNA of the sub-advised fund and of its potential twin fund. Second, the *family's style market share* equals the potential sub-advisor's TNA in the twin fund's style category, relative to all assets in that style category across the mutual fund industry. We also consider whether the effect of this variable is stronger for styles focused on small-capitalization stocks (small-cap growth, blend, and value) by including an interaction term between a dummy for small-cap categories and family's style market share, since diseconomies of scale may set in at a lower level of TNA in this sector. Finally, we include the *family's (unadjusted) Herfindahl Index* to capture whether advisors have a preference for families that tend to specialize in a few styles. Because smaller families tend to be more concentrated than larger families, we also control for the natural logarithm of family TNA in actively managed domestic equity funds.

As proxies for potential twin quality, we include *lagged annual return, lagged annual return*$^2$, and dummy variables capturing whether the potential twin received any *positive media mentions* or *negative media mentions* during the prior calendar year. These media mention

dummy variables are derived from the media mention data used in Reuter and Zitzewitz (2006).[6] Table 10 contains the results of a conditional logit where the dependent variable equals one for the actual sub-advised fund-twin pair, and zero for the potential twins that were not chosen. In column (1) we examine 123 actual pairs in 2002, with a total of 13,575 potential twins. In columns (2) and (3), we report the results of repeating the test for the 46 actual pairs whose sub-advisory relationship begins in 2001 or 2002. This sub-sample has 4,913 potential twin funds. In this sub-sample, the advisor's choice is more likely to be an active decision over potential sub-advisors, rather than a perfunctory renewal of a potentially long-standing contract.

Consistent with the results of Table 7, we find support for advisors preferring to hire sub-advisors that distribute their funds in a different channel, although this does not hold in every distribution channel. Specifically, advisors in the bank, captive, direct, and insurance channels avoid pairing with sub-advisors in their same channel. In contrast, advisors in the institutional and wholesale channels do not display this preference. The more crudely defined distribution channels using the CRSP data do not indicate a preference to pair with sub-advisors in a different channel. Specifically, the dummy for the same load channel and the same no-load channel are insignificant. The dummy for institutional channel, however, indicates a preference among advisors in the institutional channel to pair with sub-advisors in the same channel. Thus, the results using both the FRC and CRSP definitions of the institutional channel suggest that these advisors do not view these sub-advisors as direct competitors.

The same state dummy is insignificantly different from zero in all specifications, suggesting that, conditional on an advisor choosing to pair with a mutual fund family and not

[6] The positive media mention dummy variable equals one if the potential twin was mentioned in the *New York Times* "Investing With" column, *Money Magazine's Money* 100 list, one of *Consumer Reports' lists of recommended mutual funds*, or received a positive mention in any article appearing in *Kiplinger's* or *SmartMoney* in the previous twelve months, and zero otherwise. The negative media mention dummy variable equals one if the potential twin received a negative mention in either *Kiplinger's* or *SmartMoney* in the previous twelve months, and zero otherwise.

with a separate account manager, geographic location is not a consideration. Overall, these results support the hypothesis that advisors view other families in the same FRC distribution channel as direct competitors, and that channel better captures the degree of competition than geographic location.

Regarding variables intended to capture diseconomies of scale and specialization, we find a positive and significant coefficient on the potential twin's Herfindahl Index, suggesting that advisors display a preference for sub-advisors that are relatively more concentrated in a particular investment style. We also find a negative and significant coefficient on the size of the sub-advised fund relative to its potential twin, suggesting that advisors prefer to hire sub-advisors that have larger twin funds relative to the sub-advised fund. This could also be consistent with preferring 'specialists' in that style, or that twins with lots of assets are the low cost provider of that particular investment style. However, we do not find the measure of the potential twin family's market share in that particular style category to be significant.

Surprisingly, none of the measures of potential twin quality (returns, media mentions) are significantly different from zero. If we interpret families with lots of active domestic equity assets under management as high quality or reputable firms, we find the perverse result that advisors prefer lower quality sub-advisors. Alternatively, advisors may prefer families with fewer assets if they believe diseconomies of scale will affect fund performance.

## VI. Evidence on the performance of sub-advised funds

In this section, we turn to a measurable outcome of the contracting between the buyers and sellers of sub-advisory services, namely, the performance of sub-advised funds. Because much of this contracting is between two mutual fund families (versus between a mutual fund

family and a separate account manager), in concept, we can compare the performance of sub-advised funds relative to the funds that the sub-advisor offers to investors in its own fund family. What we would like to capture, for example, is the performance of funds Janus manages for other families relative to Janus' own internally-managed funds. While we defer direct tests of this possibility until the next draft of this paper, the pooled regressions in this section provide some interesting, albeit indirect, evidence.

Table 11 contains a series of pooled cross-sectional regressions based on monthly fund data for 1996 and 2002. Columns (1), (2), (3), and (4) focus on monthly net returns, whereas column (5) focuses on monthly risk-adjusted returns estimated using the four-factor model of Carhart (1997). In each case, we restrict our sample to actively-managed domestic equity funds with a non-missing Morningstar investment objective category.

Following the existing literature, our initial independent variable of interest is a dummy variable indicating whether fund *i* employs a sub-advisor at the beginning of the calendar year (column (1)). We then turn to several variables intended to quantify the observed diversity in sub-advisor relationships across funds and families. Specifically, we decompose the sub-advised fund dummy variable into three mutually exclusive dummy variables: one that indicates whether the fund hires a single separate account sub-advisor, one that indicates whether the fund hires a single mutual fund sub-advisor, and one that indicates whether the fund hires two or more sub-advisors (e.g., manager of manager funds). We also create a dummy variable that equals one if the fund name contains the name of the sub-advisor (e.g., the ASAF Marsico Capital Growth Fund). To explore differences in performance between sub-advised funds with a single mutual fund sub-advisor and their twin funds, we also create a dummy variable that equals one if we

classify fund *i* as the twin for one (or more) of the funds hiring a single sub-advisor with its own mutual funds.

