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Business Networks, Corporate Governance, and Contracting in the Mutual Fund Industry

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ABSTRACT

Business connections can mitigate agency conflicts by facilitating efficient information transfers, but can also be channels for inefficient favoritism. I analyze these two effects in the mutual fund industry and find that fund directors and advisory firms that manage the funds hire each other preferentially based on the intensity of their past interactions. I do not find evidence that stronger board-advisor ties correspond to better or worse outcomes for fund shareholders. These results suggest that the two effects of board-management connections on investor welfare—improved monitoring and increased potential for collusion—balance out in this setting.

THE U.S. MUTUAL FUND INDUSTRY manages more than $12 trillion on behalf of 44% of American households.[1] While the importance of the industry has increased steadily since its regulation by the Investment Company Act of 1940, it still faces a fundamental principal-agent problem. In particular, the investment advisory firms that manage mutual funds' money do not have the same incentives as the fund shareholders: Advisory firms' profit is generated by collecting management fees, which are typically a percentage of assets under management, whereas investors' profit is generated by funds earning high returns. Recognizing this conflict of interests, the 1940 Act required that mutual funds have boards of directors that are elected by shareholders and responsible for monitoring and negotiating with the management on behalf of investors. However, the effectiveness of boards as fiduciaries has recently been questioned.

Voicing the concerns of fund investors, in June 2004 the Securities and Exchange Commission (SEC) demanded that mutual fund boards disclose more information regarding the selection of the advisory firms that manage the funds' money and the setting of management fees. The concern expressed in the SEC's

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[1] See the 2008 Investment Company Institute Fact Book, online at http://www.icifactbook.org/.

ruling was that directors face conflicts of interest that prevent them from dealing with the fund management at arms-length. Such conflicts can arise from the way directors are elected. When a new fund is created, the advisory firm is the only shareholder in the fund, and will elect the board of directors. Further, future board elections are not mandatory, and therefore fund boards do not change much over time. Thus, as other investors add money to the fund, the advisor no longer has a significant stake but still controls the board. In turn, instead of acting in investors' best interests when dealing with the management, fund directors may favor the advisory firm that has offered them board seats and may do so again in the future.

This paper aims to document the extent to which such conflicts of interest are present in this industry, and to measure their impact on the welfare of fund investors. The main insight of the paper is that the agents who serve fund investors—namely, fund directors and managers—are very much connected through business interactions. These strong business ties may cause the conflicts of interest alluded to by the SEC's new disclosure requirement by fostering favoritism between directors and the fund management to the detriment of investors. However, it is also possible that connections benefit shareholders by providing means for efficient information transfers among directors and managers.

Several important institutional details of the 1940 Act impact fund governance and contracting decisions. Each year directors have the opportunity to look for and hire other firms to manage the fund's money, and to renegotiate the advisors' pay. It is common for mutual funds to be managed by a primary advisor (i.e., the entity that created the fund in the first place) together with one or more secondary advisors, or subadvisors.[2] Directors can propose to shareholders that they replace any of these advisors if better management can be hired. They can also renew advisory contracts annually without asking for shareholders' approval.[3] However, as Kuhnen (2004) shows, advisory fees do not change much over time and advisors are rarely fired. On average, only about 10% of all U.S. mutual funds renegotiate the management fee or change a subadvisor in any given year between 1993 and 2002, and there are only a handful of cases where the primary advisor was fired by the board.

Given that directors are offered jobs on fund boards by advisory firms when new funds are started, it is possible that they will "return the favor" and offer contracts to these firms based on connections rather than merit. Favoritism can manifest when directors negotiate the management fees with the fund's primary advisor (the entity that offered them the board seats) and also when they select a new subadvisor, since candidate subadvisors may have previously nominated these directors for other funds' boards, or may do so in the future.

To study the role of business connections between directors and advisory firms in contracting decisions involving these two parties, I construct a large

[2] A third of all U.S. mutual funds were managed by more than one advisor in 2002 (Kuhnen (2004)). About 26% of funds are managed by a subadvisor not associated with the fund's family (Chen, Hong, and Kubik (2007)).

[3] See the *Fund Director's Guidebook*, 2nd ed., published by the American Bar Association, 2003.

and unique data set containing information about advisory contracts for all U.S. mutual funds during 1993–2002, as well as information about the identity of the directors of these funds during the same period. This data set tracks business relationships between mutual fund directors and advisory firms, as well as between advisory firms themselves. I identify 257 cases of funds that hired a new subadvisor between 1993 and 2002. These events are used to study which candidates (from a pool of about 1,000 firms each year) win subadvisory contracts from funds.[4] I also study a sample of 216 open-end U.S. mutual funds newly created in 1998 to test whether the connections of potential candidate directors (3,005 individuals) influence the assignment of board seats by the primary advisors of these new funds.

I show that when mutual funds choose among candidate subadvisors, the more connected such a firm is to the directors of these funds through past business relationships, the more likely it is to win the contract. This effect holds even after controlling for the candidate's reputation, degree of specialization in the investment objective of the fund, cost, and also for the connections between the fund's primary advisor and the candidate. The preferential selection of connected subadvisors by directors is mirrored by the preferential hiring of connected directors by primary advisory firms when these firms create (sponsor) new funds.

In a panel data set of 15,523 fund-year observations, I find that measures of connections between fund directors and primary advisors do not have a robust or economically significant effect on the funds' expense ratios, management fees paid to advisors, expense reimbursements paid back to investors by advisors, or on net fund returns.[5] Thus, while connections are strong determinants of how the manager and director positions are filled in this industry, they do not have an economically significant impact on investors' bottom line.

The strong effects of business ties on reciprocal hiring by directors and managers that I document are consistent with both of the possible roles of connections—as means for efficient information exchange, or as channels for favoritism.

Models of asymmetric information, moral hazard, and costly search would predict a positive relationship between the likelihood of an advisor being hired and the strength of its ties with the fund board. For instance, directors may be more likely to hire an advisor they know from previous relationships because they have more information about the advisor's skill. Also, it may be easier to monitor a known advisor, since directors already monitor this firm for other funds that they oversee. Finally, directors may hire a known advisor simply

[4] In some cases, fund directors may use the help of outside consulting firms when selecting a new subadvisor or when setting the management fee. These instances, however, cannot be identified in my data set.

[5] These three components of the contractual agreement between the fund and its manager are the result of annual (and mandatory) negotiations between the board of directors of the fund and the advisory firm. Other transfers from investors, such as front and back loads, are decided when the fund is created. The board does not have a legal obligation to negotiate the value of fund loads over time.

because it is too costly to search for the best alternative among all the possible candidates.

Connections could also proxy for influence between parties. Directors and advisory firms are part of the same network and have repeated interactions. This may lead to collusion, or side-dealing, in the assignment of portfolio management contracts and board seats or in the negotiation of transfers from funds to advisors, as suggested by theoretical models (e.g., Tirole (1986)). There also exists a behavioral explanation for favoritism: homophily. This concept from the sociology literature (McPherson, Smith-Lovin, and Cook (2001)) refers to the principle that people tend to associate with and be most influenced by others similar to them (i.e., "birds of a feather flock together").

Recently, social networks analysis has permeated the finance literature.[6] Networks have been shown to facilitate information transfer in the marketplace, as in Hong, Stein, and Kubik (2005) and Hong, Kubik, and Stein (2004), who study the influence of social ties on portfolio choices and stock market participation, and Hochberg, Ljungqvist, and Lu (2007), who investigate the role of venture capital networks in investment performance. Networks have also been proposed to be channels for inefficient favoritism, as in Hallock (1997), Larcker et al. (2005), and Barnea and Guedj (2007) who study the role of connections of corporate executives and directors in decisions such as the setting of CEO pay.

The literature on the corporate governance of mutual funds has not yet used social network concepts. Most papers that examine the link between board independence and various fund characteristics use the standard SEC rule for classifying directors as independent, which is based on whether they or members of their family are employees of the advisory firm.[7] However, this definition does not capture the repeated interactions between directors and advisors over time and through the numerous funds they oversee and manage, respectively. Social network analysis allows us to quantify these interactions.

Fund governance, measured using the SEC definition of independence, has been shown to be important for outcomes relevant to shareholders, but the evidence is mixed. On the one hand, Tufano and Sevick (1997) show that open-end funds that have more independent boards have lower expense ratios. Del Guercio, Dann, and Partch (2003) find that more independent boards are associated with more beneficial fund restructuring decisions in a sample of closed-end funds, and Khorana, Tufano, and Wedge (2007) find a positive link between board independence and a fund's decision to undergo a merger with another fund after having underperformed. On the other hand, Kong and Tang (2008), Ferris and Yan (2007), and Meschke (2007) do not find evidence that board independence corresponds to better returns or lower fund expenses.

This paper makes several contributions to the literature. First, it proposes a set of novel corporate governance measures based on social network analysis.

[6] Wasserman and Faust (1994) summarize the sociology literature on networks and discuss in detail the concepts that I use in this paper that relate to connections and influence.

[7] An exception is Del Guercio, Dann, and Partch (2003), who compute alternative measures of independence, such as the percentage of independent directors on the board since the inception of the fund, the directors' compensation, and the existence of staggered boards.

Second, it studies contracting decisions that have not been investigated before, such as the selection process involved in creating boards of directors, as well as the selection of fund advisors. Third, it shows that business network measures are strong determinants of the outcomes of these contracting decisions.

The rest of the paper is organized as follows. Section I describes the empirical strategy and the measures of connectivity, Section II identifies the data sources, Section III presents the results, and Section IV concludes.

I. Empirical Model

I analyze the impact of business connections on the selection of fund subadvisors and directors, on the negotiation of transfers from funds to advisors, and on fund performance. The empirical strategy is described in Section I.A. Section I.B. presents all measures of connections used in the empirical estimation. All variables are defined in Table I.

A. Estimation Strategy

A.1. Model of the New Subadvisor Selection Process by Fund Boards

In the econometric model, I assume that each year investment advisory firms compete for subadvisory contracts offered by funds. I label a fund as "actively hiring" a subadvisor if the fund separated from an existing subadvisor and has replaced it with another, or if it added a new subadvisor to the existing ones.[8] Thus, the results will indicate what characteristics fund boards value when deciding to contract with a candidate advisory firm, conditional on the fund hiring a new firm.

Advisory firms can compete with each other based on characteristics such as reputation, past performance, and specialization in the investment objective of the fund, as well as through the fee they are willing to accept.

