How Do Firms and Directors Choose Each Other? Evidence from a Two-sided Matching Model of the Director Labor Market

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Abstract

This paper develops and estimates an equilibrium model that identifies the key factors explaining the allocation of outside directors across firms. The approach is based on a two-sided matching model that allows an identification of outside director and appointing firm preferences. The findings indicate that directors' choices are driven by their desire to expand their professional network. Likewise, firms choose directors that increase the connectedness of their boards the most. The model is used to estimate the compensating differentials needed to attract directors with more attractive skill levels and higher quality connections. The evidence also suggests that CEO directors have lower propensity to expand their network, and choose firms with better records of recent performance. The performance of a CEO's firm does not affect his future prospects in the labor market for directorships.

JEL-Classification: G30, G34, C78, L14
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1 Introduction

Following Fama (1980) and Fama and Jensen (1983), an influential branch of the corporate governance literature emphasizes the role of external managerial labor markets in addressing agency conflicts between corporate insiders and outside shareholders. In an efficient labor market, directors who perform their board functions effectively are likely to be offered other directorships; those who perform poorly will not. The relevance and importance of this argument, however, depends on the nature of the demand for directors: What search criteria do firms use when looking to add someone to the board of directors? For example, if good performance has little connection to future opportunities, then the incentive effects of labor market are minimal and shareholders must rely on other mechanisms to align the incentives of managers and directors with shareholder interests.

This paper examines how the labor market for outside directors operates. It provides comprehensive evidence on what skills and attributes of directors employers value, as well as how these qualities impact someone's ability to obtain new directorships. This is an important step in advancing our understanding of the attributes that appointing committees consider important in determining a director's ability to monitor and advise management. As pointed out by Yermack (2004), the majority of the studies that address this question tend to focus on extreme circumstances, such as financial distress or hostile takeovers. Since the majority of firms do not go through these events, there is little evidence on what director characteristics are valued by firms.

One obstacle hinders any empirical attempt to estimate how firms value the skills and attributes of directors. If firms were unilaterally able to choose any director, their preferences could be estimated using a multi-nominal probit or logit random utility model. In reality, however, the interaction of decisions of a firm and a director determines if a director gets a job. These decisions by the two parties considering whether to match crucially depend upon the choices made by all other directors and firms. In particular, a firm's willingness to extend an offer to a candidate depends upon the firm's hiring needs (preferences), as well as its choice set (i.e., the set of directors willing to join them). In turn, a director's willingness to accept an offer depends upon the individual's preferences and whether another firm is willing to extend a job offer. To solve this problem, the study considers a variation of Gale and Shapley's (1962) two-sided matching model and uses Simulated Method of Moments (SMM) to estimate it. This enables identification of the factors that affect the choices made by directors and firms, and how these choices interact to determine the equilibrium allocation of directors across firms.

The paper starts by providing evidence on how a director's work experience, education, and business connections are valued by firms. In particular, measures of college selectivity and the age at which the director attained the first directorship are used to proxy for director skill.[1] The measures of how well-connected a director is come from the sociology literature. These network measures have been extensively used in the finance literature, and have also been proposed to be channels of inefficient favoritism.[2] Both sets of measures are found to be important in explaining labor market outcomes for directors. Network measures, however, are quantitatively more important in explaining a firm's choices. In particular, this study examines the improvement in the network location of current board members that results from hiring new directors. The findings indicate that the most significant factor explaining board member preferences for one candidate over another is the accompanying improvement in their network status from hiring a particular candidate.

Next, the structure of the matching model allows identification of a directors' preferences. This is believed to be the first paper that estimates the *revealed* preferences of directors, as opposed to their *stated* preferences. Lorsch and MacIver (1989) summarize the stated preferences of directors that drive their decisions to join or refuse a board position. The findings in the current study indicate a significant disconnect between the two. First, I find that compensation is an important determinant in directors' decisions to join the board.[3] Second, directors are also motivated by the networking opportunities. They value firms that improve their location in the network. One of the reasons directors refuse a new board position is lack of time. Hence proximity from a director's permanent location to an appointing firm's headquaters should play an important role. Indeed, an average directors disutility from a 10% increase in distance can be offset by a 5% increase in pay. Finally, directors exhibit preference towards a quiet life.[4]

[1]Both measures have been found to proxy for CEO skill (Perez-Gonzalez, 2006; Falato, Li, and Milbourn, 2010).

[2]For example, Hallock (1997) and Barnea and Guedj (2009) study the role of connections of corporate executives and directors in decisions such as the setting of CEO pay. Other applications in finance literature can be found in Hochberg, Ljungqvist, and Lu (2007) and Kuhnen (2009).

[3]The survey results summarized in Table X consistently rank compensation as an insignificant factor in influencing a director to join the board.

[4]In a related study, Bertrand and Mullainathan (2003) document managers' preferences for a quiet life.

Further, given the importance of CEO directors, and the high demand for their services, the model is estimated on the subset of CEO directors only. This allows more degrees of freedom to measure an appointee's skill. If the market holds the CEO accountable for the performance of a CEO's firm, there should be a positive relation between a willingness to hire the CEO as a director and the performance of the CEO's firm. The results are striking. Unless CEO's firm performance is an outlier, networking considerations are of primary importance in recruiting CEO directors as well. Moreover, the labor market does not hold other executives in the firm accountable for their firm's performance. Finally, the study investigates whether a firm with better governance attenuates the self-serving motives of the appointing committee. Several proxies are used for the strength of corporate governance, namely, the GIM Index from Gompers, Ishii, and Metrick (2003), the proportion of independent directors on the board, and the CEO's ownership stake in the firm. Firms where CEOs have a higher stake in the company put more weight on performance measures when recruiting directors.

The difference between this paper and papers that try to link board characteristics to firm performance is that it does not try to answer whether or not firms choose directors optimally. Rather, it examines the patterns of how hiring committees choose directors. Although in the process of recruiting new directors, nominated directors must get shareholder approval at the annual meeting, almost all nominated candidates get approved. Quite naturally, hiring committees and shareholders may have different preferences for directors. Simply put, appointing committees may not be hiring directors in the interests of shareholders. Hence, it would be interesting to compare the results in this paper with the results of the studies that isolate which director characteristics are viewed more favorably by investors.

Overall, the results in this paper suggest that the incentive effects of the labor market are minimal and shareholders must rely on other mechanisms to align the incentives of managers and directors with shareholder interests. This notion supports a recent trend towards more incentive-based compensation for directors (Linck, Netter, and Yang, 2009).

This paper contributes to the broad literature that explores the relation between a company's performance and service by its executive team and board members on boards of other companies. Early literature, beginning with Kaplan and Reishus (1990), shows that executives who cut dividends in their firms are 50% less likely to get board seats in other companies. Gilson (1990) shows that directors of the companies that file for bankruptcy find it harder to get directorships in the future. More recently, Brickley, Linck, and Coles (1999) show that a CEO's performance affects the number of directorships they hold after they retire. Srinivasan (2005) shows that members of audit committees of companies that restated their financials are able to obtain fewer directorships in the future. Harford (2003) provides further evidence that not only executives, but outside directors are also held accountable for the performance of the firm where they serve as directors. He shows that directors of acquired firms get fewer directorships in the future. Further, Coles and Hoi (2003) find that rejecting antitakeover provisions specified in Pennsylvania Senate Bill 1310 has a positive impact on the number of additional board sits directors are able to obtain in the future.