In addition to these five fund-level sub-advisor variables, we also create five family-level variables related to sub-advisor relationships. *Family hires sub-advisor(s) in this category?* equals one if the family hires a sub-advisor for any of its actively-managed domestic equity funds within the same Morningstar category as fund *i* in year *y*. Similarly, *Family hires sub-advisor(s) in any other category?* equals one if the family hires a sub-advisor for any of its actively-managed domestic equity funds within a different Morningstar category than that of fund *i* in year *y*. Two other family-level variables indicate whether and where families choose to serve as sub-advisors to other mutual fund families. *Family sub-advises for other mutual fund families in this category?* equals one if a family sells sub-advisory services to any other mutual fund family within the same Morningstar category as fund *i* in year *y*; *Family sub-advises for other mutual fund families in other category?* equals one if a family sells sub-advisory services to actively managed domestic equity funds within a different Morningstar category during the same calendar year. The final family-level variable is a dummy variable that equals one if family j is a virtual family, meaning that they hire sub-advisors for more than 80 percent of their actively-managed domestic equity funds.

We also include a number of standard fund-level and family-level control variables: the expense ratio and 12b-1 fee as reported by CRSP in December of the prior calendar year, fund age through the current calendar year (measured in years), the natural logarithms of fund and family TNA in the prior month, the continuously compounded net flow over the prior 12 months, the continuously compounded net return over the prior 12 months, and this return squared. To control for differences in fund distribution, we use FRC data on fund distribution channels to

construct dummy variables for whether the fund's primary distribution channel is banks (6.2%), captive (6.7%), direct (28.2%), institutional (15.9%), insurance (4.1%), or wholesale (19.3%). (The omitted category is "other/missing," which has a mean of 19.6%.) Finally, we also include a separate fixed effect for each of the nine Morningstar style categories, each month. Consequently, we are testing for differences in return relative to funds within the same Morningstar category and month. Since many of the variables are defined at the family-year level, all standard errors are clustered on family-year.

Column (1) reports the coefficients from a regression of fund *i*'s net return in month *m* on a dummy variable that indicates whether the fund has one or more sub-advisors at the beginning of the calendar year. The regression includes a separate fixed effect for each Morningstar category-month pair but no other control variables. The coefficient on the sub-advisor dummy variable is -0.07 and is statistically significant at the 10-percent level. This result is consistent with Chen et al (2006) and Cashman and Deli (2006), and suggests that sub-advised funds underperform peer funds by an economically significant 7 basis points per month.

However, exploiting data unique to this paper, in column (2), we find evidence that the degree of underperformance varies across different sub-advisory arrangements. Specifically, we find the strongest evidence of underperformance by funds hiring a single mutual fund; the coefficient is -18 basis points per month and statistically significant at the 1-percent level. In contrast, the coefficients on the separate account and multiple sub-advisor dummies are 2 and -4 basis points, respectively, and statistically indistinguishable from zero. Interestingly, the coefficient on the twin fund dummy variable is -16 basis points per month (p-value of 0.062), suggesting that the underperformance of funds using a single mutual fund sub-advisor may

reflect the underperformance of their twin funds, rather the persistent return differences between sub-advised funds and their twins.

The evidence of heterogeneity in sub-advisor performance is weaker in column (3), however, when we add the standard set of fund-level and family-level controls. The coefficient on the single mutual fund sub-advisor dummy increases from -18 to -8 basis points per month and the p-value rises from 0.01 to 0.16. Similarly, the coefficient on the twin fund dummy increases from -16 to -9 basis points per month and the p-value rises from 0.06 to 0.15. In contrast, the coefficient on the single separate account sub-advisor remains very close to zero, while the coefficient on the multiple sub-advisor dummy variable falls from -4 to -7 basis points per month and becomes statistically significant at the 10-percent level. Among the control variables, we find that net returns in month *m* are decreasing in the expense ratio and size of fund *i*, and increasing in net returns over the prior 12 months.

In column (4), we add dummy variables that capture how fund *i* is distributed to investors and whether the sub-advisor name appears in the name of fund *i*. We also add the five family-level variables of participation in the market for sub-advisors: three that measure the families' use of sub-advisors and two that measure whether the family sub-advises for other mutual funds.

Of the five fund-level measures of sub-advising, only one is statistically significant. The coefficient on the single separate account manager dummy variable is 0.10 and statistically significant at the 10-percent level. In contrast, the coefficient on the single mutual fund manager is much smaller in magnitude and statistically indistinguishable from zero. While these results are consistent with the possibility that separate account managers generate higher returns when employed as sub-advisors than do other mutual fund managers, the p-value of the test that the coefficients on the single separate account manager dummy and single mutual fund manager

dummy are different is 0.21. The coefficient on the dummy variable indicating whether the sub-advisor name appears in the fund name is negative -0.02, but statistically indistinguishable from zero. The coefficient on the twin fund dummy is -10 basis points per month, but not statistically different from zero at conventional levels (p-value of 0.12).

Of the coefficients on the five family-level measures, two are negative and statistically significant. The coefficient on the dummy variable indicating whether fund *i* belongs to a family that hires sub-advisors in the same Morningstar category as fund *i* is -15.7 basis points per month. Similarly, the coefficient on the dummy variable indicating whether fund *i* belongs to a family that hires sub-advisors in the other eight Morningstar categories is -11.1 basis points per month. (Both coefficients are statistically significant at the 1-percent level.) In other words, funds in families that hire sub-advisors appear to underperform, by an economically significant margin, funds in families that internally manage all of their funds. Consider a fund that hires a single mutual fund sub-advisor. The predicted level of underperformance is -14 basis points per month (minus 16 basis points because the family hires a sub-advisor within the same Morningstar category as fund *i*, plus 2 basis points implied by the coefficient on the single mutual fund sub-advisor), which is statistically different from zero at the 10-percent level. In contrast, the implied level of underperformance is only 4 basis points per month for funds hiring a single separate account manager as its sub-advisor, which is statistically indistinguishable from zero (the p-value is 0.32). In other words, funds that hire single separate account sub-advisors exhibit less underperformance than funds that hire single mutual fund sub-advisors. The coefficient of 6 basis points per month on the virtual family dummy variable is consistent with less underperformance by families that hire sub-advisors for most or all of their actively-managed domestic equity funds, but is not statistically different from zero.