I further assume that advisors will accept any reasonable offer, instead of ranking and selecting funds. Ljungqvist, Marston, and Wilhelm (2006) employ a similar methodology in the context of underwriter–issuer matching. Thus, I do not model funds competing for subadvisory services through a two-sided matching process.[9]

There are two reasons for my modeling choice. First, there is a prevalent belief that the money management business offers large economies of scale. This implies that an advisor may be quite content to work for as many clients as it can get business from. The existence of concave pay schemes for advisory

[8] Note that this definition does not include the set of funds for which the board considers hiring a new subadvisor but does not actually achieve this goal, either because no suitable candidate is found or no agreement can be reached between the fund and any candidate because the data do not allow me to identify these cases.

[9] See, for instance, Fernando, Gatchev, and Spindl (2005). In that paper, which focuses on how firms that issue securities are paired up with underwriters, the underwriter–firm relationships are the result of a process where both sides rank each other and then match accordingly.

Table I
Description of Variables

Variable	Description
$AdvisorAge_t$	Number of years the advisor has been in the data set, up to year t.
$AdvisorDegree_t$	Number of directors the advisor is associated with across all funds managed in year t.
$AdvisorBoardJointDegree_t$	Average across all fund board members of their individual values of $AdvisorDirectorJointDegree_t$.
$AdvisorBoardJointDegree_{t-2,t}$	Average across all fund board members of their individual values of $AdvisorDirectorJointDegree_{t-2,t}$.
$AdvisorBoardInfluence_t$	Average across all fund board members of their individual values of $AdvisorDirectorInfluence_t$.
$AdvisorBoardInfluence_{t-2,t}$	Average across all fund board members of their individual values of $AdvisorDirectorInfluence_{t-2,t}$.
$AdvisorDirectorJointDegree_t$	Number of funds overseen by the director that are also managed by the advisor in year t.
$AdvisorDirectorJointDegree_{t-2,t}$	3-year average of $AdvisorDirectorJoinDegree_t$.
$AdvisorDirectorInfluence_t$	Influence of the advisor over the director in year t, calculated by dividing $AdvisorDirectorJoinDegree_t$ by $DirectorDegree_t$.
$AdvisorDirectorInfluence_{t-2,t}$	3-year average of $AdvisorDirectorInfluence_t$.
$AdvisorDirectorRelationshipLength_t$	Number of years up to year t since the first connection between the director and the advisor in the data set.
$AdvisorFractionFundsInCategory_t$	The fraction of all funds the advisor has under management at t that are in the same investment category of interest.
$AdvisorLnAssetsUnderManagement_t$	Natural log of the $ amount (in thousands) that the advisor manages across all investment categories in year t.
$AdvisorManagementFee_t$	Average management fee (in basis points) paid by funds the advisor manages at t. See $ManagementFee_t$.
$AdvisorPerformance_t$	Advisor's overall performance in year t. It is the average investment objective-adjusted performance (expressed as deciles 1-10, 1=lowest, 10=highest) of all the advisor's portfolios.
$BoardSize_t$	Number of directors on the fund board in year t.
$CandidateAdvisor PrimaryAdvisorJointDegree_t$	Number of times the candidate subadvisor co-managed funds with the primary advisor of the fund up to year t.
$CandidateAdvisor PrimaryAdvisorJointDegree_{t-2,t}$	Average number of times the candidate subadvisor co-managed funds with the primary advisor of the fund in years $t-2$ to t.
$DirectorDegree_t$	Number of ties between the director and all advisors in year t across funds the director oversees and advisors manage.
$ExpenseRatio_t$	Expense ratio of the fund in year t, reported in item *expenses* in CRSP Mutual Funds. Defined as the ratio of the amount that shareholders pay for the fund's operating expenses (12b-1 and management fees, other administrative costs) and fund size.

(*continued*)

Table I—*Continued*

Variable	Description
$ExpenseReimbursements_t$	Amount of expenses reimbursed to the fund by its advisors at the end of year t, as a fraction of fund size. Reported in item 072y in N-SAR B filings.
$FundReturn_t$	Fund's net return in year t computed by aggregating monthly net returns reported in CRSP Mutual Funds, item *retm*.
$\%Interested(SEC)_t$	Percentage of the fund's directors who are interested according to the SECs definition of fund directors independence status.
$Ln(FundSize_t)$	Natural logarithm of fund total net assets, given by item *tna* in CRSP Mutual Funds for the last month of year t ($millions).
$ManagementFee_t$	Management fee paid in year t by the fund to its advisors, as a % of fund size. Reported in item 048 in N-SAR B filings.
$NumberOfFundsInFamily_t$	Number of funds offered by the fund family in year t. Family is identified by the answer to item 019c on form N-SAR B.

firms—that is, decreasing fees as a function of the size of assets under management—supports this hypothesis. Second, even if the assumption of economies of scale in the asset management industry is incorrect and managers of large funds face an increasing marginal cost of effort (e.g., as a result of increased trading costs), it remains the case that the main driver of an advisor's compensation is the fund's size, not its performance.[10] An advisor has more to gain from capturing more assets under management than it has to lose as a result of the decreasing economies of scale experienced after adding these assets. Thus, in my model advisory firms will always compete for subadvisory contracts, irrespective of how much money they already have under management.

It is possible, though, that there is endogenous matching. For instance, an advisor may only compete for funds in the advisor's area of investment expertise, or for funds with a minimum size. The control variables in my analysis allow such characteristics to influence the propensity of the advisor to be in the pool of candidates considered by the board. In several robustness checks I reduce the pool of candidates based on their propensity to compete for the contract, as predicted by these characteristics.

I model the process of selecting a new subadvisor using the random utility model of McFadden (1974) as it is the most appropriate estimation procedure for settings where only the best alternative is chosen among many.[11] For fund board i, the utility from choosing advisory firm $j \in \{0, \ldots, J\}$ is $y_{ij}^* = \beta' x_{ij} + \epsilon_{ij}$, where

[10] For instance, Berk and Green (2004) propose a model of the relationship between fund flows and past performance where it is assumed that there are diseconomies of scale that prevent skilled managers from achieving superior performance as more money flows into their funds.

[11] A simple logit model estimates the probability of an alternative being chosen, without conditioning on the fact that only one alternative can be selected, which is the case in the setting I analyze. The McFadden conditional logit solves this problem.

x_{ij} is a vector of observable characteristics of the board and of the candidate subadvisor, while ϵ_{ij} represents unobservable factors that affect utility.

Let j be the choice for board i that maximizes its utility: $y_i = argmax(y^*_{i0}, \ldots, y^*_{iJ})$. McFadden (1974) shows that if $\{\epsilon_{ij}\}_{j\in 0,1,\ldots J}$ are independently distributed with Weibull distribution $F(\epsilon_{ij}) = exp(-e^{-\epsilon_{ij}})$, then the probability that candidate j is chosen is:

$$Prob(y_i = j \mid x_i) = \frac{e^{\beta' x_{ij}}}{\sum_{h=0}^{J} e^{\beta' x_{ih}}}. \tag{1}$$

I estimate the conditional logit model in equation (1) using a panel data set containing all possible pairs of advisor j–fund i relationships at the time of hiring. The dependent variable is zero or one, indicating whether at that time advisor j and fund i contracted with each other. The potential determinants x_{ij} of the probability that at time t advisor j is chosen by fund i include advisor j's characteristics (A_{jt}) and characteristics of the advisor-fund pair (AF_{jit}). The standard errors of the estimates are adjusted for heteroskedasticity and correlation among error terms in observations belonging to the same fund-year cluster.[12]

In the empirical model, the advisor characteristics A_{jt} include measures of advisor *reputation* (value of assets under management, age, and past performance across all investment categories), *specialization* (fraction of portfolios under management in the specific investment category of the hiring fund), and *cost* (the fee the advisor is willing to accept in exchange for management services). The proxy for the cost characteristic is the average annual fee paid by the funds that candidate advisory firm j already has under management.

Advisor-fund characteristics AF_{jit} include various measures of connections between candidate advisor j and fund i's board of directors from past business relationships, and between the candidate and the fund's primary advisor. These measures are defined in Section I.B.

A.2. Model of the Director Selection Process by Primary Advisors of New Funds

I employ a logit model to find whether previous business connections determine which directors are selected on the boards of new funds by the primary advisors of these funds. The probability of a candidate director being hired by an advisor in year t depends on several characteristics of the director and of the advisor-director pair, such as the director's prominence in the network, and the strength of prior connections between the director and the advisory firm, as defined in Section B. The standard errors of the estimates are adjusted for

[12] See Froot (1989) for the exact form of the robust covariance matrix. I use fund-year clusters to account for the fact that a few of the funds changed subadvisors in more than 1 year in my sample, and thus faced a different set of choices in each year they hired a new firm. Clustering observations by fund yields very similar results.

heteroskedasticity and correlation among error terms in observations belonging to the same primary advisory firm.

I do not use the McFadden conditional logit model for the director selection process, since that model works best for the selection of one alternative among many. When new funds are created, multiple directors win board seats, and thus a logit estimation is more appropriate in this setting.

A.3. Models of Fund Fees, Expenses, and Performance

To study the impact of business connections on contractual agreements negotiated by the board with the advisor and on fund performance, I estimate pooled OLS models according to the general specification

$$FundCharacteristic_t = f(A_{jt}, AF_{jit}, F_t). \tag{2}$$

The dependent variable $FundCharacteristic_t$ refers to one of the following variables: (1) the fund's expense ratio, (2) the management fee paid to the advisory firm, (3) the amount returned by the advisor to fund investors as expense reimbursements, and (4) the fund's return. The term F_t includes controls such as the fund's size and its investment objective, and the terms A_{jt} and AF_{jit} are defined as earlier.

To be conservative, in all models estimated according to equation (2) the standard errors are adjusted for heteroskedasticity and for correlation among error terms in observations belonging to the same fund family.

B. Measures of Connections

The network considered here is formed by two types of agents: directors and advisory firms. These parties have the opportunity to interact because directors sit on fund boards while advisory firms manage those funds. Several concepts from the sociology literature help define the connections between these two parties.

In sociology, the number of ties between an individual in the network and the other network participants is referred to as the *degree* of the individual. For each pair of network participants, the number of ties between them is called their *joint degree* (Wasserman and Faust (1994)). For each such pair, one can calculate the importance of the interactions between the two parties relative to the importance of the interactions of each them with the rest of the network. Take, for instance, two individuals, A and D. Individual A has 10 ties to individual D, and none to any other network member, while individual D has yet another 10 ties to network participants besides A. In this example, A is only connected to D, while D is also connected to other people. Hence, D's *influence* over A is stronger than the influence of A over D, since D communicates with others in the network besides A, while A only "listens" to D. The influence of A over D is calculated as the ratio of the joint degree of A and D to D's degree in the network (i.e., the number of ties between A and D divided by the total

number of ties between D and all network participants). The influence of D over A is calculated similarly. In this example, the influence of A over D is $\frac{10}{20} = 0.5$, while the influence of D over A is $\frac{10}{10} = 1$.