Overall, this line of research provides substantial evidence for both executives and directors that company performance affects their prospects for outside directorships. While most of these studies focus on specific events, this paper explores the subject further by studying how the labor market for outside directors operates in general. Using a much larger sample, the study examines which director characteristics appointing committees pay attention to when they are selecting a new director. Along with performance measures, it is hypothesized that a director's social network is also a significant factor in explaining labor market outcomes. A growing body of work also suggests that board connections have economic consequences for firms. That is, connectedness may affect the board's independence, their monitoring or advising abilities, and thus board actions. Barnea and Guedj (2009) find that CEO pay is higher, CEO pay and turnover are less sensitive to firm performance, and forced CEO turnover is less likely in firms where directors are more connected.

Although the personal characteristics of board members such as education, experience, and connections are clearly relevant to the advisory role of directors, they have received little attention in prior literature. Director characteristics are central to their labor market outcomes. A recent paper by Ahern and Dittmar (2011) provides partial evidence using a natural experiment from Norway. This paper is also related to Yermack (2004), who studies if the labor market provides incentives for directors; however, the main focus of his paper are the incentives received by directors within the firms. His sample consists of Fortune 500 companies only. Adams and Ferreira (2009) study the labor market prospects of female directors. They find that the likelihood of a female director being appointed to the board increases if the board already has female board member.

Finally, this paper is related to the literature that applies insights from the two-sided matching theory to corporate finance. Fernando, Gatchev, and Spindt (2005) employ two-sided matching model to generate testable predictions for sorting patterns in the market for underwriting services. Sørensen (2007), Park (2008), and Pan (2010) estimate structural two-sided matching models of venture capital market, acquisition market in the mutual fund industry, and CEO-firm assignment, respectively. In this paper, I estimate a structural two-sided matching model of the director labor market; the underlying model and estimation technique used in this paper are different from the above.

The rest of this paper is organized as follows. Section 2 describes the institutional features of the director labor market, and lays out the two-sided matching model. In Section 3, the sources of data and empirical methodology used to estimate the model are discussed. Section 4 explains the main results, and Section 5 concludes.

2 The labor market for outside directors

2.1 Director selection

In a typical situation, a contact between a firm and director is initiated by a firm. To replace or recruit a new director, the firm's nominating committee identifies prospective candidates. This process is confidential, and normally happens either through current board member recommendations or through a hired executive search firm. After the list of prospects is narrowed down, the committee conducts interviews. Candidates either agree or decline the offer to be considered for the board. If someone agrees, their name is added to the proxy statement for shareholder approval. Although, nominated directors must get shareholder approval at the annual meeting, almost all nominated candidates get approved. Firms do not usually announce a director search. The names of the candidates who declined an invitation is not publicly known, and only final selections are announced.

2.2 A model of director-firm match

The market for outside directors is modeled as a two-sided matching game.[5] The version of the model developed here is a many-to-many extension of the original college admission problem. The main difference between the college admission model and the model discussed here is that directors can choose to be on the boards of multiple firms, likewise each firms chooses multiple directors to serve on its board. This section describes the preferences of agents on both sides of the market.

Consider a market where two disjoint sets of agents, directors and firms, are looking to match with each other. Denote by $\mathscr{C} = \{c_1, c_2, \ldots, c_K\}$ set of K firms in the market each having p_i, $i \in \{1, \ldots, K\}$ board sites to fill with outside directors. On the other side of the market are N directors $\mathscr{D} = \{d_1, d_2, \ldots, d_N\}$, each willing to work for q_i $i \in \{1, \ldots, N\}$ firms. Numbers p_i and q_i are firm and director quotas, respectively. Both types of agents in the model have complete preferences over the agents on the other side of the market. Every agent has a strict preference order over the agents on the other side of the market. Incomplete preferences can be accommodated but they are ruled out by the parametric approach I adopt in this paper. An agent prefers to be matched to some entity on the other side of the market than to be matched to fewer than the number of agents specified by their quota.

In a general many-to-many matching model, an agent may have preferences defined over subsets of the members of the other set (e.g., Roth, 1984; Echenique and Oviedo, 2006). There are two alternative simplifying assumptions most commonly used in the literature: (1) assume that agents on both sides of the market regard each other as substitutes, and (2) assume that agents have an upper limit on the number of partners they want to match with and specify preferences over singleton matches. The first approach yields that if a director is a desirable addition to the board with the current set of directors, then she continues to be so even amongst a less desirable subset of directors. Under this assumption many results developed for the one-to-one matching games have their counterparts for one-to-many and many-to-many situations (e.g., Roth, 1984). Although this approach maybe more appealing, this study employs second approach: define preferences over individual partners and assume

[5] See Roth and Sotomayor (1990) for extensive coverage of two-sided matching models. Recent applications of matching games in the finance literature include Fernando, Gatchev, and Spindt (2005), Sørensen (2007), Park (2008), and Pan (2010). Other applications can be found in the economics literature, for example Boyd, Lankford, Loeb, and Wyckoff (2003), Choo and Siow (2006), and Gordon and Knight (2009).

quotas on the number of partners agents want to match with. The main reason for doing this is computational tractability. The relatively high number of agents in the market and exponential nature of the preference function induces computational limitations if one wants to solve for equilibrium in this market.

Any search frictions and costs that a firm may incur while looking for a suitable candidate are assumed away.

2.2.1 Equilibrium matching

Consider a match formed by director d_i, $i \in \{1, \ldots, N\}$, and firm c_j $j \in \{1, \ldots, K\}$. Assume that the utility that director d_i gets from this match is $u(d_i, c_j)$, and assume that the firm's utility is $\pi(d_i, c_j)$. In the empirical implementation, these utilities are parametrized as functions of observable and unobservable firm and director attributes. Note that this study is not trying to answer the question of whether or not hiring this particular director is good for a firm or not from a shareholder prospective. Rather, I assume that director labor market functions well, and estimate preferences of those making hiring decisions within a firm. What is good for shareholders, might not be good for hiring committees, and vice versa.

To solve for the equilibrium in this model, I employ a concept that is usually used in two-sided matching models, a pair-wise stability. A matching is called stable if no pair of a director and a firm can break the current match and be strictly better off in the new match. In other words, matching is stable if reshuffling of pairs makes at least one agent (either firm or director) less happy than before. Formally, a match is defined as $\mu \subset M$, where $M = \mathscr{D} \times \mathscr{C}$, and $d_i = \mu(c_j)$ and $c_j = \mu(d_i)$ are partners in match μ. A feasibility of match μ would require that all directors and firms are matched with at most the number of partners as specified by their quota. An equilibrium matching μ in this case is characterized by the following set of inequalities:

$$
\begin{aligned}
&u(d_i, \mu(d_i)) \geq u(d_i, c_j) \text{ for all } c_j \in \{c_k | \pi(d_i, c_k) \geq \pi(\mu(c_k), c_k)\} \text{ for all } i \in \{1, \ldots, N\} \\
&\text{and} \\
&\pi(\mu(c_j), c_j) \geq \pi(d_i, c_j) \text{ for all } d_i \in \{d_k | u(d_k, c_j) \geq u(d_k, \mu(d_k))\} \text{ for all } j \in \{1, \ldots, K\}.
\end{aligned} \tag{1}
$$

This is equivalent to saying that equilibrium matching is such that:

$$\mathbf{1}\{u(d_i, \mu(d_i)) < u(d_i, c_j)\}\mathbf{1}\{\pi(\mu(c_j), c_j) < \pi(d_i, c_j)\} = 0 \tag{2}$$

for every director d_i and firm c_j that are not matched in the labor market; $\mathbf{1}\{\cdot\}$ denotes an indicator function.