To the extent that families selling sub-advisory services within a category are relatively skilled within that category, the expected sign on the coefficient on the dummy variable indicating whether fund *i* belongs to a category in which its family sells sub-advisory services is positive. However, the estimated coefficients on this dummy variable, and on the dummy variable indicating whether fund *i*'s family sells sub-advisory services in other Morningstar categories, are both within a half of a basis point of zero. With respect to fund distribution channels, we find that net returns are significantly higher when funds are distributed directly to investors (a finding first documented in Bergstresser, Chalmers, and Tufano (2007), which also uses FRC data to study differences in flows and performance across distribution channels), but also when funds are classified as distributed in the captive channel.

The results in column (5), where the dependent variable is a fund's four-factor alpha in month *m* instead of its net returns, are qualitatively similar to those in column (4), but fewer of the variables are statistically significant. For example, the coefficient on the single separate account manager dummy variable remains 0.10 but the p-value rises from 0.07 to 0.20. Similarly, the coefficient of the dummy variable indicating whether the family hires any sub-advisors increases slightly from -0.11 to -0.12 while and the p-value rises from 0.00 to 0.01. One notable exception is the coefficient on the twin dummy variable, which changes from -0.10 to 0.05, but remains statistically indistinguishable from zero. With respect to the family-level variables on the use of sub-advisors, we continue to find evidence that funds in families hiring sub-advisors underperform funds in families that do not, but cannot reject the hypotheses that funds with a single separate account sub-advisor, single mutual fund sub-advisor, or multiple sub-advisors generate alphas which are statistically different from zero (the p-values from the

hypotheses tests that the sum of each dummy variable plus the coefficient on the family hires any sub-advisor in the same category is zero range from 0.20 to 0.73).

## VII. Conclusion

Mutual fund families are increasingly outsourcing the portfolio management function to outside firms via sub-advisory contracts. In addition, fund families are increasingly turning to other fund families to provide this service. In 1996, only 36% of sub-advised funds were outsourced to another fund family while in 2002 the corresponding number is 50%. We document trends in sub-advising in the mutual fund industry and provide the economic motivations behind this practice.

## References


Bergstresser, Daniel, John M.R. Chalmers, and Peter Tufano. "Assessing the Costs and Benefits of Brokers in the Mutual Fund Industry" *unpublished working paper, Harvard University (2006).*

Berk, Jonathan and Richard Green. "Mutual Fund Flows and Performance in Rational Markets" *Journal of Political Economy 112 (2004), 1269-1295.*

Carhart, Mark. "On Persistence in Mutual Fund Performance" *The Journal of Finance 52 (1997), 57-82.*

Cashman, George and Daniel Deli. "Locating Decision Rights: Evidence from the Mutual Fund Industry" *unpublished working paper, Arizona State (2006).*

Chen, Joseph, Harrison Hong, and Jeffrey Kubik. "Outsourcing Mutual Fund Management: Firm Boundaries, Incentives and Performance" *unpublished working paper, USC (2006)*

Christoffersen, Susan, Richard Evans, and David Musto. "The Economics of Mutual Fund Brokerage: Evidence from the Cross Section of Investment Channels" *unpublished working paper, McGill University (2005).*

Edelen, Roger, Richard Evans, and Greg Kadlec. "Scale Effects in Mutual Fund Performance: The Role of Trading Costs" *unpublished working paper, Boston College (2007).*

Huberman, Gur. "Familiarity Breeds Investment" *Review of Financial Studies 14 (2001), 659-680.*

Ivkovich, Zoran and Scott Weisbenner. "Local Does as Local Is: The Information Content of the Geography of Individual Investors' Common Stock Investments" *The Journal of Finance 60 (2005), 267-306.*

Khorana, Ajay and Henri Servaes. "The Determinants of Mutual Fund Starts" *Review of Financial Studies 12 (2004), 1043-1074.*

Kuhnen, Camelia. "Social Networks, Corporate Governance and Contracting in the Mutual Fund Industry" *unpublished working paper, Northwestern University (2007).*

Massa, Massimo. "How Do Family Strategies Affect Fund Performance? When Performance Maximization is Not the Only Game in Town" *The Journal of Financial Economics 67* (2003*), 249–304*.

Mamaysky, Harry and Matthew Spiegel. "A Theory of Mutual Funds: Optimal Fund Objectives and Industry Organization" *unpublished working paper, Yale University (2001).*

Pollet, Joshua and Mungo Wilson. "How Does Size Affect Mutual Fund Behavior?" *The Journal of Finance, forthcoming.*

Reuter, Jonathan and Eric Zitzewitz. "Do Ads Influence Editors? Advertising Bias in the Financial Media" *Quarterly Journal of Economics (2006), 197-227.*

Warner, Jerald and Joanna Wu. "Why Do Mutual Fund Advisory Contracts Change? Fund versus Family Influences" *unpublished working paper, University of Rochester (2006).*

Zhu, Ning. "The Local Bias of Individual Investors" *unpublished working paper, Yale University (2002).*

**TABLE 1**
**The Use of Sub-advisors Across Broad Mutual Fund Objectives**

Using N-30D filings in 1996 and 2002, we conduct text searches on variants of the word "sub-advisor" to identify mutual funds that outsource portfolio management to sub-advisors. The N-30D discloses whether the sub-advisor is affliliated with the fund family via common ownership. We match each sub-advised fund to the CRSP mutual fund database, and assume that any fund that we do not identify as using a sub-advisor is managing the fund in-house.