In this paper, I use the three concepts from social networks above to define connection measures in the setting of the mutual fund industry. An individual's (or firm's) degree captures the prominence of the person (or firm) in the network of directors and advisory firms. The joint degree of an advisor-director pair counts the number of interactions between the advisor and the director. Finally, the influence of an advisory firm over a director measures the importance of the director's ties to that particular advisor, relative to his/her ties to all advisors in the network.

More specifically, the number of ties between a director D and an advisory firm A in year t is the number of funds that the director oversees that are also managed by the advisor that year. I refer to this quantity as the $Advisor_A Director_D JointDegree_t$. The importance or prominence in the network of each of the two parties is given by their individual degree measures, which I label $Advisor_A Degree_t$ and $Director_D Degree_t$. Formally: $Advisor_A Degree_t = \sum_D Advisor_A Director_D JointDegree_t$ and $Director_D Degree_t = \sum_A Advisor_A Director_D JointDegree_t$. The variable $Advisor_A Director_D Influence_t$ measures the influence of the advisor over the director and is defined as $\frac{Advisor_A Director_D Joint Degree_t}{Director_D Degree_t}$.

A director's degree proxies for his prominence in the network, among other directors, and for his income from overseeing funds. The joint degree of a director-advisor pair proxies for the dollar amount of money (or perks) received by the director as compensation from the funds managed by that advisor, for the dollar amount of potential side-payments (or perks) received directly from the advisor, or for the amount of information exchanged between the two parties. The influence of an advisory firm over a director is a proxy for the fraction of the director's overall fund-related income, perks, or information that is received from that advisor.

The following example illustrates how these connection measures are computed. Suppose that in year t, director $D1$ sits on the boards of two funds, $F1$ and $F2$. Fund $F1$ is managed solely by advisor $A1$, while fund $F2$ is co-managed by advisors $A1$ and $A2$. In this example, the director has a total of three connections ($Director_{D1} Degree_t = 3$), and two of them are with advisor $A1$($Advisor_{A1} Director_{D1} JointDegree_t = 2$). Thus, two thirds of all the director's interactions are with this advisor, and hence $Advisor_{A1} Director_{D1} Influence_t = 2/3$.[13]

[13] These measures give equal weight to directors' ties to firms that serve as primary advisors and firms that serve as secondary advisors. I chose this simple weighting scheme because many firms serve as primary advisors for some funds and as secondary advisors for others. If the weighting is not optimal, this will only bias against finding any effect of connections on the outcomes studied in the paper. Moreover, note that the ties between the advisory firm and the director are counted irrespective of which family funds $F1$ and $F2$ belong to. In other words, the joint degree and influence measures describe the connections between the advisor and the director through all

To allow for longer-term interactions to affect current outcomes, I construct 3-year (rolling-window) averages of the degree, joint degree, and influence measures, captured by $DirectorDegree_{t-2,t}$, $AdvisorDirectorJointDegree_{t-2,t}$, and $AdvisorDirectorInfluence_{t-2,t}$, respectively.[14] Since interactions prior to this 3-year window may also be important, I also calculate the time since the initial interaction between any director and advisor in the sample. This is captured by the variable $AdvisorDirectorRelationshipLength_t$.

After I calculate the joint degree and influence measures between an advisory firm and each of the directors of a particular fund, I average the individual director scores to obtain the board-level connections with the advisor. For instance, to calculate the 1-year joint degree of the advisor and the board ($AdvisorBoardJointDegree_t$), I identify who was on the fund's board at time t and for each person in this set I calculate their 1-year joint degree measure ($AdvisorDirectorJointDegree_t$). I then average these individual scores to obtain the board-level measure. I use the same method to calculate the other measures of connections to the board ($AdvisorBoardJointDegree_{t-2,t}$, $AdvisorBoardInfluence_t$, $AdvisorBoardInfluence_{t-2,t}$, and $AdvisorBoardRelationshipLength_t$).

For the analysis of the selection of new subadvisors by funds, I measure the connections between the hiring fund's primary advisor (which continues to manage the fund) and the candidate subadvisor. I do so to test whether the primary advisor (which is the advisor that formed the fund in the first place) has a say in the decision on whether the candidate is selected at time t. The measure $CandidateAdvisorPrimaryAdvisorJointDegree_t$ equals the number of times in the past that the fund's primary advisor has managed other mutual funds together with the candidate subadvisor in years prior to t. A related variable, $CandidateAdvisorPrimaryAdvisorJointDegree_{t-3,t-1}$, represents the average number of funds co-managed by the two advisory firms in the 3 years prior to the subadvisor selection process.

II. Data

The data come from annual N-SAR B and N-30D filings filed by mutual funds with the SEC during 1993–2002 (available through the SEC's public Edgar database), from the Center for Research in Security Prices (CRSP) Mutual Funds database, and from EdgarOnline, a company that specializes in the processing and sale of information from SEC filings.

Each registered investment company, also referred to as fund company, is identified by the SEC by its Central Index Key (CIK). A fund company often consists of multiple funds, also referred to as series or portfolios. It is possible that multiple fund companies (i.e., multiple CIKs) are under the umbrella of the

funds that the advisor manages and the director oversees at some point in time, and not through those belonging to a specific fund family. My goal is to capture the complete set of interactions between these two parties.

[14] In the remainder of the paper I omit subscripts A and D for brevity.

same fund family. Hence, a family may encompass multiple fund companies, and each of them in turn may contain multiple funds.

The N-SAR B filings are filed annually by each fund company, and provide for each mutual fund in the company the fund's characteristics (investment objective, foreign vs. domestic, index vs. actively managed), performance (net asset value per share, total assets under management, dividends and capital gain distributions), and overall advisory fee, plus the names of investment advisors (up to three per fund per year) and the name of the fund family that the fund company is affiliated with.[15] Form N-30D is also filed by each fund company, and is the annual shareholder report. A section of this form lists all the individuals who serve as directors for the company.

Automatically parsing these two types of filings, N-SAR B and N-30D, is prone to add some noise to the data. However, it is the only feasible way to get information for a large number of funds on the identity of all of the fund's advisors and directors, and also on the contractual agreement between the fund and the advisor. While expense ratios and fund returns can also be obtained from the CRSP Mutual Funds database, information on annual contract negotiations between the fund's board and the advisor (specifically, advisory fees and expense reimbursements from advisors back to the fund) is not available from any other source but the N-SAR filings, and names of fund directors are only available from forms N-30D.

I manually match all mutual funds from the N-SAR B filings with the CRSP Mutual Funds database. N-SAR B and CRSP do not show a common fund identifier other than the fund's name. Since the name is often spelled or abbreviated slightly differently across these two sources, it is not possible to automate the matching process. I use CRSP Mutual Funds to obtain monthly net fund returns, which I aggregate in order to calculate the fund's annual performance.

The names of all persons affiliated with any mutual fund during the 1993–2002 period are obtained from EdgarOnline. For each name in this list (obtained by concatenating the first, middle, and last names), I automatically search all N-30D filings during the same period. This allows me to find which fund companies a particular director was associated with each year. The full director name has to exactly match a fragment of the text of the filing.[16]

Ideally, I would like to know for each person and for each year the name of all the funds this person was a director of. The data, however, only provide me with the identity of the fund company (CIK) that the director was associated with.

[15] The key to decoding the N-SAR B documents is available at: http://www.sec.gov/about/forms/formn-sar.pdf. See Kuhnen (2004) for a detailed description of these data.

[16] This matching algorithm does not identify certain directors if their names are not spelled the same way over time (for instance, sometimes the director's middle initial may not be mentioned). This will lead to an understatement of the strength of connections between directors and investment advisors. However, since spelling modifications are likely to occur randomly and not in specific types of fund companies, this does not bias the empirical results. I can measure the size of such noise in a subset (25%) of the data by merging in information from Meschke (2007), who reports names of directors at the fund level. In my data, the median board size is eight people, whereas according to the data from Meschke (2007), it is nine people.

Nonetheless, as Tufano and Sevick (1997) and others have found, the same directors tend to sit on the boards of all funds in the same fund company.[17] Hence, I assume that a director works for all funds in a company if he is mentioned in the shareholder report filed by that company. I verify this assumption in a subset (25%) of the data by merging in information from Meschke (2007), who reports names of directors at the fund level.[18] I find that in more than 97% of the fund companies, the same directors sit on the boards of all the funds offered by that company.

To address the question of whether connections influence the selection of subadvisors by fund directors, I use the N-SAR B filings to identify 257 funds that hired new subadvisors during 1993–2002. For each such instance, the set of potential candidates for the subadvisor job includes all the advisory firms active in the market in the year prior to the change. I exclude the fund's continuing advisors from the set of possible choices and eliminate all observations that miss information about the fund's directors.[19]

The number of advisory firms actively managing funds increases over time, from 217 in 1993 to 1,055 in 1999, and remains close to this level afterwards. Hence, the set of potential subadvisors a fund can choose from is quite large. In the empirical analysis I allow for certain advisor characteristics to influence the propensity that the candidate is considered by the fund. Also, I restrict the available alternatives to only 20 advisory firms per hiring fund using a bootstrap approach, to check whether the results are robust to how the candidate set is constructed.

To test whether connections influence which directors are given board seats by advisory firms that start new funds, I identify all the funds newly created in 1998 that I can match in CRSP Mutual Funds as well as in the N-SAR B and N-30D filings. The final sample contains 216 new funds.[20] The potential candidates for board seats are all the directors who were actively overseeing funds at any time between 1993 and 1997, were active in at least 1 year during 1998–2002, and who, prior to 1998, did not oversee portfolios belonging to the fund company that created the new fund. Since this set of candidates may be too large, I use a bootstrap approach to check the robustness of the results by limiting the available directors an advisor can choose from to only 20 individuals in addition to the selected ones.

The entire sample of funds matched in the N-SAR B, N-30D, and CRSP Mutual Funds data sets (15,523 fund-year observations) is used to test the relationships between advisor-board connections and fund fees, expenses, expense

[17] See the Independent Directors Council Task Force Report "Director Oversight of Multiple Funds," May 2005.

[18] I am grateful to Felix Meschke for sharing these data with me.

[19] Each year in the sample between 9% and 16% of funds have missing director identity information.

[20] While the analysis can be extended to include funds born in any other year in the sample, the data collection process is quite time-consuming. Also, I am not aware of any particular event in 1998 that would not allow us to generalize the results based on this subsample of funds to funds created in other years.

reimbursements, and returns. Management fees and expense reimbursements are obtained from data items 48 and 72y, respectively, in the N-SAR B filings. Expense ratios and monthly returns are obtained from CRSP Mutual Funds (data items *expenses* and *retm*, respectively). Annual fund performance is calculated by aggregating the monthly net returns from CRSP. The name of the fund family is given by item 019c in the NSAR-B filings.