The above stable matching, however, does not have to be unique. In fact, it is known that matching games of this type have a lattice of multiple equilibrium assignments. To solve the multiplicity problem further auxiliary assumptions need to be imposed or, alternatively, Gale and Shapley's (1962) algorithm can be used, which is known to produce stable matching. The drawback of this algorithm is that it depends on who starts to make offers first. For example, if firms start to make offers to directors, the algorithm gives one matching from the lattice of all possible ones, that is known to be firm-optimal. In this matching, firms get the best partners they can in any stable matching and every director gets the worst firm they can get in every stable matching. Alternatively, if directors move to make offers first, we will arrive to director-optimal stable matching, which is characterized similarly. As discussed in the beginning of this section, it seems reasonable to assume that firms make offers first, producing firm-optimal stable matching. Once this assumption has been made, the Gale-Shapley algorithm gives a unique stable matching in this market.[6]

The many-to-many variation of the original Gale-Shapley Deferred-Acceptance algorithm is used to compute the set of firm-optimal matches. A detailed description of the algorithm is provided in Section A.3. The algorithm works the following way. All firms make offers to their best candidates up to the number of director positions they need to fill. After directors receive the offers, they accept those that rank highly on their list of desirable firms, and reject the rest. Every director can accept at most the number of offers as specified by his or her quota. Firms whose offers were rejected make second round offers to their best prospects to whom they have not yet tendered an offer. They extend offers up to the number of slots they have left open. Directors who have received a better offer than the one they already accepted, resign from the board of their least attractive firm and accept the lucrative offer. A firm that has a

[6]Another reason why this assumption is reasonable is given in Hitsch, Hortacsu, and Ariely (2010). The authors use data on both desired and rejected matches to estimate preferences without using an equilibrium model. They then find that a calibrated models prediction fits observed matching behavior.

director resign goes back to the market to fill in the position. The process continues. At each round firms make offers up to the number of positions they have to fill. Directors act rationally and accept offers from firms that are better than their current ones. Gale and Shapley (1962) prove that this algorithm yields unique firm-optimal stable matching. Note that this algorithm appears to be quite similar to the actual workings of the labor market for outside directors as discussed in the beginning of this section.

Finally, equations (1) and (2) make it clear as to why it is not feasible to use conventional discrete choice models (probit or logit) to estimate the preferences of directors and firms. Recall that the standard assumption underlying the discrete choice model, written in the above terms, is $\mathbf{1}\{\pi(\mu(c_j), c_j) < \pi(d_i, c_j)\} = 0$ for all pairs (d_i, c_j) not matched, if we estimate which firm attributes drive director choices. The actual condition described here is much weaker in the sense that it is required to hold only for the partners that are potentially attainable. A logit regression would assume that director d_i prefers firm c_j to c_k and ignore that c_k might have simply been unattainable to d_i because there are better candidates available for c_k. This is apparent from equation (1). The matching model described here solves this selection problem.

2.2.2 Assumption of non-transferable utility

In the specification of the preferences, it is assumed that agent utility is non-transferable, and that the division of surplus is fixed prior to match formation. This means that the way the surplus is split between director and firm (shareholders) is predetermined regardless of the actual value of the match between the two.

While the literature on the estimation of matching games is relatively scarce, the majority of work assumes transferrable utility between the agents. An assumption of transferrable utility is convenient from an estimation standpoint. In a series of papers, Fox (2008) and Fox (2009) develops a computationally appealing estimation technique for matching games with transferrable utility. In the finance literature, Pan (2010) recently applies this estimation technique to estimate a CEO assignment model.

In the labor market for directors, an assumption of transferrable utility is restrictive. First, although the compensation of directors may vary on individual bases as discussed in Engel, Hayes, and Wang (2010), this does not constitute large enough magnitudes to consider that compensation alone equilibrates supply and demand in this market. While for the CEO labor market this might be a reasonable assumption, the outside director labor market is better described as a matching game without transfers. Also, in the director labor market non-pecuniary benefits, other than the compensation a firm offers, might play a significant role. Indeed, the connections of current directors might play a significant role (as shown below) in someone's decision to join the firm.

Finally, assuming transferable utility would make it impossible to separate the preferences of the directors from those of the firms. With transferrable utility, the matching function (utility of both agents combined) is estimated at the pair level. In contrast, the main goal of the paper is to identify how various factors separately affect the choices of firms and directors.[7]

3 Data and Empirical Model

3.1 Data

Data used in this paper comes from multiple sources. The main source of the data is International Responsibility Research Center (IRRC), now RiskMetrics, directors database, which documents directors' characteristics of all firms that were included in the S&P 1,500 index during the years 1996-2009. To obtain additional background information on directors (including education, legal and banking expertise, and compensation), this dataset is merged with BoardEx and Execucomp using each director's name and year of birth. A new director appointment is determined from the IRRC files that document when a director was first appointed. Appointments made prior to 1996 are observed; they are not included in the sample because this information is not complete. Not everyone appointed as director prior to 1996 survives until 1996 and further. Only appointments of outside directors that are not affiliated with the company at the time of appointment are considered. Additional firm accounting information was obtained from Compustat. Finally, stock return information comes from Center for Research in Security Prices (CRSP). Table I gives detailed definition of variables used in this paper.

Firms that appointed more than three directors in a single year were deleted. These firms most likely suffered from a corporate control event. Small firms with total assets under $25 million were also deleted, as were firms with board size less than three members. The final

[7]Other papers that estimate games without transfers include Sørensen (2007), who estimates a two-sided matching model of venture capital industry, and Park (2008), who estimates a merger model of the mutual fund industry.

sample consists of 26,618 unique directors and 1,852 unique firms. Sample distribution by year is given in Table II. There are approximately 1,000 outside director appointments annually. The average director holds about 1.54 directorships, but there is a clear downward trend and towards the end of the sample period directors on average sit on 1.22 boards. Table III gives year-by-year distribution of new appointments across firms and directors. Since firms that have appointed more than 3 outside directors per year are removed from the sample, the maximum possible number of appointments per year per firm is three. On average about 5% of the firms appoint three outside directors. The overwhelming majority of firms appoint one director per year, if they appoint at all. On the director side, the majority of directors accept only one new directorship per calendar year, with only a few accepting as many as four positions a year. The numbers in this Table serve as "quotas" described in the previous section.