| | 1996 | | | 2002 | | |
|---|---|---|---|---|---|---|
| Number of Funds (% in category) | No sub-advisors [internally managed] | Sub-advisors affiliated with family | One or more unaffiliated sub-advisors | No sub-advisors [internally managed] | Sub-advisors affiliated with family | One or more unaffiliated sub-advisors |
| US Equity | 1,218 (84.0%) | 112 (7.7%) | 120 (8.3%) | 1,715 (73.5%) | 188 (8.1%) | 429 (18.4%) |
| US Specialized Equity | 145 (81.0%) | 13 (7.3%) | 21 (11.7%) | 281 (81.2%) | 28 (8.1%) | 37 (10.7%) |
| US Debt | 1,425 (87.7%) | 117 (7.2%) | 83 (5.1%) | 1,219 (84.0%) | 122 (8.4%) | 110 (7.6%) |
| US Hybrid | 270 (80.6%) | 34 (10.1%) | 31 (9.3%) | 300 (75.8%) | 39 (9.8%) | 57 (14.4%) |
| Global | 527 (72.7%) | 86 (11.9%) | 112 (15.4%) | 614 (67.3%) | 119 (13.0%) | 180 (19.7%) |
| Missing objective | 292 (89.6%) | 19 (5.8%) | 15 (4.6%) | 284 (91.0%) | 17 (5.4%) | 11 (3.5%) |
| Total | 3,877 (83.6%) | 381 (8.2%) | 382 (8.2%) | 4,413 (76.8%) | 513 (8.9%) | 824 (14.3%) |

## TABLE 2
## The Use of Sub-advisors Across Families Offering One or More Domestic Equity Funds

**Panel A. Comparison of Families that Outsource with Families that Manage In-house**

Using the classification of funds as outsourced to unaffiliated sub-advisors in Table 1, we use management company codes in the CRSP mutual fund database to aggregate by fund family. We only include families that offer one or more actively-managed domestic equity funds. Family TNA is the assets under management across all of the mutual funds the family offers, including funds that are not domestic equity. Similarly, number of funds in the family includes all mutual funds the family offers, including funds that are not domestic equity.

| | 1996 | | | 2002 | | |
|---|---|---|---|---|---|---|
| | Number of families (%) | Average Family TNA $Billions | Average Number of Funds in Family | Number of families (%) | Average Family TNA $Billions | Average Number of Funds in Family |
| Do not sub-advise any funds in family | 360 (86.7%) | 5.05 | 9.8 | 346 (76.0%) | 6.40 | 9.5 |
| Sub-advise at least one domestic equity fund in family | 55 (13.3%) | 7.45 | 16.5 | 109 (24.9%) | 12.02 | 21.2 |

**Panel B. The Use of Sub-advisors by Family Size (TNA) Quintile**

| | 1996 | | 2002 | |
|---|---|---|---|---|
| Family TNA quintile | Average Family TNA $Billions | % Families with domestic equity sub-advised funds | Average Family TNA $Billions | % Families with domestic equity sub-advised funds |
| Quintile 1 | 0.11 | 9.6% | 0.06 | 8.8% |
| Quintile 2 | 0.25 | 13.3% | 0.16 | 15.4% |
| Quintile 3 | 0.56 | 16.9% | 0.49 | 22.0% |
| Quintile 4 | 1.85 | 10.8% | 2.19 | 31.9% |
| Quintile 5 | 24.06 | 15.7% | 35.82 | 41.8% |

**TABLE 3**
**The Intensity of Use of Sub-advisors across Families that Sub-advise One or More Domestic Equity Funds in 2002**

For the sub-sample of families that sub-advise at least one actively-managed domestic equity fund in 2002, this panel computes the fraction of the total number of actively-managed domestic equity funds that the family outsources to sub-advisors. We define a virtual family as a fund family with more than 80% of their actively-managed domestic equity funds outsourced to sub-advisory firms.

| | 2002 | | | |
|---|---|---|---|---|
| Fraction of family's active domestic equity funds outsourced to sub-advisor: | Number of families | Average Number of funds per family | Average number of domestic equity funds per family | Average number of sub-advised domestic equity funds per family |
| > 0 but ≤ 20% | 21 | 51.2 | 18.1 | 2.0 |
| > 20% but ≤ 40% | 15 | 17.5 | 7.1 | 1.9 |
| > 40% but ≤ 60% | 16 | 15.3 | 6.4 | 2.9 |
| > 60% but ≤ 80% | 9 | 24.6 | 8.6 | 5.9 |
| > 80% Virtual Families | 48 | 10.5 | 4.6 | 4.5 |
| Total | 109 | 21.2 | 8.1 | 3.5 |

**TABLE 4**

**The Use of Sub-advisors in Actively-managed Domestic Equity Funds Across Investment Styles**

The sample below includes actively-managed domestic equity funds. Morningstar style categories are from various Morningstar Principia CDs. There are 100 funds in 1996 and 105 funds in 2002 with missing style categories, 3 and 7 of these are sub-advised funds respectively. These are not reported separately in the table, but are included in the row containing the Total across categories. We categorize sub-advisors as either exclusively serving separate account clients (pension funds, endowments, foundations, high net-worth individuals), or also having their own retail mutual fund family. The percentage of funds hiring a mutual fund sub-advisor indicates the percentage of sub-advised funds in that style category that hire a sub-advisory firm that also has their own retail mutual fund family. In the case of funds that hire multiple sub-advisors, we assume that each sub-advisor manages 1/N of the fund, where N is the number of sub-advisors in that fund.

| | 1996 | | | | 2002 | | | |
|---|---|---|---|---|---|---|---|---|
| Morningstar Style Category | Number of funds | Number sub-advised | % Sub-advised | % Hire mutual fund sub-advisor | Number of funds | Number sub-advised | % Sub-advised | % Hire mutual fund sub-advisor |
| Large-cap Value | 149 | 22 | 14.8% | 22.7% | 305 | 63 | 20.7% | 46.0% |
| Large-cap Blend | 300 | 24 | 8.0% | 42.4% | 408 | 59 | 14.5% | 49.9% |
| Large-cap Growth | 105 | 13 | 12.4% | 30.8% | 434 | 94 | 21.7% | 60.5% |
| Mid-cap Value | 99 | 5 | 5.1% | 80.0% | 100 | 17 | 17.0% | 32.4% |
| Mid-cap Blend | 133 | 11 | 8.3% | 15.5% | 93 | 14 | 15.0% | 37.5% |
| Mid-cap Growth | 182 | 15 | 8.2% | 70.0% | 264 | 44 | 16.7% | 57.9% |
| Small-cap Value | 111 | 6 | 5.4% | 8.3% | 103 | 19 | 18.4% | 39.7% |
| Small-cap Blend | 86 | 6 | 7.0% | 29.8% | 123 | 15 | 12.2% | 51.7% |
| Small-cap Growth | 128 | 11 | 8.6% | 28.0% | 239 | 55 | 23.0% | 44.1% |
| Total | 1393 | 116 | 8.3% | 36.0% | 2174 | 387 | 17.8% | 50.3% |