In all OLS panel regressions I include fund investment objective dummies to account for the large amount of cross-sectional variation in the dependent variables.[21] I assign investment objectives to funds in three ways: first, based on their self-declared objective in item 66 of the N-SAR B ("aggressive capital appreciation, or capital appreciation," "growth," "growth and income, or income," and "total return" for equity funds, or "bond" for fixed-income funds); second, based on Standard & Poor's Detailed Objective Code (177 unique codes captured by data item *sp_obj_cd* in CRSP Mutual Funds); third, based on the ICDI Fund Objective Code recorded in the CRSP Mutual Funds database for each fund-year observation (25 unique codes captured by data item *icdi_obj_cd* in CRSP Mutual Funds). The findings of the paper are robust to all three fund investment objective categorization systems.

III. Results

A. General Patterns of Connectivity

I identify 6,414 individuals who have served as directors of mutual funds during 1993–2002, and 1,658 advisory firms that have managed or co-managed funds in this time period. While in the sample, 57% of directors oversee funds in just one family, 20% oversee funds in two families, and 23% oversee funds in three or more families. Advisory firms exhibit a similar employment pattern: 53% of advisors work for one family only, 21% work for two families, and 26% work for three families or more. Thus, directors and advisory firms are connected by overseeing and managing funds belonging to multiple families.

In a given year, within a fund family few directors sit on the boards of more than one of the family's fund companies, but within each fund company each fund almost always has the same board.[22] Most families (about 85%) that encompass more than one fund company have different boards serving funds in different companies.

Directors seem to be connected to several advisory firms during the sample period: 35% of directors interact with one advisor, 17% interact with two

[21] For instance, we know that equity funds and those investing in foreign securities pay significantly higher management fees compared to bond funds or those investing in domestic securities (Kuhnen (2004)).

[22] For instance, 73% of directors sit on the boards of just one fund company in the family, 9% sit on the boards of two fund companies in the family, and 18% sit on the boards of three or more fund companies under the umbrella of the same family. Therefore, it is not the case that the average director oversees all the funds in the family. However, as mentioned before, for 97% of fund companies the same directors oversee all funds in the company.

advisors and 48% interact with three or more advisory firms by overseeing the funds that these firms manage.

B. Selection of New Fund Subadvisors

For this part of the analysis I focus on the 257 cases of subadvisor changes. I use this sample to study the determinants (including connections) of an advisor's success at being hired.

Panel A of Table II presents a summary of characteristics of advisory firms that in year t won subadvisory contracts from the hiring funds, all measured in year $t-1$. Panel B presents the same characteristics measured across all subadvisory candidates that each fund could have selected. Several important differences emerge between the selected advisory firms and the overall sample: Selected advisors manage more money ($3 billion vs. $0.4 billion, as indicated by the variable *AdvisorLnAssetsUnderManagement*), have a higher proportion of funds under management in same investment category as the hiring fund (22% vs. 15%, as indicated by the variable *AdvisorFractionFundsInCategory*), and charge lower annual management fees from their existing clients (66 bp vs. 77 bp, as indicated by variable *AdvisorManagementFee*).[23] All these differences are statistically significant ($p < 0.0001$). Interestingly, selected advisors do not differ from the general population with regard to their recent past performance (*AdvisorPerformance*), which is measured as the average performance of all funds under their management at $t-1$.[24]

Selected advisors also differ significantly from the general sample with regard to all connection measures. They are more than 10 times more connected to the board of directors of the hiring fund, using either the advisor-board joint degree measure or the influence measure and their 1-year or 3-year variants. The advisor-board relationship length measure is eight times larger for chosen subadvisor candidates relative to unchosen ones. The chosen advisory firms are more than three times more connected, or prominent, in the industry, as shown by their degree measure. Also, the chosen advisor is about seven times more connected to the primary advisory of the hiring fund than are the unchosen candidates. All these differences are statistically significant ($p < 0.0001$).

These univariate results indicate that when boards of directors select new subadvisors, they do so based on relevant observable characteristics of the candidates such as expertise or cost, but may also choose based on the strength of their prior interactions with the candidates. Estimating the conditional logit model in equation (1) shows that connection measures are significant and positive predictors of which subadvisor is selected, even controlling for all other

[23] It is the norm in the asset management industry for the advisory fee to be simply a percentage of the total value of the fund. See Kuhnen (2004) for more details on the fee structure.

[24] I assign each fund managed by the advisor to performance deciles (1=lowest, 10=highest), depending on how its net return compared to the average net return of all funds in the same investment category that year.

Table II

Summary Statistics

The table shows summary statistics for advisory firms that won management contracts (Panel A), all potential advisory firm candidates (Panel B), chosen directors (Panel C), all potential director candidates (Panel D), and all fund-year observations in the data set (Panel E). All variables are defined in Table I.

	Panel A Chosen Subadvisors		Panel B Subadvisor-Board Pairs in Subadvisor Selection Model (Table III)		Panel C Chosen Directors		Panel D Advisor-Director Pairs in Director Selection Model (Table IV)		Panel E Advisor-Board Pairs in OLS Regressions (Tables V-VIII)	
Variable	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Advisor-Board Level Measures										
AdvisorBoard Influence$_t$	0.03	0.06	0.001	0.005					0.56	0.31
AdvisorBoard JointDegree$_t$	2.86	5.18	0.29	1.61					25.68	24.13
AdvisorBoard Influence$_{t-2,t}$	0.02	0.05	0.001	0.004					0.44	0.28
AdvisorBoard JointDegree$_{t-2,t}$	1.40	2.70	0.20	0.99					17.96	19.58
AdvisorBoard Relationship Length$_t$	0.80	0.97	0.10	0.36					3.18	1.58
Advisor Characteristics										
AdvisorFraction FundsInCategory$_t$	0.22	0.27	0.15	0.27					0.37	0.27
AdvisorLnAssets UnderManagement$_t$	15.04	2.09	12.83	2.52					15.51	2.22
Advisor Performance$_t$	5.50	1.79	5.58	2.38						

Advisor ManagementFee$_t$	0.66	0.21	0.77	0.29				
CandidateAdvisor PrimaryAdvisor JointDegree$_t$	4.54	14.38	0.06	1.50				
CandidateAdvisor PrimaryAdvisor JointDegree$_{t-3,t-1}$	1.32	3.87	0.02	0.33				
AdvisorDegree$_t$	38.23	43.02	13.21	22.08				
AdvisorAge$_t$	4.80	2.33	4.57	2.16				
Advisor-Director Level Measures								
AdvisorDirector Influence$_{1997}$					0.35	0.44	0.004	0.05
					0.35	0.44	0.004	0.05
AdvisorDirector Influence$_{1995-1997}$					0.22	0.35	0.002	0.04
					0.22	0.35	0.002	0.04
AdvisorDirector JointDegree$_{1997}$					7.05	14.54	0.05	1.03
AdvisorDirector JointDegree$_{1995-1997}$					4.68	11.49	0.03	0.71
AdvisorDirector Relationship Length$_{1997}$					1.12	1.36	0.02	0.19
DirectorDegree$_{1997}$					75.81	170.07	18.17	44.69

(*continued*)

Table II—*Continued*

Variable	Panel A Chosen Subadvisors		Panel B Subadvisor-Board Pairs in Subadvisor Selection Model (Table III)		Panel C Chosen Directors		Panel D Advisor-Director Pairs in Director Selection Model (Table IV)		Panel E Advisor-Board Pairs in OLS Regressions (Tables V-VIII)	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Fund Characteristics										
$BoardSize_t$									8.71	6.88
$Ln(FundSize_{t-1})$									4.92	1.82
$NumberOfFunds\ InFamily_t$									43.15	42.31
$ExpenseRatio_t$									121.40	57.14
$ManagementFee_t$									65.85	25.72
$Expense\ Reimbursements_t$									14.82	25.74
$FundReturn_t$									380.54	1873.41
Observations	257		194,249		920		514,855		15,523	

Table III

Predictors of Advisory Firms Winning Subadvisory Contracts

The table shows the coefficient estimates from the conditional logit model of subadvisor selection in equation (1). Each fund hiring a subadvisor at time t can choose among all firms managing funds at $t-1$. The dependent variable is a dummy equal to one for the fund-candidate subadvisor pairs that contracted with each other at t. Standard errors are adjusted for heteroskedasticity and correlation among observations belonging to the same fund-year. T-statistics are in parentheses. The change in the odds of the candidate being selected as a result of a one-standard deviation increase in each right-hand side variable is shown in square brackets. All variables are defined in Table I. *, **, *** indicate significance at the 10%, 5%, and 1% level, respectively.

Dependent Variable	Indicator Equal to 1 If the Fund Hired the Candidate Advisory Firm						
AdvisorBoard			27.38				
Influence$_{t-1}$			(13.76)***				
			[15%]				
AdvisorBoard				27.95			
Influence$_{t-3,t-1}$				(10.95)***			
				[12%]			
AdvisorBoard					0.08		
JointDegree$_{t-1}$					(6.75)***		
					[14%]		
AdvisorBoard						0.08	
JointDegree$_{t-3,t-1}$						(2.91)***	
						[8%]	
AdvisorBoard							1.19
Relationship							(13.76)***
Length$_{t-1}$							[53%]
CandidateAdvisor		0.26	0.12	0.17	0.22	0.23	0.12
PrimaryAdvisor		(10.01)***	(3.76)***	(6.18)***	(8.51)***	(8.54)***	(4.72)***
JointDegree$_{t-3,t-1}$		[9%]	[4%]	[6%]	[8%]	[8%]	[4%]
AdvisorDegree$_{t-1}$		0.01	0.01	0.01	0.01	0.01	0.01
		(6.80)***	(6.28)***	(6.35)***	(5.97)***	(6.05)***	(1.67)*
		[25%]	[25%]	[25%]	[25%]	[25%]	[25%]
AdvisorAge$_{t-1}$	−0.07	−0.13	−0.12	−0.13	−0.11	−0.12	−0.18
	(−1.78)*	(−3.18)***	(−2.91)***	(−3.38)***	(−2.84)***	(−3.15)***	(−4.49)***
	[−14%]	[−24%]	[−23%]	[−24%]	[−21%]	[−23%]	[−32%]
AdvisorFraction	1.33	1.33	1.25	1.30	1.32	1.32	1.31
FundsIn	(5.42)***	(5.45)***	(4.91)***	(5.22)***	(5.40)***	(5.42)***	(5.38)***
Category$_{t-1}$	[43%]	[43%]	[40%]	[42%]	[43%]	[43%]	[42%]
AdvisorLnAssets	0.38	0.25	0.22	0.24	0.23	0.24	0.26
Under	(12.42)***	(7.18)***	(6.12)***	(6.65)***	(6.46)***	(6.96)***	(7.33)***
Management$_{t-1}$	[160%]	[88%]	[74%]	[83%]	[79%]	[83%]	[93%]
Advisor	−0.56	−0.68	−0.72	−0.72	−0.71	−0.69	−0.62
Management	(−1.91)*	(−2.23)**	(−2.29)**	(−2.31)**	(−2.29)**	(−2.26)**	(−2.04)**
Fee$_{t-1}$	[−15%]	[−18%]	[−19%]	[−19%]	[−19%]	[−18%]	[−17%]
Advisor	−0.02	−0.02	−0.02	−0.01	−0.02	−0.02	−0.02
Performance$_{t-1}$	(−0.73)	(−0.60)	(−0.54)	(−0.42)	(−0.57)	(−0.60)	(−0.69)
Pseudo R^2	0.07	0.11	0.17	0.15	0.12	0.12	0.16
Observations	194,249	194,249	194,249	194,249	194,249	194,249	194,249

observable characteristics of candidate firms. The estimation results are in Table III and include the coefficient estimates as well as the change in the odds of winning the contract caused by a one-standard deviation increase in each of the right-hand side variables.