Descriptive statistics for the key variables are given in Table IV. Panel A documents the distribution of director and firm characteristics. The sample has 7.4% CEO directors, which is roughly similar to the samples used in other studies (e.g., Fahlenbrach, Low, and Stulz, 2010). The percentage of directors who are currently executives (but not CEOs) of listed companies is about 12%; the remaining 80% come from either executive positions in the firms that I do not observe (or retirees), or from different backgrounds (consulting, law firms, academicians). Directors with legal (8%) and financial (12%) expertise are identified in the sample, although academicians are not. These directors play important role on the board of directors, and as suggested by Linck, Netter, and Yang (2009) post-SOX demand for them is much higher. To follow recent literature on boardroom diversity, a female director dummy is included in the analysis. While there is no conclusive evidence on the value of female directors in the boardroom, the appointing committees might have gender preferences (e.g., Ahern and Dittmar, 2011; Adams and Ferreira, 2009). Female directors compose 7% of the sample. A dummy is also included for an attendance problem. Directors who are characterized as having an attendance problem attend less than 75% of meetings in a given year. The average board member is 60 years old and has two directorships. Finally, the median distance between a director's permanent location and the headquarters of the firm is about 150 miles.

There are three distinct measures of a director's location in the network of directors. These measures are dynamic and change when directors accept new positions, hence they are recalculated annually. Table IV Panel A shows that an average director in the network has 22 *degrees*.

I define network measures in greater detail in the next section, and provide intuitive meaning here. *Degrees* measures the number of unique connections a director has in the network through his employment history.[8] Hence an average director is connected to 22 other directors in the network. *Closeness* measures how central a director's position is in the network. A central director can reach other directors through a minimal number of connections, and hence is better located in the network. The mean value of the closeness in the sample is around 2. The *betweenness* measure is based on the viewpoint of an intermediary director who is positioned between other directors. The higher the number, the higher is the chance that valuable information in the network flows through a director who is located between the others. An average director's betweenness is 0.2.

Panel B of Table IV shows the correlation between measures of skill and connectedness of directors. Although all three measures of a director's position in the network are highly correlated, they measure a director's connectedness from different angles. Following Perez-Gonzalez (2006) and Falato, Li, and Milbourn (2010), two measures are used that may potentially capture director skill. The first one, *Selective College*, is based on the selectivity of the undergraduate institution the director attended (from BoardEx). If attending a selective college provides a valuable signal of ability (e.g., Spence, 1974), then those directors who hold this signal should be expected to have higher ability. As a result, appointments of directors who attended selective colleges may signal that appointing committees hire directors based on merit, or at least their ability to think creatively. Barron's *Profiles of American Colleges* is used to identify which colleges are selective. Directors are sorted into two groups: the ones that attended a selective college, and those who did not. Barron's ranks colleges on the scale of 1 to 6, with the first three being "most competitive," "highly competitive," and "very competitive." Directors who attended colleges in one of these categories are assigned into *Selective College* group. The second measure, *Fast-track career*, is the age at which a director got his first board seat. The sample is divided into three age cohorts, and the variable is defined as the difference between the age at which an individual accepted the first board position and the median age at which his cohorts got their first position. This measure might be less reliable as the full employment history of directors is not observed, hence this measure is probably biased upwards for some directors.

[8] It is possible to provide a broader definition of the network, which would also include executives. However, since executive mobility is quite rare, and executives cannot hold multiple positions at the same time, it is assumed adding executives would not alter director network measures.

Both measures of skill are correlated with network measures, but the correlation is weak. This suggests that either network measures do not capture a director's skill, or they capture different aspects of a director's talent. Both of the skill measures are noisy.

Table IV also provides descriptive statistics for firm characteristics. Three measures are used to proxy for the strength of corporate governance: the GIM Index of antitakeover defense from Gompers, Ishii, and Metrick (2003), the proportion of independent directors, and a CEO's ownership stake in the firm.

3.2 Estimation methodology

In every period $t = 1, \dots, T$, matched pairs of directors and firms are observed. In the empirical implementation, firm and director utilities are parametrized by $u(d_{it}, c_{jt}) = U(X_{d_{it}}, X_{c_{jt}}; \theta_d) + \epsilon_{ijt}$ and $\pi(d_{it}, c_{jt}) = \Pi(X_{d_{it}}, X_{c_{jt}}; \theta_c) + \eta_{ijt}$, where vectors $X_{d_{it}}$ and $X_{c_{jt}}$ represent observable director and firm characteristics at time t, respectively. For simplicity, attributes of director i matched with firm c_{kt} at time t are collected in d_{k_it}. Firm attributes are collected in vector c_{kt}.[9]

Given particular functional forms of $U(\cdot)$ and $\Pi(\cdot)$, parameter values $\theta = (\theta_d, \theta_c)$, and realizations of error terms ϵ_{ijt} and η_{ijt}, the Gale-Shapley algorithm produces stable unique equilibrium in this labor market, and hence the expected value of director d_{k_it} attributes who works for firm c_{kt}: $\mathbb{E}[d_{k_it}|c_{kt}; \theta]$. For the true value of parameter θ, the difference in attributes of a director who actually sits on the board of firm c_{kt} and expected is zero in expectation. This gives the main moment conditions used in estimation:

$$\mathbb{E}\big[d_{k_it} - \mathbb{E}[d_{k_it}|c_{kt}; \theta]\big|c_{kt}\big] = 0. \tag{3}$$

The Appendix shows that sample counterpart to the above moment condition is:

$$\sum_{t=1}^{T}\sum_{k=1}^{K} c_{kt}p_{kt}\big(\bar{d}_{kt} - \mathbb{E}[\bar{d}_{kt}|c_{kt}; \theta]\big) = 0, \tag{4}$$

where $\bar{d}_{kt} = 1/p_{kt}\sum_{i=1}^{p_{kt}} d_{k_it}$, and p_{kt} are quotas on the number of outside directors firm c_{kt} wants to hire at time t.

The main obstacle comes from the fact that $\mathbb{E}[\bar{d}_{kt}|c_{kt}; \theta]$ is not easily estimable. A standard

[9] More details on the structure of the data are in Appendix.

parametric approach to estimate it, would be to write down a likelihood function that gives the probability that the observed set of matches is part of the stable equilibrium as defined above, conditional on the observed characteristics of agents in this game. In practice it is impossible to derive a closed-form expression for the likelihood of observing any particular director-firm match. As noted in Berry (1992), not only would integrals have extremely high dimensions, but the integration regions may be quite complex, which makes this problem even more difficult than the original in McFadden (1989). To circumvent this problem, the simulated method of moments (SMM) developed by Pakes and Pollard (1989) and McFadden (1989), and recently applied in the financial literature by Hennessy and Whited (2005), is used.[10]

Equation (4) makes it clear which moments to choose for estimation. The details of the estimation procedure are given in the Appendix. The weighting matrix is set equal to the efficient weighting matrix, which is the inverse of the estimated covariance of the moments.

3.3 Empirical specification and hypotheses development

Hypotheses are developed in this section on which factors are relevant for firms and directors when they choose each other. In general, the latent utility of a director d_i sitting on board of firm c_j is parametrized as:

$$\begin{aligned} u(d_i, c_j) &= U(X_{d_i}, X_{c_j}; \theta_d) + \epsilon_{ij} \\ &= X'_{c_j}\beta_d + (X'_{d_i}\Gamma X_{c_j})'\gamma_d + \epsilon_{ij}. \end{aligned}$$

The first component of utility is a simple linear valuation of the firm's attributes. The second allows for interaction terms. Note that director attributes cannot enter director's utility if they are not interacted with firm attributes. Since director's own attributes do not impact his ranking of alternatives, coefficients γ_d will not be identified.