## TABLE 5
## New Fund Start-Ups (1997-2002)

**Panel A. New fund starts by year**

The sample below includes actively-managed domestic equity fund start-ups using the fund inception year from the CRSP database. Because we only have information on which funds are sub-advised in 1996 and 2002, we use the information from these years to infer whether the fund is sub-advised at fund inception. Thus, if a fund is internally managed at fund inception, but then switches to being sub-advised, we include it in the number sub-advised. We categorize sub-advisors as either exclusively serving separate account clients (pension funds, endowments, foundations, high net-worth individuals), or also having their own retail mutual fund family. The fraction of funds using mutual fund sub-advisors indicates the percentage of sub-advised funds in that style category that hire a sub-advisory firm that also has their own retail mutual fund family. In the case of funds that hire multiple sub-advisors, we assume that each sub-advisor manages 1/N of the fund, where N is the number of sub-advisors in that fund.

| Year of fund start-up | Number of start-up funds | Number sub-advised | % of start-ups sub-advised | % Hire mutual fund sub-advisor |
|---|---|---|---|---|
| 1997 | 214 | 44 | 20.5% | 52.7% |
| 1998 | 203 | 32 | 15.8% | 50.4% |
| 1999 | 170 | 32 | 18.8% | 66.1% |
| 2000 | 194 | 47 | 24.2% | 65.4% |
| 2001 | 87 | 35 | 40.2% | 63.2% |
| 2002 | 36 | 11 | 30.6% | 68.2% |
| Total | 904 | 201 | 22.2% | 60.1% |

## TABLE 5 (continued)
## New Fund Start-Ups (1997-2002)

**Panel A. New fund starts by Morningstar investment style**

The sample below includes actively-managed domestic equity funds. Morningstar style categories are from various Morningstar Principia CDs. There are 231 funds in 1996 and 254 funds in 2002 with missing style categories, 4 and 12 of these are sub-advised funds respectively. These are not reported separately in the table, but are included in the row containing the Total across categories. We categorize sub-advisors as either exclusively serving separate account clients (pension funds, endowments, foundations, high net-worth individuals), or also having their own retail mutual fund family. The fraction of funds using mutual fund sub-advisors indicates the percentage of sub-advised funds in that style category that hire a sub-advisory firm that also has their own retail mutual fund family. In the case of funds that hire multiple sub-advisors, we assume that each sub-advisor manages 1/N of the fund, where N is the number of sub-advisors in that fund.

| Morningstar Style Category | Number of start-up funds | Number sub-advised | % of start-ups sub-advised | % Hire mutual fund sub-advisor |
|---|---|---|---|---|
| Large-cap Value | 104 | 27 | 26.0% | 61.1% |
| Large-cap Blend | 152 | 27 | 17.8% | 63.5% |
| Large-cap Growth | 196 | 51 | 26.0% | 71.2% |
| Mid-cap Value | 41 | 13 | 36.1% | 42.3% |
| Mid-cap Blend | 38 | 5 | 13.2% | 55.0% |
| Mid-cap Growth | 107 | 24 | 22.4% | 61.6% |
| Small-cap Value | 61 | 11 | 21.6% | 50.0% |
| Small-cap Blend | 57 | 10 | 17.5% | 57.5% |
| Small-cap Growth | 90 | 27 | 30.0% | 50.0% |
| Total | 904 | 201 | 22.2% | 60.1% |

## TABLE 6
## Families that Buy and Sell Sub-advisory Services in 2002

The sample below includes families that offer at least one actively-managed domestic equity fund. These 455 families are put into five mutually exclusively groups: families that buy sub-advisory services (but not 100% of active domestic equity funds in family), families that outsource 100% of active domestic equity funds in family, families that sell their sub-advisory services to other fund families (but do not buy), families that both buy and sell sub-advisory services, and those that do not participate in this market. We compute the Herfindahl index for each family by summing the squared share of family TNA in each of the nine Morningstar style categories (TNA of missing Morningstar style categories ignored). The unadjusted Herfindahl index defines family TNA as defined in the CRSP mutual fund database. The adjusted Herfindahl index uses information on sub-advised funds and counts only the internally-managed funds for buyers of sub-advisory services, and adds assets sub-advised for others for the sellers. Median values are in brackets. $^{\cdot}$ $^{***,**,*}$ indicate that the adjusted Herfindahl index is significantly different from the unadjusted index at the 1%, 5%, and 10% levels using a two-tailed means test.

| | Number of families (%) | Average Number of Funds in Family | Average Number of Dom. Equity Funds in Family | Average Family TNA $Billions | Average Family TNA in Dom Equity $Billions | % of Family Domestic Equity funds sub-advised | Herfindahl index (unadjusted) | Herfindahl index (adjusted for sub-advised assets) |
|---|---|---|---|---|---|---|---|---|
| Sub-advise all domestic equity funds in family (BUYER-100% SUB-ADVISED) | 42<br>(9.2%) | 9.1<br>[6] | 4.1<br>[3] | $2.2<br>[$0.4] | $1.0<br>[$0.1] | 100%<br>[100%] | 0.65<br>[0.58] | N/A |
| Sub-advise at least one domestic equity fund in family (BUYER) | 51<br>(11.2%) | 23.8<br>[17] | 9.1<br>[7] | $16.8<br>[$2.7] | $4.9<br>[$1.5] | 42.8%<br>[83.3%] | 0.46<br>[0.41] | 0.63$^{***}$<br>[0.54] |
| Sub-advise for at least one domestic equity fund (SELLER) | 66<br>(14.5%) | 22.7<br>[11] | 8.3<br>[5] | $20.4<br>[$3.2] | $10.9<br>[$2.1] | 0%<br>[0%] | 0.59<br>[0.52] | 0.53$^{***}$<br>[0.48] |
| Sub-advise and sub-advise for another family at least one domestic equity fund (BOTH) | 16<br>(3.5%) | 44.6<br>[36] | 15.7<br>[14] | $22.6<br>[$9.1] | $9.7<br>[$4.4] | 24.1%<br>[15.2%] | 0.42<br>[0.36] | 0.47<br>[0.36] |
| Do not sub-advise any funds in family or sub-advise for other families (NEITHER) | 280<br>(61.5%) | 6.4<br>[3] | 2.6<br>[1] | $3.1<br>[$0.1] | $1.5<br>[$0.07] | 0%<br>[0%] | 0.82<br>[1] | 0.82<br>[1] |