In the first specification I estimate the subadvisor selection model using as predictors of hiring only characteristics of candidate advisory firms unrelated to connections. Advisors that are more specialized in the fund's investment objective and that manage more money are more likely to win the contract: Increasing $AdvisorFractionFundsInCategory_{t-1}$ and $AdvisorLnAssetsUnderManagement_{t-1}$ by one standard deviation increases the odds that the candidate will win by 43% and 160%, respectively. Following the usual nomenclature, the odds (also referred to as the odds ratio) are defined as $\frac{Prob\{Advisor\ is\ hired\}}{Prob\{Advisor\ is\ not\ hired\}}$.[25] All else equal, less expensive and younger advisors are more likely to be selected: Increasing $AdvisorManagementFee_{t-1}$ and $AdvisorAge_{t-1}$ by one standard deviation decreases the odds that the candidate will win by 15%, and 14%, respectively. The latter result may simply reflect the self-selection of advisory firms that compete for subadvisory contracts: Older firms may decide to start their own funds instead of helping other advisors manage funds. This baseline model of subadvisor selection explains about 7% of the variation in the decision to choose a candidate.

When the selection model also takes into account connection measures, the explanatory power of the model increases noticeably. The first two measures added in are the degree to which the candidate is connected to the primary advisor of the hiring fund through previous business interactions ($CandidateAdvisorPrimaryAdvisorJointDegree_{t-3,t-1}$) and the degree to which the candidate is connected to all directors in the mutual fund industry, which is a proxy for the advisor's prominence ($AdvisorDegree_{t-1}$). Increasing these measures by one standard deviation leads to an increase in the odds that the candidate will win of 9% and 25%, respectively. This model explains about 11% of the variation in the subadvisor selection decision.

The fact that a candidate's connections to the primary advisor are in part responsible for the hiring decision may indicate that funds in the same fund company share the same firm as their primary advisor and that this firm prefers to co-manage all funds with the same subadvisor. By law, any registered investment advisor can be selected by the board of directors of a fund to manage or co-manage that fund, but it is possible (and the data are consistent with this conjecture) that the primary advisor may also have a say in this choice.

In the remaining specifications in Table III, I add, one by one, the measures of connectivity between the candidate advisor and the fund's board: the 1-year and 3-year advisor-board joint degree measures, the 1-year and 3-year influence measures, and the advisor-board relationship length measure. All five of these measures are strong positive predictors of which subadvisor is selected, controlling for all other characteristics of the candidates, including how connected they are in general and how connected they are to the primary advisor of the hiring fund. Increasing the first four of these measures by one standard

[25] For the median candidate, the odds of winning are about 0.001, since a fund can choose from all advisors available at that time, and the number of potential candidates is as high as 1,100 in later years in the sample. An increase of 160% in the odds indicates that the odds for the median candidate move from 0.001 to 0.0026.

deviation increases the odds that the candidate will win by 14%, 8%, 15%, and 12%, respectively. The effect of the length of the relationship between the candidate advisor and the board is even stronger, at about 53%. The 1-year degree and influence measures have stronger predictive power (both in terms of model fit and effect size) than the 3-year average measures, indicating that more recent connections are more important in the advisor selection process.

Including any of these five connection measures further improves the fit of the selection model. For instance, when the 1-year measure of the influence of the candidate advisor on the fund's board is added as a possible determinant of the subadvisor choice, the model explains about 17% of the variation in the data.

Moreover, when the selection model allows connections to matter, the role of other candidate advisor characteristics is diminished. For instance, when the 1-year advisor-board influence measure is in the model, increasing the amount of assets the candidate has under management by one standard deviation increases the odds that it will win by 74%, which is a smaller effect compared to the 160% increase obtained in the baseline model. The effects of right-hand side variables on the odds of a candidate winning indicate that the two most important determinants of subadvisor choice are the size of assets under management and the expertise of the candidate. The effects of the connection measures are smaller than those of these two variables, but are comparable in magnitude to the effect of the candidate's cost. Further, including connections in the model allows us to explain about twice as much variation in the selection outcome compared to the baseline model.

While prior business relationships seem to be significant determinants of subadvisor selection, it is important to note that the impact of either of the connection measures on the odds of a candidate subadvisor getting the contract is smaller than the impact of other characteristics of the candidate, such as the size of assets under management or the degree of specialization in the fund's investment objective. Nevertheless, while the effects of connections are relatively small, the results in Table III indicate that they are still economically significant.

It is possible, however, that the results in Table III overstate the influence of connections on the subadvisor choice process because the allowed set of candidates is too large.[26] For example, the large data set used to estimate the conditional logit model in Table III may include irrelevant advisory firms as candidates, and as a result the estimated standard errors may be artificially small. To see whether this is indeed the case, I re-estimate the model allowing each hiring fund to choose a subadvisor from a set of only 20 alternatives. This is a conservative approach—for instance, Ljungqvist, Marston, and Wilhelm (forthcoming) allow 50 banks to compete for the role of co-manager in security issuance deals in addition to the banks that actually won the mandate.

Since I do not know the exact procedure that boards use to form the pool of candidates that they actually consider, I limit the sample of potential candidates

[26] I would like to thank an anonymous referee for making this point.

in three different ways. The chosen advisory firm is always included in the set of the 20 alternatives.

The first approach is based on nonparametric bootstrapping (Efron (1981)). For each hiring fund, I select the unsuccessful 19 candidates at random and estimate the conditional logit model on this much smaller data set (5,140 observations per random sampling). I repeat this procedure 100 times and get the empirical distribution of the estimated coefficients. The mean and standard deviation of this empirical distribution are reported as the estimated coefficients of the model and their standard errors in Panel A of Table IA.I in the Internet Appendix.[27] All the results reported in the conditional logit analysis that uses all available data continue to hold, and the magnitude of the effects is actually greater.

The second and third approaches limit the set of unchosen alternatives according to the propensity of candidates to be considered based on objective, non-connections-related measures such as expertise, reputation, or cost.[28] I estimate the first selection model in Panel A of Table III and generate for each candidate advisory firm the propensity score of being selected based on all non-connections measures. I then construct the set of allowed non-chosen alternatives to be either those 19 candidates that have the highest propensity scores, or those that have the closest propensity scores to the chosen subadvisor. Panels B and C of Table IA.I in the Internet Appendix report the results of estimating the subadvisor selection model using these two methods of constructing the sample of alternatives based on propensity scores. The effects of connections are again economically and statistically significant, in line with those reported in Table III. Thus, the significance of the results obtained using all the available data cannot be attributed to the sample size or construction.

The findings in this section indicate that even after controlling for observable characteristics of candidate subadvisory firms, and for the business ties between the fund's primary advisor and the candidate, the past connections between the fund's board and the candidate subadvisor are a strong positive predictor of which firm gets the portfolio management contract. Hence, directors hire subadvisory firms based on past business relationships. In Section III.C, I show that preferential hiring based on connections is also exhibited in the assignment of board seats to directors by advisory firms when new funds are created.

C. Selection of Directors of New Mutual Funds

Mutual funds are created by their primary advisors. At the time of a fund's birth, the primary advisor is the only shareholder of the fund, and thus has the right to choose the board of directors. While having to comply with the

[27] An Internet Appendix for this article is online in the "Supplements and Data Sets" section at http://www.afajof.org/supplements.asp.

[28] See chapter 10 "Stratification on Endogenous Variables and Estimation" in Manski and McFadden (1981) for a detailed discussion of this approach.

legal requirement that a certain proportion of the directors be independent according to the SEC's definition, the advisor is free to offer board seats to the individuals of their choice.[29] If relationships matter, then advisors of new funds should preferentially hire directors that they are connected to from past business relationships.

I find 216 open-end U.S. mutual funds newly created in 1998 whose characteristics and board composition I can identify. For each of these new funds, I know the identity of the directors who won board seats. I also construct the set of alternative director candidates who could have been considered for the job—these are the directors overseeing funds anytime during 1993–1997 and who oversee funds at least 1 year during 1998–2002.[30] The latter criterion is used to avoid having retired directors in the sample of potential candidates. The resulting set contains 3,005 unique candidate director names. For fund companies where a new fund was added, but that existed prior to 1998, the selection of directors who are already working for funds in the company is not part of the analysis because most fund companies (97%) automatically extend the same board to all funds. This allows me to focus on the hiring of new directors, or equivalently, on board changes. If, for instance, a fund company adds a new fund and the board of the fund company does not change at all, then I do not use these observations in my analysis.

The summary statistics reported in Panels C and D of Table II show that there are significant differences between the chosen directors and the set of all candidates. The five measures of connectivity between the candidate director and the primary advisor of the new fund ($AdvisorDirectorJointDegree_{1997}$, $AdvisorDirectorJointDegree_{1995-1997}$, $AdvisorDirectorInfluence_{1997}$, $AdvisorDirectorInfluence_{1995-1997}$, $AdvisorDirectorRelationshipLength_{1997}$) are about 10 times higher for the individuals who were selected relative to the entire set of available directors. Moreover, selected directors are about four times more prominent in the network, as indicated by the $DirectorDegree_{1997}$ measure. These differences are statistically significant ($p < 0.0001$).