Similar specifications are defined for a firm's utilities. Throughout estimation, error terms ϵ_{ij} and η_{ij} are drawn from standard normal distribution. This makes it possible to compare the importance of certain attributes for firms and directors. In general, note that it is impossible to identify all parameters in the unrestricted covariance matrix of the error term. At least one of the elements must be constrained. This is reminiscent of the corresponding result from the

[10]See Sørensen (2007) and Park (2008) for Bayesian alternatives.

regular random utility models.

Below I discuss factors that influence firms' and directors' choices.

3.3.1 Hypothesis development

Lorsch and MacIver (1989) note that since being a director is a prestigious job that provides valuable learning opportunities, a large pool of people is willing to take on the job. About 80% of all current directors say that they are willing to serve on an additional board. Table *X* reproduces survey results from Lorsch and MacIver (1989) where directors state their primary reasons for either joining or refusing to join a board. These results are very illustrative. I will discuss them in greater details in the next section.

Below I discuss factors that influence directors' decisions. They serve as a basis for my empirical specifications in the next section.

Firm characteristics. Various firm characteristics can influence a director's decision to join the firm. Scale measures, such as assets, number of employees, and sales are important factors as they proxy for firm size, and hence can potentially can be regraded as very prestigious firms for director to be associated with. In particular, an S&P500 indicator variable is used to identify the prestigious firms. As Linck, Netter, and Yang (2008) suggests, larger firms have more significant agency problems, and hence their board of directors must work harder to monitor management to assess whether their decisions are aligned with the interests of the shareholders. Directors who take on more difficult jobs can establish their reputations as decision control experts and will be perceived by others as more skilled because of the size and complexity of the operations they oversee.[11] Further, as suggested by Fama (1980), directors gain a reputation as good monitors only if they are noticed in the job. That is, directors have to be visible to peers and other firms. More complex and larger firms are more visible in the marketplace because of their size. Larger firms have a greater number of buyers, suppliers, and partners that result in increased external exposure. For the directors, this exposure affords them the opportunity to build their reputation.

Compensation. There are relatively few studies of board compensation, compared to large literature on executive compensation. Most of the existing research focuses on the determinants of director compensation (such as firm size, etc.) rather than the effects of compensation on

[11]See also Ferris, Jagannathan, and Pritchard (2003) for a similar discussion.

director behavior. A notable exception is Adams and Ferreira (2008), who show that higher meeting fees (which are often around $1,000) increase meeting attendance rates by directors. Since directors respond to financial incentives, it would be interesting to see if compensation influences their decision to join a board. A survey conducted by Lorsch and MacIver (1989) shows that directors rank compensation eighth among the factors that they take into consideration when deciding to join a board or not.

Networking. In addition to direct financial incentives, an important benefit of serving on the board is being associated with the other board members. Hence it is reasonable to argue that when considering whether to serve on a board, a candidate will assess the status of the other board members. A board with a greater number of high-status directors offers two advantages to a potential director: being associated with both the firm and the board members. In general, it is not clear how to measure the social status of a director. Although there are multiple alternatives, this study uses the network measures recently applied in finance literature (e.g., Carhart, 1997; Hochberg, Ljungqvist, and Lu, 2007). Three measures are used to capture director connectedness: degree, closeness, and betweenness. When someone is considering whether to join a particular firm, the individual considers their potential improvement in these three measures.

For the *degree* measure, the director's degree centrality can be determined by the number of their ties with other directors in the network. These ties are measured from the observed employment history as a corporate director. For example, if director serves (or served in the past) on three boards each with five different non-overlapping directors, the degree will be 15.[12] The intuition behind degree centrality is that directors "well connected" – in terms of having many relations – in their local environment will have access to many alternative sources of information, resources, and so forth.

The *closeness* measure is a director's ability to access independently all other members of the network. One can measure a director's closeness centrality by summing the lengths of the shortest paths from the individual to all other actors. The most central directors have the shortest aggregate distances to all other directors. A central director can reach other directors through a minimum number of intermediary positions and is therefore dependent on fewer

[12]This measure of course will be highly correlated with a simple measure of how many boards a director was part of, but the measures are not identical. Serving on the board of a firm with ten other directors, according to this measure, will be as good as serving on two boards with five non-overlapping directors each.

intermediary positions than the peripheral directors. A director with a low closeness centrality is highly dependent on others to access other regions of the network. Accordingly, closeness centrality measures a director's independent access to different points in the network. When a director is "close" to all the others, the individual can access information quickly throughout the network. The "close" position in the network can be highly beneficial for a director who is concerned about his future career.

The *betweenness* centrality measure is similar to the closeness measure since both consider access to other directors, but it is based on the viewpoint of an intermediary director who is positioned between other agents, rather than from the standpoint of the "sending" and "receiving" agents who must form exchanges via third parties. Betweenness centrality measures the frequency with which an actor falls on the paths between pairs of other agents. It is possible to interpret betweenness as the extent to which an agent has control over other agents' access to various regions of the network. Whereas closeness centrality indicates an agent's degree of independence (the ability to access other nodes through the least number of intermediaries), betweenness centrality captures an agent's ability to control others. Agents with high betweenness centrality are brokers or gatekeepers in the sense that they facilitate exchanges between less central agents.

Each centrality measure attempts to identify directors occupying important or prominent positions from which they can get an access to other directors, but each measure describes and measures a different property of a director's location. Also, note that degree, closeness, and betweenness centrality do not always produce similar rankings. For every year, a previous employment history of directors is used to create an adjacency matrix, which is used to calculate the degree, closeness, and betweenness measures.

Distance. Directors are typically busy individuals with high opportunity costs thus they may prefer to join a firm that is close to their home to minimize travel time. I use a measure of distance between a firm's headquarters and the director's location. Current location is inferred from the current permanent job (ZIP Code), if this information is available; if it is not the distance between a director and all firms in the sample is equalized so that distance is not a factor in the decision to join a firm. In cases where the director's location is identifiable, the ZIP code of both the potential employer and the director are used to measure the distance between them. Latitude and longitude data were obtained from the U.S. Census Bureau's Gazetteer

Place and ZIP Code Database. The method described in Coval and Moskowitz (1999) is used to compute the distance between the two locations.

Distance, however, may not only be measuring the opportunity cost of director's time, rather it may be measuring potential social networking. For example, it may be important for directors to live geographically in the same area where they can join the same country clubs, and attend the same social events with firm's management. This question is investigated by considering piece-wise splines in the empirical specification. The idea is that, once the distance between a firm headquarter's and a director's location is greater than, say 300 miles, they probably have to travel by air. At that point, there is no difference between a firm located 300 miles away, or 1,000 miles away. This discussion is continued in the next section.

4 Results

This section lays out main results of the paper. The model is estimated on the full sample first, and then on two subsamples. Since CEOs and other executives are widely acknowledged to be the most desirable candidates for the board position, I estimate the model on separate subsamples of executives, excluding CEOs, and CEOs only.