**TABLE 7**

**Distribution Channels of Families that Buy and Sell Sub-advisory Services**

The sample below includes 370 advisor-sub-advisor pairs and includes only sub-advised funds managed by one sub-advisory firm. Thus, it does not include sub-advised funds managed by multiple sub-advisors (e.g., manager of manager funds). The distribution channel is defined at the fund level. Thus, the advisor's distribution channel is equal to 1 for a particular channel if 75% of the fund's assets are distributed by that channel, and is equal to zero otherwise. The sub-advisor's distribution channel is defined analogously, but the fund of interest is the sub-advisory firm's internally-managed fund with the maximum correlation with the sub-advised fund. The categories bank, captive, direct, institutional, insurance, wholesale, and other represents distribution channels within the mutual fund universe. Separate account sub-advisory firms are defined as firms that do not offer any retail or institutional mutual funds.

| | Sellers of Sub-advisory Services | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Mutual Fund Families that Buy (Advisors) | Bank | Captive | Direct | Institutional | Insurance | Wholesale | Other | Separate Account | Total |
| Bank | **0** | 0 | 1 | 2 | 0 | 4 | 1 | 13 | 22 |
| Captive | 0 | **0** | 1 | 1 | 0 | 2 | 3 | 14 | 23 |
| Direct | 0 | 0 | **3** | 1 | 0 | 6 | 2 | 57 | 72 |
| Institutional | 0 | 2 | 8 | **4** | 0 | 2 | 5 | 22 | 44 |
| Insurance | 1 | 3 | 15 | 6 | **1** | 2 | 5 | 13 | 48 |
| Wholesale | 2 | 1 | 8 | 7 | 1 | **8** | 6 | 30 | 65 |
| Other | 0 | 2 | 10 | 1 | 0 | 6 | **9** | 37 | 69 |
| Total | 4 | 8 | 49 | 26 | 2 | 31 | 35 | 197 | 370 |

## TABLE 8
## Geographic Location of Families that Buy and Sell Sub-advisory Services

**Panel A. Full sample**

The sample below includes 370 advisor-sub-advisor pairs and includes only sub-advised funds managed by one sub-advisory firm. Thus, it does not include sub-advised funds managed by multiple sub-advisors (e.g., manager of manager funds). The geographic location is obtained from the Statement of Additional Information SEC filing (495BPOS) for the advisory and sub-advisory firm. Separate account sub-advisory firms are defined as firms that do not offer any retail or institutional mutual funds.

| | Sellers of sub-advisory services: | | |
|---|---|---|---|
| Buyers of sub-advisory services: | Also offers own Mutual funds | Offers only Separate Accounts | Totals |
| Operate in the same state | 14 (8.0%) | 47 (23.8%) | 61 |
| Operate in different states | 159 (91.9%) | 150 (76.1%) | 309 |
| Totals | 173 | 197 | 370 |

**Panel B. Sample limited to advisory and sub-advisory firms operating in a state with at least one other firm**

The sample is similar to Panel A, except that we require that at least one sub-advisory firm offering mutual funds and one sub-advisory firm offering only separate accounts exists in the same state as the advisor.

| | Sellers of sub-advisory services: | | |
|---|---|---|---|
| | Also offers own Mutual funds | Offers only Separate Accounts | Totals |
| Operate in the same state | 14 (10.9%) | 36 (22.0%) | 50 |
| Operate in different states | 114 (89.1%) | 127 (77.9%) | 241 |
| Totals | 128 | 163 | 291 |

## TABLE 9

## Predicting Whether Advisory and Sub-advisory Firms Operate in the Same State

The table below contains a probit regression estimating the probability that the advisory and sub-advisory firm operates in the same geographic location. The sample is the same as in Table 8 Panel B, where we only include observations where at least one sub-advisory firm offering mutual funds and one sub-advisory firm offering only separate accounts exists in the same state as the advisor. Marginal effects are reported below, along with P-values reflecting robust standard errors corrected for family-year clustering in parentheses. ***, **, * indicate significance at the 1%, 5%, and 10% levels.

| | Dependent variable =1 if advisory and sub-advisory firm in same state |
|---|---|
| Mutual fund sub-advisory firm hired indicator | -0.09* |
| | (0.09) |
| Sub-advisory (mutual fund) firm name in fund name indicator | -0.13* |
| | (0.10) |
| Sub-advisory (separate account) firm name in fund name indicator | -0.04 |
| | (0.64) |
| Advisor located in financial center indicator | 0.04 |
| | (0.65) |
| 1996 indicator | -0.06 |
| | (0.29) |
| Ln Number of mutual fund advisory firms in same state | 0.05 |
| | (0.41) |
| Ln Number of separate account managers in same state | -0.01 |
| | (0.92) |
| N | 291 |
| Psuedo $R^2$ | 0.07 |
| Prob > $Chi^2$ | .01 |

## TABLE 10
## Predicting the Hired Sub-advisor Among All Potential Sub-advisors

The table below contains the results of conditional logit regressions where the dependent variable equals one for the actual chosen twin of the sub-advised fund, and zero for all potential sub-advisors that were not chosen. Column (1) uses actual pairs and potential twins in 2002, while columns (2) and (3) use only actual pairs where the sub-advisory relationship began in either 2001 or 2002. P-values, reflecting robust standard errors corrected for family clustering, are in parentheses. ***, **, * indicate significance at the 1%, 5%, and 10% levels.