The results of the estimation of the logit model of director selection described in Section I.A.2 are shown in Table IV and confirm the univariate findings. Directors who are more prominent in the network are significantly more likely to be selected. Increasing $DirectorDegree_{1997}$ by one standard deviation increases the odds that the candidate gets the board seat by 25%.[31] Moreover, all five of the different measures of connectivity between the primary advisor of the new fund and the candidate director are significantly

[29] The required proportion of independent trustees used to be 40%, but was increased to 75% in 2004.

[30] While individuals not previously associated with fund boards could also have been considered for the director positions, I cannot observe these people unless they won the board seat. About 4% of directors in the candidate pool are new to the industry. Their connection measures are set to zero, and they are included in the selection model.

[31] For the median candidate in this large set of alternatives, the odds of winning are about 0.001. Such an effect would increase these odds from 0.001 to 0.00125.

Table IV

Predictors of Directors Winning Board Seats in New Funds

The table shows the coefficient estimates from the logit model of director selection in Section I.A.2. For each new fund created in 1998, the potential candidate directors the fund's primary advisor can choose from (in addition to those individuals who actually won the seats) are all the directors actively overseeing funds anytime between 1993 and 1997, and who are also active at some time during 1998 to 2002. Directors already working for the fund company that the new fund is a part of are not included. The dependent variable is equal to one for the fund-director pairs that successfully contracted with each other in 1998, and zero for all the other pairs. Standard errors are adjusted for heteroskedasticity and correlation among observations belonging to the same primary advisor. *T*-statistics are in parentheses. The change in the odds of the candidate director being selected as a result of a one-standard deviation increase in each right-hand side variable is shown in square brackets. All variables are defined in Table I. *** indicates significance at the 1% level.

Dependent Variable:	Indicator Equal to 1 If the Candidate Director Was Selected				
AdvisorDirector JointDegree$_{1997}$	0.23 (3.15)*** [27%]				
AdvisorDirector JointDegree$_{1995-1997}$		0.29 (3.31)*** [23%]			
AdvisorDirector Influence$_{1997}$			5.95 (22.98)*** [37%]		
AdvisorDirector Influence$_{1995-1997}$				6.56 (17.95)*** [26%]	
AdvisorDirector RelationshipLength$_{1997}$					1.61 (17.19)*** [35%]
DirectorDegree$_{1997} * 10^{-1}$	0.05 (9.03)*** [25%]	0.05 (12.22)*** [25%]	0.06 (19.05)*** [30%]	0.06 (16.84)*** [30%]	0.04 (6.86)*** [20%]
Pseudo R^2	0.14	0.12	0.25	0.18	0.20
Observations	514,855	514,855	514,855	514,855	514,855

positive predictors of the candidate's success. Increasing any one of these measures by one standard deviation increases the odds of winning by 23% (as in the case of *AdvisorDirectorJointDegree*$_{1995-1997}$) to 37% (as in the case of *AdvisorDirectorInfluence*$_{1997}$). Further, as in the case of choosing subadvisors, the 1-year degree and influence measures have stronger predictive power (both in terms of model fit and effect size) than the 3-year average measures, indicating that more recent connections are more important in the director selection process.

To test the robustness of these effects, in Panel A of Table IA.II in the Internet Appendix, I restrict the sample to new funds created only by new fund companies to avoid any potential biases induced by the fact that the director identification process is based on a noisy pattern-matching algorithm. A director who actually served on the board of a fund company in the past may be

labeled as new to the company simply because his name was spelled slightly differently in prior N-30D filings. Restricting the analysis to new fund companies avoids this potential problem. Using this subsample, I find that the economic and statistical significance of the connection measures as predictors of director selection are virtually identical to those reported using the entire sample of new funds.

However, as in the case of the subadvisor selection model, it is possible that the significance of these effects is artificially high due to the inclusion of too many unchosen director alternatives. To address this concern, I re-estimate the director selection model using a much smaller set of unchosen alternatives. I allow the primary advisor to only consider 20 other directors aside from those who actually get the board seats. I use the same bootstrap approach as before. For each new fund where directors are hired, I pick at random 20 unchosen candidates, and then estimate the selection model. I do this 100 times, and obtain the empirical distribution of the coefficient estimates. The mean and standard deviation of this empirical distribution are the bootstrap estimates and standard errors reported in Panel B of Table IA.II in the Internet Appendix. Connections continue to be large and statistically significant positive predictors of which individuals get the board seats. The magnitude of the effect is even higher than in the models estimated using all the available data. This indicates that the results in the main model in Table IV are not driven by the sample size or construction.

Another potential concern is that the results in Table IV are driven by observations belonging to fund families that use unitary or overlapping boards across funds in different fund companies in the family.[32] For instance, if a family encompasses companies 1 and 2, there may be some mechanical rule used by the family that would make it more likely for directors overseeing funds in company 1 to be given board seats in new funds in company 2. Hence, a director's prior connection to the family, and not necessarily to the primary advisor of the new fund, would mechanically cause him to win the new board seat. Since the majority (53%) of advisory firms work for one family only, it is possible that the influence of the advisor-director connection measures on who gets board seats simply captures this family effect. To see whether this is the case, I estimate the director selection model by excluding families with large overlap across directors serving different companies in the family. The amount of overlap is measured as the standard deviation across all directors in the family of the number of companies in the family that each director serves. The larger this standard deviation, the less overlap there is across directors in different companies in the family. Panel C of Table IA.II in the Internet Appendix shows the results of the director selection model where I exclude families for which this standard deviation measure is below five. Choosing different values for this overlap threshold produces very similar results. These estimated effects are virtually identical to those in Table IV, indicating that this potential mechanical family effect is not driving the result that connections to primary

[32] I would like to thank an anonymous referee for making this point.

advisors increase a director's chances to get the board seat. This is not surprising, given that in the sample only 15% of families with more than one fund company employ the same directors in all the companies. Hence, the mechanical effect of the family extending its existing directors from one company to another when new funds are created is not a significant concern.

Thus, the evidence in Table IV and Table IA.II in the Internet Appendix indicates that advisors are more likely to offer board seats to directors who already oversee more funds, and with whom they have had more prior business relationships.

D. Advisor-Board Connections, Contractual Agreements, and Fund Performance

Given the findings in Sections III.B and III.C that connections between fund directors and advisory firms induce preferential hiring among these two types of agents, it is important to know whether these connections matter for fund investors. On the one hand, having a board who has interacted more with an advisory firm in the past may mean that the advisor is of higher quality (otherwise they would have been fired already) and, moreover, that they are easier to monitor. The hypothesis that business ties lead to efficient information transfer among agents implies that there should be a positive correlation between the strength of advisor-board connections and the welfare of fund investors, as indicated by features of the advisory contract negotiated by the board and by fund performance. On the other hand, business ties can induce favoritism (Tirole (1986)) between directors and advisors, which implies that advisory contracts will not be negotiated truly at arms-length by the board and the management, and the board will not monitor the management as intensely as required by fiduciary duty.

Expense ratios are the first indicator of the efficiency with which funds are operated. The numerator of the ratio—the annual expenses of the fund—includes the management fee and administrative and marketing expenses. Controlling for observable characteristics that correlate with how difficult it is to operate the fund (such as its size and investment objective), a higher expense ratio indicates that more of the rents are captured by the management, and less by fund investors.

Table V shows the determinants of the size of expense ratios. Expense ratios are higher for funds where the board and the advisor are more connected through past business relationships, after controlling for fund, fund family, and advisor characteristics that might correlate with the level of effort or costs involved in running the fund. Two of the five advisor-board connection measures (the 1- and 3-year joint degree measures) have effects significant at the 1% level. Increasing either one of these connection measures by one standard deviation (see Panel E of Table II) translates into an increase in annual expenses of about 7 bp. To put this result in perspective, the average expense ratio in the sample is 123 bp. For the average fund in the sample (with assets of $120 million), increasing the expense ratio by 7 bp corresponds to investors losing about $84,000 per year, which is a relatively small effect.

Table V
Connections and Expense Ratios

OLS regressions are estimated to examine the impact of connections between the fund board and the primary advisor on expense ratios, for the entire sample of open-end U.S. mutual funds during 1995–2002 matched in the N-SAR B, N-30D, and the CRSP Mutual Funds data sets. The dependent variable, $ExpenseRatio_t$, is the ratio of the fund's expenses divided by the value of the fund's assets in year t (item *expenses* in CRSP Mutual Funds). Year, ICDI investment objective, and fund family fixed effects are included. Standard errors are adjusted for heteroskedasticity and correlation across observations belonging to the same fund family. T-statistics are in parentheses. All variables are defined in Table I. * and *** indicate significance at the 10% and 1% level, respectively.

Dependent Variable	$ExpenseRatio_t$					
$AdvisorBoard$		0.30				
$Influence_{t-1}$		(0.08)				
$AdvisorBoard$			6.80			
$Influence_{t-3,t-1}$			(1.45)			
$AdvisorBoard$				0.32		
$JointDegree_{t-1}$				(3.15)***		
$AdvisorBoard$					0.37	
$JointDegree_{t-3,t-1}$					(2.79)***	
$AdvisorBoard$						1.61
$RelationshipLength_{t-1}$						(1.37)
$BoardSize_{t-1}$	−0.11	−0.11	−0.08	−0.05	0.05	−0.02
	(−0.45)	(−0.45)	(−0.31)	(−0.24)	(0.25)	(−0.08)
$FundAge_t$	−0.55	−0.55	−0.58	−0.53	−0.58	−0.62
	(−1.29)	(−1.29)	(−1.38)	(−1.26)	(−1.38)	(−1.42)
$Ln(FundSize_{t-1})$	−6.06	−6.06	−6.05	−6.03	−6.08	−6.05
	(−8.86)***	(−8.86)***	(−8.87)***	(−8.86)***	(−8.98)***	(−8.89)***
$NumberOfFunds$	0.11	0.11	0.11	0.04	0.04	0.10
$InFamily_t$	(1.32)	(1.31)	(1.42)	(0.59)	(0.62)	(1.37)
$AdvisorFraction$	−1.95	−1.95	−2.01	−1.86	−1.50	−2.02
$FundsInCategory_{t-1}$	(−0.51)	(−0.51)	(−0.53)	(−0.50)	(−0.40)	(−0.53)
$AdvisorLnAssets$	0.02	0.00	−0.31	−1.82	−1.41	−0.17
$UnderManagement_{t-1}$	(0.02)	(0.00)	(−0.28)	(−1.95)*	(−1.49)	(−0.15)
Year FEs	Yes	Yes	Yes	Yes	Yes	Yes
Investment objective FEs	Yes	Yes	Yes	Yes	Yes	Yes
Fund family FEs	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R^2	0.67	0.67	0.67	0.68	0.68	0.67
Observations	12,866	12,866	12,866	12,866	12,866	12,866

In the regression in Table V, I control for fund board size, economies of scale as proxied by fund size and fund family size, the degree to which the advisor is specialized in the investment objective of the fund, as well as the reputation of the advisor, as proxied by the total amount of money they have under management across all mutual funds. I also include dummies for the ICDI investment objective of the fund, as well as fund family fixed effects. Since certain characteristics such as the number of funds in the family or the intensity of the director-advisor connections in the family may not vary over time, I also estimate this regression without family fixed effects. The results are shown in Table IA.III in the Internet Appendix. In accordance with the extant literature, I find that larger funds and funds in larger families have lower expense ratios.