I start by estimating a logit model that examines a firm's choice of directors under an assumption of unilateral choice. This model does not take into account a director's preferences and interdependence of choices. In general, the model does a good job explaining firms' choices, albeit produces biased estimates that are numerically different from the estimates obtained from the structural model below. Firms value a director's executive experience. For example, being CEO increases your chances of getting extra sit by 2.7%. Average stock return of firms where director serves on board is positively related to director's ability of getting new assignments. Networking measures are economically insignificant, and betweenness has counter-intuitive sign.

Next I estimate the two-sided matching model. I start by estimating the model that does not take into account firms' and directors' preferences for expanding their connections network. The goal is to capture preferences that agents' might have in an efficient labor market. It is possible that network measures may also reflect director skills, especially in industries like defense. For example, the ability of a director to obtain a valuable contract might be a valuable skill from the shareholders' perspective. However, network measures that quantify different types of skills may be orthogonal to other, more common measures of skill. Table VII presents the results.

The results in Table VII should be interpreted in terms of utilities of appointing committees and directors. The easiest way to interpret them is to consider what offsetting changes in the variables of interest would keep utility constant. The estimation in all four models is based on the moments that enter $\sum_{t=1}^{T}\sum_{k=1}^{K} c_{kt} p_{kt}\big(\bar{d}_{kt} - \mathbb{E}[\bar{d}_{kt}|c_{kt};\theta]\big)$. For example, for model (1) variables that enter c_{kt} are log(*assets*), log(*compensation*), *ROA*, and *ROE*; the variables that enter d_{kt} are *CEO* indicator, *Executive* indicator, *Selective College*, and *Fast-track*. Interacting these variables gives 16 moments. *Distance* enters separately and is not interacted with the other variables, because unlike other variables, interacted moments of variables that vary across both firms and directors are not zero. Hence, the model (1) estimation is based on 17 moments in total. The moment conditions for the other models are constructed similarly. There are 18 moments in model (2); 22 and 25 in models (3) and (4), respectively. Below I discuss estimation results for firms' and directors' preferences in turn.

4.1 Appointing firm's preferences

First, I discuss the characteristics firms are looking for in new directors. My discussion is based on model (2). Survey results from Mace (1986) and Lorsch and MacIver (1989) indicate that CEOs are the most desired board members. Although Fahlenbrach, Low, and Stulz (2010) do not find that CEO directors create value for shareholders the results in the current paper confirm that firms go after CEO directors. In fact, CEOs are three times as valuable in the eyes of employers as directors who attended a selective college. The findings also indicate that other top executives (apart from chief executives) are also sought after as board candidates. Albeit, all else equal, CEOs are in much higher demand compared to other executives.

Selectivity of college that a director attended is also a significant determinant of appointing committees choices. If selectivity of college proxies for director skill, then firms are indeed looking for talent when they seek directors. Indeed, Perez-Gonzalez (2006) finds that CEOs who attended better colleges perform better.

Another variable that is intended to capture a director's skill, fast-track career, measures how early a director received the first board appointment compared to other directors in the sample. This measure was used by Falato, Li, and Milbourn (2010), who find that it does capture certain aspects of a CEO's skills. However, the findings in the current study indicate that this measure does not capture directors' skills as it does for CEOs. This variable is noisy because the structure of my sample does not allow accurate determination of determination of when directors began their careers.

The number of directorships is an important factor in assessing director candidates. Although, there is no clear evidence on whether busy directors are detrimental or beneficial to firm value (e.g., Fich and Shivdasani, 2006; Field, Lowry, and Mkrtchyan, 2011), appointing committees have clear preferences for busy directors. Since busyness is also highly correlated with network measures, this result is discussed in greater detail below. A non-CEO director with two extra board seats is as desirable a candidate as a CEO director.

Distance also plays a significant role in firm's decision to hire director. It is a surprising result because appointing committees probably do not take into consideration how much they would pay for a director's commute. Distance, however, may be measuring how important it is for the board that a new director is located nearby. In this case, they can attend the same events, and build stronger relationships. This interpretation assumes that other board members are located close to the headquarters as well. On the other hand, if the process of appointing new directors is controlled by the CEO, this interpretation follows through.

The age of a director does not seem to affect a firm's decision, which is surprising given the evidence in Lorsch and MacIver (1989). These authors suggest that firms looking for a long-term appointment of directors and age should be inversely related to firms' willingness to appoint a person.

Observed meeting attendance problems in the other firms does not weigh in negatively on a firm's decision to hire a director. Interestingly, there is a negative willingness to hire a female board member. Ahern and Dittmar (2011) find that instituting mandatory gender quotas in the boardroom has significant adverse consequences for firm value. Their result, however, comes from an inadequate pool of female candidates with comparable characteristics to male directors. The current study examines the problem from a different angle. Appointing committees are apparently hesitating to hire female directors.[13]

Finally, banking and legal expertise is not particularly valuable in the eyes of appointing committees. Although this may contradict the requirements of SOX (e.g., Linck, Netter, and Yang, 2009), this result may come from two sources. First, my sample contains pre-SOX years.

[13]No distinction is made between boards that already have female members. The result may be coming from those boards where all the directors are male. It is possible to distinguish between the two in the analysis.

Second, the model specifications do not control for whether current board members already include lawyers and bankers.

4.2 Directors' preferences

In general, directors' choices are explained by compensation, size of the firm, and distance to the firm's headquarters. All of these variables have the right sign. One may argue that compensation, along with prestige, should be important in a director's decision. Yet, as Black, Cheffins, and Klausner (2006) put it: "Outside directors aren't in it for the money, or so they say." Table X reproduces a corresponding table from Lorsch and MacIver (1989). Indeed, compensation ranks next to last in a director's decision to accept an offer. The results suggest that compensation is important. When compared to firm size, which in turn may proxy for prestige that a director gets from serving on the board of a larger company, an increase in compensation is almost as important as serving on a board of a bigger company.[14] Although director compensation and firm size are strongly correlated in the data, this result is instructive in a sense that firms looking to hire better directors may lure them in with higher compensation.

Another important variable is the distance between a director's home and firm's headquarters. Referring to Table X, directors indicate that the main reason to refuse a board seat is lack of time. Hence proximity should play an important role. Indeed, the average director's disutility from a 10% increase in distance is worth approximately a 5% increase in pay. Taken at the mean, these numbers imply that average director is indifferent between commuting an extra 40 miles and an extra $16,000 in compensation. Of course, this effect may not be linear. In fact, one can argue that there are certain thresholds. For example, when a director has to commute by air. The other thresholds may have a regional explanation. This non-linearity may be of interest to explore.[15] Distance may also proxy for a director's networking preferences. Being closer to the company's location means more frequent interactions with management, or other board members.

Although operating performance measures do not seem important, stock return and return volatility do seem to play role. Interestingly, volatility seems to cause discomfort. A 10%

[14] In an unreported results, an attempt was made to isolate the prestige of the firm using S&P500 dummy. The results are similar. Directors view serving on board of a more prestigious firm and compensation as substitutes.