| Independent variables: | (1) | (2) | (3) |
|---|---|---|---|
| Same state dummy | 0.45<br>(.24) | 0.44<br>(.43) | 0.48<br>(.41) |
| Same bank distribution channel dummy | -11.31***<br>(.00) | Drops out | |
| Same captive distribution channel dummy | -11.38***<br>(.00) | -13.15***<br>(.00) | |
| Same direct distribution channel dummy | -0.20<br>(.73) | -13.42***<br>(.00) | |
| Same institutional distribution channel dummy | 0.15<br>(.79) | -0.08<br>(.98) | |
| Same insurance distribution channel dummy | 1.19<br>(.25) | -12.71***<br>(.00) | |
| Same wholesale distribution channel dummy | 0.15<br>(.76) | -0.54<br>(.65) | |
| Same CRSP no-load distribution channel dummy | | | 0.43<br>(.62) |
| Same CRSP load distribution channel dummy | | | 0.19<br>(.54) |
| Same CRSP institutional distribution channel dummy | | | 1.78***<br>(.00) |
| Potential twin family's Herfindahl index | 0.73<br>(.17) | 1.88***<br>(.01) | 1.82***<br>(.00) |
| Sub-advised fund size relative to potential twin | -2.17***<br>(.00) | -2.20***<br>(.01) | -2.19**<br>(.02) |
| Potential twin family's market share in style category | -26.71<br>(.11) | -16.97<br>(.11) | -16.61<br>(.16) |
| Category is small-cap dummy*Potential twin family's market share in style category | -199.86*<br>(.08) | -265.48<br>(.42) | -253.23<br>(.42) |
| Potential twin's Ln (Family TNA in active domestic equity) | -0.31***<br>(.00) | -0.20*<br>(.10) | -0.21*<br>(.08) |
| Potential twin's Ln (Net return) | -1.32<br>(.32) | -1.18<br>(.60) | -1.17<br>(.61) |
| Potential twin's Ln (Net return)$^2$ | -1.53<br>(.34) | -2.57<br>(.27) | -2.51<br>(.28) |

| | | | |
|---|---|---|---|
| Potential twin's positive media mentions dummy | 0.16 | -0.07 | -0.09 |
| | (.52) | (.86) | (.83) |
| Potential twin's negative media mentions dummy | 0.45 | 0.21 | 0.15 |
| | (.38) | (.85) | (.90) |
| N | 13575 | 4913 | 4913 |
| Pseudo $R^2$ | 0.057 | 0.064 | 0.062 |
| Prob > $Chi^2$ | .00 | .00 | .00 |

## TABLE 11
## The Performance of Actively-managed Domestic Equity Funds

The table below contains regressions of monthly performance (net return and 4-factor alpha) and monthly flow on fund and family characteristics. Net return is unadjusted for risk, but net of expenses. 4-factor alpha adjusts for the four factors in Carhart (1997). Beta is the loading on the market factor in the 4-factor fund return regression. Flow is monthly percentage net flow (percentage change in fund TNA, adjusted for capital appreciation). Fund-months in 1996 and 2002 are pooled in the regressions, and Morningstar investment style-month fixed effects are included. In columns (4) and (5), when we add a family-level dummy variable indicating whether fund i's family hires any subadvisers in the same Morningstar style as fund *i*, we also report p-values from three hypotheses tests that the sum of coefficient on this variable and the sole sub-advisor is a separate account manager dummy, or sole sub-advisor is a mutual fund family dummy, or multiple sub-advisors dummy is zero. P-values, reflecting robust standard errors corrected for family-year clustering, are in parentheses. ***, **, * indicate significance at the 1%, 5%, and 10% levels.

| | Dependent variable: | | | | |
|---|---|---|---|---|---|
| | Net return | Net return | Net return | Net Return | Alpha |
| Independent variables: | (1) | (2) | (3) | (4) | (5) |
| Intercept | -0.62*** | -0.61*** | -0.39*** | -0.42*** | -0.11 |
| | (.00) | (.00) | (.00) | (.00) | (.24) |
| Fund sub-advised dummy | -0.07* | | | | |
| | (.09) | | | | |
| Sole sub-advisor is a separate account manager dummy | | 0.02 | 0.01 | 0.10* | 0.10 |
| | | (.68) | (.84) | (.07) | (.20) |
| Sole sub-advisor is a mutual fund family dummy | | -0.18*** | -0.08 | 0.02 | 0.10 |
| | | (.00) | (.16) | (.83) | (.29) |
| Multiple sub-advisors dummy | | -0.04 | -0.07* | 0.03 | 0.06 |
| | | (.36) | (.07) | (.59) | (.36) |
| Twin fund dummy | | -0.16* | -0.09 | -0.10 | 0.05 |
| | | (.06) | (.15) | (.12) | (.48) |
| Sub-advisor name in fund name dummy | | | | -0.02 | -0.05 |
| | | | | (.77) | (.55) |
| Family hires sub-advisor(s) in this category? | | | | -0.16*** | -0.13** |
| | | | | (.00) | (.02) |
| Family hires sub-advisor(s) in any other category? | | | | -0.11*** | -0.12*** |
| | | | | (.00) | (.01) |
| Family sub-advises for other mutual fund families in this category? | | | | 0.00 | -0.02 |
| | | | | (.95) | (.78) |
| Family sub-advises for other mutual fund families in other category? | | | | -0.00 | -0.01 |
| | | | | (.89) | (.79) |
| Virtual family dummy | | | | 0.06 | 0.09 |
| | | | | (.20) | (.12) |
| Fund in bank channel dummy | | | | 0.02 | 0.04 |
| | | | | (.64) | (.40) |