Table VI
Connections and Management Fees

OLS regressions are estimated to examine the impact of connections between the fund board and the primary advisor on advisory fees, for the entire sample of open-end U.S. mutual funds during 1995–2002 matched in the N-SAR B, N-30D, and the CRSP Mutual Funds data sets. The dependent variable, $ManagementFee_t$, is the fee paid by the fund in year t to its advisors for managing the fund (item 048 in N-SAR B filings). Year, ICDI investment objective, and fund family fixed effects are included. Standard errors are adjusted for correlation across observations belonging to the same fund family. T-statistics are in parentheses. All variables are defined in Table I. *, **, *** indicate significance at the 10%, 5%, and 1% level, respectively.

Dependent Variable	$ManagementFee_t$					
$AdvisorBoard\ Influence_{t-1}$		0.62				
		(0.35)				
$AdvisorBoard\ Influence_{t-3,t-1}$			0.53			
			(0.30)			
$AdvisorBoard\ JointDegree_{t-1}$				0.11		
				(2.38)**		
$AdvisorBoard\ JointDegree_{t-3,t-1}$					0.08	
					(1.66)*	
$AdvisorBoard\ RelationshipLength_{t-1}$						−0.21
						(−0.64)
$BoardSize_{t-1}$	−0.01	−0.01	−0.01	0.01	0.02	−0.03
	(−0.15)	(−0.15)	(−0.11)	(0.09)	(0.22)	(−0.28)
$FundAge_t$	−0.16	−0.16	−0.16	−0.15	−0.17	−0.15
	(−0.81)	(−0.82)	(−0.83)	(−0.77)	(−0.85)	(−0.77)
$Ln(FundSize_{t-1})$	−1.33	−1.33	−1.33	−1.33	−1.34	−1.34
	(−6.50)***	(−6.51)***	(−6.51)***	(−6.55)***	(−6.53)***	(−6.50)***
$NumberOfFunds$	0.00	0.00	0.00	−0.02	−0.01	0.00
$InFamily_t$	(0.07)	(0.11)	(0.09)	(−0.95)	(−0.59)	(0.08)
$AdvisorFraction$	4.54	4.53	4.53	4.57	4.63	4.55
$FundsInCategory_{t-1}$	(2.32)**	(2.32)**	(2.32)**	(2.35)**	(2.38)**	(2.32)**
$AdvisorLnAssets$	−0.38	−0.41	−0.40	−1.01	−0.68	−0.35
$UnderManagement_{t-1}$	(−0.50)	(−0.57)	(−0.56)	(−1.94)*	(−1.16)	(−0.47)
Year FEs	Yes	Yes	Yes	Yes	Yes	Yes
Investment objective FEs	Yes	Yes	Yes	Yes	Yes	Yes
Fund family FEs	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R^2	0.67	0.67	0.67	0.67	0.67	0.67
Observations	12,866	12,866	12,866	12,866	12,866	12,866

I also find that board size is not correlated with the expense ratio, and neither are the advisor's degree of specialization in the investment objective of the fund nor the advisor's reputation.

A large component of the expense ratio is the management fee. As required by law, this fee has to be renegotiated at arms-length by the board and the management every year, when the advisor is evaluated. The link between advisor-board connections and the size of the management fee paid to the fund's advisors is shown in Table VI, where I estimate the pooled OLS model in equation (2). Two of the five measures of connectivity between fund directors and the primary advisor (the 1- and 3-year joint degree) are positive and significant predictors

of the size of the fee paid to the advisor. Increasing either measure by one standard deviation increases the fee by about 2 bp per year, a relatively small effect given that the average annual management fee in the sample is 66 bp.

To understand the role of characteristics of the fund family or of the primary advisory firm that may be time-invariant but different in the cross-section, I estimate the management fees regression model without family fixed effects. The results are shown in Table IA.IV in the Internet Appendix. Those results and the results in Table VI indicate that advisor-specific characteristics influence the fee received from the fund: Advisors who are more specialized in the objective of the fund (i.e., those that has more portfolios under management that has the same investment objective) get significantly higher fees. The fee is lower for advisors with higher overall assets under management, indicating that economies of scale are shared with the fund investors. I also find that fund characteristics matter for the size of the advisory fee, with larger funds paying a lower percent of assets as fees.

The final aspect of the advisory contract that I examine is the annual expense reimbursements that are paid by the advisor back to fund investors after negotiations with the board. Such reimbursements provide a direct a mechanism for increasing shareholder value, as well as a strategy for the advisor to temporarily increase the fund returns—and potentially the fund inflows—by forgoing some of the management fee (Christoffersen (2001)). I estimate a pooled OLS regression as in equation (2), where the dependent variable is the amount of the annual expense reimbursements. The results of the model that includes family fixed effects are shown in Table VII. I find no significant relationship between advisor-board connections and expense reimbursements. However, when the model is estimated without family fixed effects (see Table IA.V in the Internet Appendix), I find that the 1- and 3-year advisor-board influence measures are significantly negative predictors of the size of expenses reimbursed by the advisors back to funds. Increasing either of these variables by one standard deviation decreases the annual expense reimbursed by about 1 bp, a relatively small effect given that the average amount reimbursed in the sample is 15 bp. These results indicate that the small effect of connections on reimbursements from the advisor back to the fund is mainly a between-fund family effect.

The final test of whether advisor-board connections are helpful or detrimental to fund investors is to analyze the relationship between connections and net fund returns. If connections induce better monitoring of the advisor by the board, we should expect to see a positive correlation between connections and fund performance. Alternatively, if connections proxy for favoritism, and thus less effective monitoring, they should be negative predictors of fund returns.

The results in Table VIII show no significant relationship between advisor-board connections and fund returns, once fund family fixed effects are accounted for. If I estimate the regression without family fixed effects, as in Table IA.VI in the Internet Appendix, the 1- and 3-year advisor-board joint degree measures are negatively correlated with fund net returns, after controlling for the fund's investment objective using the ICDI indicators, and for fund and fund family

Table VII
Connections and Expense Reimbursements

OLS regressions are estimated to examine the impact of connections between the fund board and the primary advisor on expense reimbursements, for the entire sample of open-end U.S. mutual funds during 1995–2002 matched in the N-SAR B, N-30D, and the CRSP Mutual Funds data sets. The dependent variable, $ExpenseReimbursements_t$ represents the expenses reimbursed back to the fund (item 072y in N-SAR B filings) by the advisor at the end of year t, expressed as a fraction of the fund's total net assets (in basis points). Year, ICDI investment objective, and fund family fixed effects are included. Standard errors are adjusted for correlation across observations belonging to the same fund family. T-statistics are in parentheses. All variables are defined in Table I. ** and *** indicate significance at the 5% and 1% level, respectively.

Dependent Variable	$ExpenseReimbursements_t$					
AdvisorBoard		−0.36				
$Influence_{t-1}$		(−0.17)				
AdvisorBoard			−0.10			
$Influence_{t-3,t-1}$			(−0.04)			
AdvisorBoard				0.02		
$JointDegree_{t-1}$				(0.48)		
AdvisorBoard					0.01	
$JointDegree_{t-3,t-1}$					(0.27)	
AdvisorBoard						−0.15
$RelationshipLength_{t-1}$						(−0.35)
$BoardSize_{t-1}$	0.09	0.09	0.09	0.09	0.09	0.08
	(1.04)	(1.04)	(1.02)	(1.08)	(1.08)	(0.90)
$FundAge_t$	−1.16	−1.16	−1.16	−1.16	−1.16	−1.15
	(−5.25)***	(−5.24)***	(−5.24)***	(−5.24)***	(−5.25)***	(−5.19)***
$Ln(FundSize_{t-1})$	−5.37	−5.37	−5.37	−5.36	−5.37	−5.37
	(−14.15)***	(−14.16)***	(−14.16)***	(−14.16)***	(−14.15)***	(−14.15)***
NumberOfFunds	0.04	0.04	0.04	0.03	0.03	0.04
$InFamily_t$	(1.29)	(1.30)	(1.31)	(1.11)	(1.18)	(1.31)
AdvisorFraction	−2.22	−2.21	−2.21	−2.21	−2.20	−2.21
$FundsInCategory_{t-1}$	(−1.11)	(−1.11)	(−1.11)	(−1.11)	(−1.10)	(−1.11)
AdvisorLnAssets	−1.43	−1.41	−1.42	−1.51	−1.46	−1.41
$UnderManagement_{t-1}$	(−2.58)***	(−2.45)**	(−2.48)**	(−2.49)**	(−2.52)**	(−2.52)**
$FundReturn_t$	−0.001	−0.001	−0.001	−0.001	−0.001	−0.001
	(−5.73)***	(−5.73)***	(−5.73)***	(−5.73)***	(−5.73)***	(−5.72)***
Year FEs	Yes	Yes	Yes	Yes	Yes	Yes
Investment objective FEs	Yes	Yes	Yes	Yes	Yes	Yes
Fund family FEs	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R^2	0.37	0.37	0.37	0.37	0.37	0.37
Observations	12,866	12,866	12,866	12,866	12,866	12,866

size, board size, advisor specialization in the fund's investment category, and the total amount of money managed by the advisor. Increasing these measures by one standard deviation corresponds to a 81 bp to 95 bp decrease in annual net fund returns, controlling for characteristics that include the fund's investment objective. The mean net return in the sample is 381 bp. As before, these results suggest that if connections have any impact on returns, this is a between-fund

Table VIII
Connections and Fund Returns

OLS regressions are estimated to examine the impact of connections between the fund board and the primary advisor on the fund net returns, for the entire sample of open-end U.S. mutual funds during 1995–2002 matched in the N-SAR B, N-30D, and the CRSP Mutual Funds data sets. The dependent variable, $FundReturn_t$, is the annual net return (expressed in basis points) of the fund calculated by aggregating monthly net returns (data item *retm*) in CRSP Mutual Funds. Year, ICDI investment objective, and fund family fixed effects are included. Standard errors are adjusted for heteroskedasticity and correlation across observations belonging to the same fund family. *T*-statistics are in parentheses. All variables are defined in Table I. *** indicates significance at the 1% level.