[15] For example, there are few observations in the sample where directors are located on the East Coast, but serves on the board of a company located on the West Coast. For more evidence on the effect of location on the board structure, see Knyazeva, Knyazeva, and Masulis (2011).

increase in stock volatility would be offset by a 15% increase in compensation, which taken at the mean is about $25,000. This result, taken together with negative coefficient on R&D intensity, implies a director's preferences for a quiet life, not challenge as director from their stated preferences in Table X. This result is reminiscent of Bertrand and Mullainathan (2003) – not only managers but also directors prefer a quiet life.

A 3% annual increase in stock price performance over the last two years makes a potential employer as good as getting an extra 10% in compensation. Although surprising, these numbers might well be in line with evidence in Adams and Ferreira (2008), who suggest that even as little as $1,000 has an impact on director's attendance records. Sales growth is also an important factor in a director's decision. This is consistent with directors looking for company's growth potential when they make decisions to join a board. Finally, none of the variables that proxy for the strength of corporate governance significantly enter a director's preference equation.

4.3 Network effects

Next I incorporate network measures in my analysis. Table VII reports the results. Changes in network measures show the expected gain in network position from joining a particular firm. For example, if a director joins a company with nine directors, and did not have a prior employment history with any of them, the director's $\Delta Degree$ is 9. The closeness and betweenness measures indicate how a director's position will improve in the network. In particular, consider a director who is currently located on the outskirts of the network. Joining a firm where some of the directors are centrally located greatly improves the director's position in the network. Moreover, even if all the directors in the new network are located on the outskirts, but not close to the director's position, it would still significantly improve the director's position. Hence, the changes in closeness and betweenness capture potential gain differently than *degree*.

For firms' preferences, both plain measures of director connectedness and changes in the connectedness measures that board members gain from appointing a new director are examined. The conceptual difference between the two is that while plain network measures might be measuring *what is good for firm's shareholders* (i.e., well-connected new director who brings in new contracts), changes in the measures would indicate how much positions of the current board members would improve. The two are not the same, and the latter may or may not be in shareholders' best interests. To keep estimation tractable, only the most important variables from previous table are considered.

The results are striking. In the horse-race between the measures of skill and connectedness, the latter seem to have more impact. While interpreting the *degree* measure is relatively straightforward, interpretation of connectedness and betweenness is not. A particular numerical gain in the measure does not carry much information. Hence, the results are interpreted in terms of gaining position in the distribution of director population. For example, specification (1) implies that directors value 5 percentile rank increase in the population on the closeness measure as much as \$26,000 increase in their compensation. The test of over-identifying restrictions rejects the specification in model (1). In model (2), a gain of 1 in the *degree* measure makes a director as happy as a 2.5% increase in compensation, which is negligible. This is not surprising as there is no significant heterogeneity in board size across firms, and the gain in this measure across firms is quite uniform. More interestingly, for measures of position in the network, the results are more significant.

One may suspect that the above results may vary across directors. Indeed, there is a great deal of heterogeneity among firms and directors that is not captured by the variables used in the analysis. For example, maybe firms with better corporate governance, or firms in which CEOs have a higher stake in the company are hiring directors based on merit. Or maybe directors' networking considerations diminish with age, and older directors no longer stress the importance of network position in their choices. I explore this possibilities next. A 5 percentile increase in the closeness rank is as good as extra \$30,000 in compensation, evaluated at the mean. For firms, the self-serving motives of nominating committees are more important. For example, the firm values their own 5 percentile increase in the closeness as much as attracting a board member who is 20-percentile more connected. This means that the appointing committee may forgo a very valuable addition to the board if it at least slightly increases their own connectedness. Likewise, a director who attended selective college is as valuable to them as a director who attended less selective college but brings in 1 percentile extra to their closeness. This is significant given our understanding that selectivity of college brings significant value to the shareholders.

One way to explore the heterogeneity in the network measures is to use a random coefficient model. In particular, the coefficient on $\Delta Closeness$ in specification (2) is assumed to vary across firms. Let this coefficient, θ_j^c be distributed log-normally across firms with the mean and standard deviation for the corresponding normal density $\mu+\beta F_j$ and σ, respectively. Parameters

μ, β, and σ will be estimated. Here F_j is a firm's characteristic that may induce different preferences for the networking concerns. Three proxies for the strength of corporate governance were examined: GIM Index of takeover defense from Gompers, Ishii, and Metrick (2003), the percentage of CEO ownership of the firm, and the proportion of independent directors on the board.

Although the GIM Index and the proportion of independent directors do not yield significant results, the percentage of CEO ownership seems to be important. The results of the estimation are in specification (3) of Table VII. Note that when $\beta = \sigma = 0$, specification (3) reduces to specification (2). Estimation of specification (3) yields highly significant results. A negative coefficient on beta suggest that the higher a CEO's ownership stake in the firm, the less appointing committees recruit directors that benefit them personally. These results are economically significant. An unreported analysis examines similar heterogeneity on the director's side. Indeed, one may suspect that not all directors are equally likely to be concentrated on building their social connections. The findings indicate that some of them indeed might be in it for the challenge. Directors that are closer to retirement are less concerned with building their network. Other attributes, for example compensation, are of greater importance.

4.4 Executive and CEO Directors

Table VIII reports results from estimation on the subsample of CEO directors. The first major difference from the above results come from the little weight CEO directors put on expanding their network in deciding to accept director seat. For them, however, it is much more important how the firm performed recently. This may explain certification conjecture addressed in Fahlenbrach, Low, and Stulz (2010): markets seem to react favorably on the news of a CEO director appointment. The findings in the current study suggest that CEO directors are less driven by external factors and put more weight on firm quality when deciding to join a firm. Hence, in deciding to join, a CEO provides external certification of the firm's quality.

On the demand side, performance does not affect a CEO's prospects in the labor market, unless this performance is extreme. This is evident from model (2). The main measure of performance I use is the average annual stock return in the two-year period prior to the appointment. A piece-wise linear specification with the break points at 1st and 10th decile of the distribution of stock returns is used. More precisely, I define variable RET^+ as $RET_{t-3,t-1}$ if it is in the top

10% of the distribution, and 0 otherwise; RET^0 is $RET_{t-3,t-1}$ if $RET_{t-3,t-1}$ is not in the top and bottom decile, and 0 otherwise; and RET^- is $RET_{t-3,t-1}$ if it is in the bottom decile, and 0 otherwise. The networking measure, Δ Closeness, remains significant.

Table IX reports results from estimation on the subsample of executives, excluding CEOs. The preferences of executive directors are in line with the previous results. Some measures, for example compensation, have higher weight in their preferences. Interestingly, on the firm's side, none of the performance measures are significant. This suggests that appointing committees do not take into account any measures of candidate's firm performance when making appointment decisions. One interpretation of the results is that still networking considerations are more important for appointing committees. Alternatively, the marketplace may not hold executives for own firm performance unless they are CEOs.

5 Conclusion

This paper examines the preferences of firms and directors for each other using a two-sided matching model. The matching model provides convenient way to control for selection issues when estimating preferences on both sides of the market. Traditional discrete-choice models are not suitable alternatives for the question at hand. This study examines the importance of director expertise, skills, and network connections in the eyes of the appointing committees. This provides a unique opportunity to understand what drives a firm's choices and to evaluate them from the perspective of shareholders. Although there is evidence that a firm's appointing committees value skill when making their hiring decisions, the effect of network building is much more economically significant. This points out the self-serving motives of those who nominate directors. Only few things can mitigate this behavior. In particular, if a CEO holds a larger stake at the firm, these firms have more meritocratic hiring practices.