| | | | | | |
|---|---|---|---|---|---|
| Fund in captive channel dummy | | | | 0.13*** | 0.17*** |
| | | | | (.00) | (.01) |
| Fund in direct channel dummy | | | | 0.12*** | 0.10** |
| | | | | (.00) | (.02) |
| Fund in institutional channel dummy | | | | 0.03 | 0.07* |
| | | | | (.29) | (.10) |
| Fund in insurance channel dummy | | | | 0.05 | 0.06 |
| | | | | (.24) | (.33) |
| Fund in wholesale channel dummy | | | | 0.05 | 0.09* |
| | | | | (.16) | (.08) |
| Expense ratio | | | -0.08** | -0.09*** | -0.11*** |
| | | | (.01) | (.00) | (.00) |
| 12b-1 fee | | | -0.04 | 0.00 | -0.01 |
| | | | (.49) | (.89) | (.92) |
| Ln (TNA) | | | -0.03*** | -0.04*** | -0.03*** |
| | | | (.00) | (.00) | (.00) |
| Ln(Family TNA) | | | 0.01 | 0.01** | 0.01 |
| | | | (.20) | (.04) | (.11) |
| Fund age | | | 0.00 | 0.00 | 0.00 |
| | | | (.57) | (.61) | (.15) |
| Ln (flow) | | | -0.01 | -0.01 | 0.03 |
| | | | (.83) | (.81) | (.40) |
| Ln (Net return) | | | 3.55*** | 3.48*** | -0.17 |
| | | | (.00) | (.00) | (.69) |
| Ln (Net return)$^2$ | | | -0.53 | -0.63 | 1.28* |
| | | | (.36) | (.27) | (.09) |
| Ho: Sole sub-advisor SA + Family hires in same cat = 0 | | | | 0.32 | 0.65 |
| Ho: Sole sub-advisor MF + Family hires in same cat = 0 | | | | 0.09* | 0.73 |
| Ho: Multiple sub-advisors + Family hires in same cat = 0 | | | | 0.01*** | 0.20 |
| | Morningstar investment category-month fixed effects included | | | | |
| N | 39150 | 39150 | 33296 | 33296 | 31403 |

Figure 1. The spectrum of fund families' motivation to outsource portfolio management

**PURE COST-SAVINGS MOTIVATION**

No in-house portfolio management expertise

(in entire family or in particular investment style)

No in-house portfolio management expertise, but a differentiated product is entire business model (e.g., access to institutional managers)[7]

**PURE PRODUCT DIFFERENTIATION MOTIVATION**

Offer sub-advised funds in the same investment styles that have in-house expertise (i.e., offer both sub-advised and internally-managed funds in same investment style)

[7] This group is defined as virtual families that market themselves as providing mutual fund investors with access to institutional managers previously unavailable to retail investors. We identify these families by examining SEC filings, marketing materials, and/or family websites of all virtual families in our sample.

# Appendix A. Listing of Virtual Families

We define a virtual family as a fund family with more than 80% of their actively-managed domestic equity funds outsourced to sub-advisory firms.

## 1996:

AMR INVESTMENT SERVICES
AQUINAS INVESTMENT ADVISERS
ATLAS ADVISERS
BENNINGTON CAPITAL MANAGEMENT
CENTRAL CAROLINA BANK & TRUST CO
CITIZENS TRUST
EVALUATION ASSOCIATES CAPITAL MARKETS
GNA CAPITAL MANAGEMENT
GOLDEN OAK FUNDS / CITIZENS BANK
GRIFFIN FINANCIAL INVESTMENT ADVISERS
HARBOR CAPITAL ADVISORS
HEWITT ASSOCIATES
IDEX MANAGEMENT
INVESTORS MANAGEMENT GROUP
MANAGERS FUNDS
MANUFACTURERS AND TRADERS TRUST (M&T)
MICHIGAN NATIONAL BANK
NORTH AMERICAN FUNDS
NORTHSTAR INVESTMENT MANAGEMENT
SIGNATURE FINANCIAL GROUP
TIMOTHY PARTNERS
VIRTUS CAPITAL MANAGEMENT (SIGNET)

## 2002:

ACCESSOR CAPITAL MANAGEMENT
ACTIVA ASSET MANAGEMENT
AFBA FIVE STAR INVESTMENT MANAGEMENT
ALPHA ANALYTICS INVESTMENT GROUP
AMERICAN SKANDIA INVESTMENT SERVICES
AMR INVESTMENT SERVICES
AQUINAS INVESTMENT ADVISERS
ATLAS ADVISERS
BC ZIEGLER & CO
CALVERT ASSET MANAGEMENT
CATERPILLAR INVESTMENT MANAGEMENT
CCM ADVISORS
CIGNA INVESTMENTS
CONCENTRATED CAPITAL MANAGEMENT
CONSECO CAPITAL MANAGEMENT
ENTERPRISE CAPITAL MANAGEMENT
EQUITY ANALYSTS
EVALUATION ASSOCIATES CAPITAL MARKETS
FIDUCIARY MANAGEMENT
FRANK RUSSELL INVESTMENT
FRIEDMAN BILLINGS RAMSEY GROUP
FRONTEGRA ASSET MANAGEMENT
GOLDEN OAK FUNDS / CITIZENS BANK
HARBOR CAPITAL ADVISORS
HARTFORD INVESTMENT FIN SVC
HERITAGE ASSET MANAGEMENT
ICMA RETIREMENT
IDEX MANAGEMENT
ING PARTNERS
INTRUST BANK
LITMAN/GREGORY FUND ADVISORS
MANAGERS FUNDS
MASSMUTUAL INSTITUTIONAL FUNDS
MEMORIAL INVESTMENT ADVISORS
NUVEEN INVESTMENTS
ORBITEX-SARATOGA CAPITAL MANAGEMENT
PACIFIC LIFE INSURANCE
POLESTAR MANAGEMENT
PRO-CONSCIENCE FUNDS
QUANTITATIVE ADVISORS
RESERVE MANAGEMENT COMPANY
RYBACK MANAGEMENT
SEI FINANCIAL MANAGEMENT
TIMOTHY PARTNERS
UNDISCOVERED MANAGERS
USAA INVESTMENT MANAGEMENT
WILLAMETTE ASSET MANAGERS
WILSHIRE TARGET FUNDS