Dependent Variable	$Returns_t$					
AdvisorBoard		122.45				
$Influence_{t-1}$		(1.04)				
AdvisorBoard			59.73			
$Influence_{t-3,t-1}$			(0.41)			
AdvisorBoard				−1.68		
$JointDegree_{t-1}$				(−0.85)		
AdvisorBoard					−1.60	
$JointDegree_{t-3,t-1}$					(−0.78)	
AdvisorBoard						18.94
$RelationshipLength_{t-1}$						(0.60)
$BoardSize_{t-1}$	−5.41	−5.35	−5.06	−5.73	−6.10	−4.28
	(−0.95)	(−0.94)	(−0.89)	(−1.00)	(−1.06)	(−0.74)
$FundAge_t$	88.12	87.70	87.81	87.99	88.24	87.28
	(6.82)***	(6.77)***	(6.75)***	(6.80)***	(6.82)***	(6.73)***
$Ln(FundSize_{t-1})$	−76.99	−76.71	−76.91	−77.13	−76.89	−76.96
	(−6.00)***	(−5.99)***	(−6.00)***	(−6.03)***	(−6.01)***	(−5.99)***
NumberOfFunds	0.92	1.09	0.98	1.28	1.23	0.90
$InFamily_t$	(0.30)	(0.35)	(0.32)	(0.42)	(0.41)	(0.29)
AdvisorFraction	−544.50	−545.99	−545.08	−544.93	−546.40	−545.39
$FundsInCategory_{t-1}$	(−3.87)***	(−3.89)***	(−3.88)***	(−3.87)***	(−3.88)***	(−3.87)***
AdvisorLnAssets	−138.83	−145.67	−141.71	−129.22	−132.66	−141.08
$UnderManagement_{t-1}$	(−4.57)***	(−4.55)***	(−4.45)***	(−3.85)***	(−4.10)***	(−4.50)***
Year FEs	Yes	Yes	Yes	Yes	Yes	Yes
Investment objective FEs	Yes	Yes	Yes	Yes	Yes	Yes
Fund family FEs	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R^2	0.32	0.32	0.32	0.32	0.32	0.32
Observations	12,866	12,866	12,866	12,866	12,866	12,866

family effect. Once we control for family fixed effects, returns do not depend on prior advisor-board links.

The control variables included in the model in Table VIII are good predictors of net fund returns. Larger funds have worse performance, as suggested in prior literature (Chen et al. (2004)). If the fund's advisor manages more money, or if more of the portfolios under their management are in the same investment category as that of the fund, the return is lower. These findings support models such as Berk and Green (2004) where there are diseconomies of scale to managerial skill.

Taken together, these results show that the overall impact of advisor-board connections on the contractual agreements negotiated each year by the board and the management and on fund returns is, if anything, only marginally negative, and the economic magnitude of these effects is small. Also, the contribution of the advisor-board connections to the R^2 of the models predicting expense ratios, management fees, expense reimbursements, and net returns is less than 1%.

Furthermore, using the conventional level of significance ($p < 5\%$), connections are statistically significant predictors of these investor welfare measures in only 3 out of 20 models estimated in Tables V to VIII (and in 8 out of the 20 specifications ran without family fixed effects in Tables IA.III to IA.VI in the Internet Appendix). Hence, more often than not, I fail to reject the null hypothesis that advisor-board connections do not impact investors' bottom line.

The lack of a strong relationship between advisor-board connections and investor welfare is in line with prior findings in the mutual fund governance literature, which suggests that it is difficult for investors to identify better funds based on board independence.

While Tufano and Sevick (1997), Del Guercio, Dann, and Partch (2003), Ding and Wermers (2006), and Khorana, Tufano, and Wedge (2007) indicate that more independent boards are associated with lower fund fees and better fund restructuring and manager replacement decisions, Kong and Tang (2008), Ferris and Yan (2007), and Meschke (2007) do not find evidence that board independence leads to better outcomes for investors, in terms of expenses or returns.

Unlike these previous papers, however, the corporate governance measures that I develop here capture the intensity of interactions between the board and the advisory firm managing the fund, and are not based on the SEC's definition of director independence. As shown in Table IX, the connection measures based on prior relationships have a very low correlation (about -0.1) with the fraction of interested directors, defined according to the SEC rules. Figure 1 shows the time trends for the fraction of interested directors ($\%Interested(SEC)_t$), as well as the measures $AdvisorBoardJointDegree_t$ and $AdvisorBoardInfluence_t$ during the 1995–2002 period. While $\%Interested(SEC)$ has been close to 25% (which is now the upper limit, by law), the influence measure has been more volatile, and the joint degree measure has steadily increased since 1997.

The low correlation between connection measures and board independence according to the SEC is not a surprising result. A director can be deemed independent according to the SEC's rules because he is not an employee of the fund's advisor, even though he might have served on the boards of numerous funds managed by this advisor in the past. Hence, he and the advisor are very connected (i.e., they have had numerous opportunities to exchange favors or information) even though the director is not an employee of the advisory firm.

Regardless of whether connections proxy for favoritism or efficient information exchange, the theoretical predictions with respect to the role of past interactions on hiring decisions are clear, and strongly supported by the data.

Table IX

Correlation Matrix for Board Independence Measures

The table shows the correlations between various measures of board independence, based on prior business connections and also on the SEC's definition of director independence. All variables are defined in Table I. ** significant at $p < 0.05$.

	%Interested (SEC)	*Advisor Board JointDegree$_t$*	*Advisor Board Influence$_t$*	*AdvisorBoard Relationship Length$_t$*	*Advisor Board JointDegree$_{t-2,t}$*	*Advisor Board Influence$_{t-2,t}$*
%Interested(SEC)	1.00					
AdvisorBoard JointDegree$_t$	−0.08**	1.00				
AdvisorBoard Influence$_t$	−0.10**	0.29**	1.00			
AdvisorBoard RelationshipLength$_t$	−0.10**	0.38**	0.32**	1.00		
AdvisorBoard JointDegree$_{t-2,t}$	−0.05**	0.94**	0.31**	0.52**	1.00	
AdvisorBoard Influence$_{t-2,t}$	−0.06**	0.34**	0.86**	0.58**	0.45**	1.00
Observations	4,675	15,523	15,523	15,523	15,523	15,523

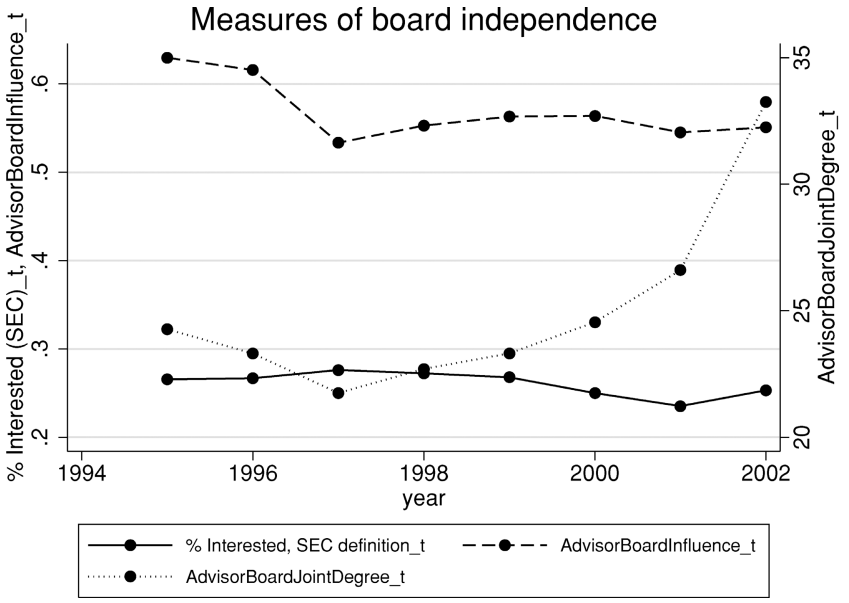

Figure 1. Time Trends for Board Independence Measures, 1995–2002. $\%Interested(SEC)_t$ is the percentage of directors who are "interested" according to the SEC's definition of mutual fund director independence status, and is calculated using data from Meschke (2007) (4,675 fund-year observations). $AdvisorBoardJointDegree_t$ and $AdvisorBoardInfluence_t$ are 1-year connection measures defined as in Table II (15,523 fund-year observations).

Connections seem to determine how agents split rents among themselves, by influencing which parties get employed as directors or advisors in this industry. The fact that in the cross-section of funds there is not a significant link between advisor-board ties and fund investors' welfare is consistent with the idea that the two opposing roles of connections balance out in this setting, and therefore the total size of rents extracted from fund shareholders is not affected by these ties.

However, the evidence documented here cannot reject the hypothesis that neither the monitoring nor the collusion effect matter on their own for investors' welfare. Nevertheless, the data show that connections are important for the reciprocal hiring of directors and advisory firms. They must matter for some economic reason, such as those listed in the Introduction: asymmetric information, moral hazard, costly search, or favoritism. Hence, since monitoring and collusion reasons could explain hiring decisions, it is natural to conjecture that *individually* they also influence outcomes relevant to investors. Unfortunately, the evidence in the paper does not allow me to verify this conjecture.

A final caveat in interpreting the results is that there may be some omitted variables that drive the selection of advisors and directors that correlate with the connection measures defined here. Hence, while prior business ties are predictors of hiring outcomes, their effect is not necessarily causal.

IV. Conclusion

This paper develops a set of novel corporate governance measures based on social network analysis to explain important contracting decisions that have not been previously investigated in the mutual funds literature, such as the selection process involved in creating boards of directors, as well as the selection of fund advisors.

The paper uses a unique data set that tracks characteristics of all U.S. open-end mutual funds and investment advisory firms, as well as the business relationships between fund directors and advisory firms during 1993–2002 period. I find that that connections between fund directors and advisory firms induce preferential hiring among these two parties. However, they do not have a significant effect on the welfare of fund investors.

When mutual funds hire new advisory firms to help manage their assets, a candidate advisor is significantly more likely to be offered the portfolio management contract by the fund's board if it is more connected to the fund's directors through prior business relationships. Also, when advisory firms start new mutual funds they are more likely to offer fund board seats to directors they are more connected with through previous business relationships. The strength of advisor-board connections is positively correlated with fund expense ratios and management fees, and negatively related to expense reimbursements and net fund returns, but these effects are not robust to all specifications and their economic magnitude is small.

Hence, while the social network measures developed in this paper are not significant indicators of which funds in the cross-section are better choices for investors, they are major determinants of outcomes in the labor market for fund directors and in the market for fund management services.

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