The results in the paper are robust to an alternative matching algorithm that departs from firm-optimal unique stable allocation, and chooses a unique match from the lattice based on egalitarian criterion.

Overall, the results indicate the limiting role that the external labor market plays in shaping internal agency conflicts at the firm. This notion supports a recent trend towards more incentive-based compensation for directors, as documented in Linck, Netter, and Yang (2009). Further, the structurally-motivated model presented in this paper provides a unique opportunity to run counterfactual experiments that can shed light on the resulting equilibrium allocation of directors across firms if either preferences change, or underlying distributions shift. For example, if CEOs are more reluctant to participate in the director market following institution of SOX, or the government mandates gender quotas in the boardroom, which recently happened in several European countries. Finally, since the sample covers both the pre- and post-SOX era, it may be instructive to estimate the model on two time periods. These questions are left for future research.

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A Details of the estimation procedure

A.1 The choice of moment conditions

For every period t we observe realized matches between firms and directors. Collect all firm-related characteristics in c_{kt} and all director-related attributes in d_{kt}. For example, variables in c_{kt} will be variables like firm size, return on assets, all variables that may play role in director's evaluation of potential employer. Variables in d_{kt} on the other hand will contain director personal characteristics, for example age, employment history, etc. We can sort observed data either by firm (shown in Table A.1), or director (shown in Table A.2)[16]:

d_{1_1}	c_1
d_{1_2}	c_1
$\dots$	$\dots$
$d_{1_{p_1}}$	c_1
d_{2_1}	c_2
$\dots$	$\dots$
$d_{2_{p_2}}$	c_2
$\dots$	$\dots$
d_{K_1}	c_K
$\dots$	$\dots$
$d_{K_{p_K}}$	c_K

Table A.1: Sorted by firm

c_{1_1}	d_1
c_{1_2}	d_1
$\dots$	$\dots$
$c_{1_{q_1}}$	d_1
c_{2_1}	d_2
$\dots$	$\dots$
$c_{2_{q_2}}$	d_2
$\dots$	$\dots$
c_{N_1}	d_N
$\dots$	$\dots$
$c_{N_{q_N}}$	d_N

Table A.2: Sorted by director

Every firm c_k above has p_k outside directors, with $k \in \{1, \dots, K\}$, and every director d_n sits on q_n boards, $n \in \{1, \dots, N\}$.

Suppose we have the structure given in Table A.1. Then the moment conditions can be written as

$$\mathbb{E}\big[d_{k_i t} - \mathbb{E}[d_{k_i t}|c_{kt};\theta]\big|c_{kt}\big] = 0,$$

i.e. the difference between observable (actual) attributes of director i working for firm k at time t and model-implied ones is equal to zero under true parameter value θ. This conditional expectation can be written as

$$\mathbb{E}\big[g(c_{kt})\big(d_{k_i t} - \mathbb{E}[d_{k_i t}|c_{kt};\theta]\big)\big] = 0$$

for some function $g(\cdot)$. In the practical implementation I am only using moments

$$\mathbb{E}\big[c_{kt}\big(d_{k_i t} - \mathbb{E}[d_{k_i t}|c_{kt};\theta]\big)\big] = 0.$$

Sample analogue of the above expression is

$$\sum_{t=1}^{T}\sum_{k=1}^{K} c_{kt} \sum_{i=1}^{p_{kt}} \Big(d_{k_i t} - \mathbb{E}[d_{k_i t}|c_{kt};\theta]\Big) = 0,$$

or if we denote $\bar{d}_{kt} = 1/p_{kt}\sum_{i=1}^{p_{kt}} d_{k_i t}$, it can be written as

$$\sum_{t=1}^{T}\sum_{k=1}^{K} c_{kt} p_{kt}\big(\bar{d}_{kt} - \mathbb{E}[\bar{d}_{kt}|c_{kt};\theta]\big) = 0 \tag{5}$$

[16] I omit t index to simplify notation.

Note that for for variables in d_{kt} that do not vary with firm, i.e. age, prior employment record, $\sum_{t=1}^{T}\sum_{k=1}^{K}\left(\bar{d}_{kt}-\mathbb{E}[\bar{d}_{kt}|c_{kt};\theta]\right)=0$ for any value of parameter θ. For other characteristics that do vary across potential employers, i.e. distance from current director's location to the firm headquarters and network measures I use, $\sum_{t=1}^{T}\sum_{k=1}^{K}\left(\bar{d}_{kt}-\mathbb{E}[\bar{d}_{kt}|c_{kt};\theta]\right)$ is not necessarily zero. For such variables, I am using both $\sum_{t=1}^{T}\sum_{k=1}^{K}\left(\bar{d}_{kt}-\mathbb{E}[\bar{d}_{kt}|c_{kt};\theta]\right)$ and $\sum_{t=1}^{T}\sum_{k=1}^{K}c_{kt}\left(\bar{d}_{kt}-\mathbb{E}[\bar{d}_{kt}|c_{kt};\theta]\right)$ in the empirical implementation.

Note that due to symmetrical structure of the problem, structure in Table A.2 will give us moments

$$\sum_{t=1}^{T}\sum_{n=1}^{N}d_{nt}q_{nt}\left(\bar{c}_{nt}-\mathbb{E}[\bar{c}_{nt}|d_{nt};\theta]\right)=0. \tag{6}$$

It can be shown that for any value of parameter θ expression in equation (5) and (6) will be numerically identical to each other. Hence, I only work with moments (5).

Also note that

$$\sum_{k=1}^{K}p_{kt}=\sum_{n=1}^{N}q_{nt}$$

holds for every t.

A.2 Estimation of parameters

As discussed in text, we can not obtain analytical expression for $\mathbb{E}[\bar{d}_{kt}|c_{kt};\theta]$, hence I resort to simulation techniques to compute it.

First, recall that our utility functions are parametrized by $u(d_{it},c_{jt})=U(X_{d_{it}},X_{c_{jt}};\theta_d)+\epsilon_{ijt}$ and $\pi(d_{it},c_{jt})=\Pi(X_{d_{it}},X_{c_{jt}};\theta_c)+\eta_{ijt}$, where vectors $X_{d_{it}}$ and $X_{c_{jt}}$ represent observable director and firm characteristics at time t, respectively. For a given $\theta=(\theta_d,\theta_c)$, I draw S samples of random components ϵ^s_{ijt} and η^s_{ijt} from standard normal distribution.[17] This gives me firm's ranking of directors, and director's ranking of firms, that can be represented by the following matrices:

	$\mathbf{d}_1$	$\cdots$	$\mathbf{d}_N$
$\mathbf{c}_1$:	r^c_{11}	$\cdots$	r^c_{1N}
$\mathbf{c}_2$:	r^c_{21}	$\cdots$	r^c_{2N}
$\cdots$	$\cdots$	$\cdots$	$\cdots$
$\mathbf{c}_K$:	r^c_{K1}	$\cdots$	r^c_{KN}

Table A.3: Ranking of directors by firms

	$\mathbf{c}_1$	$\cdots$	$\mathbf{c}_K$
$\mathbf{d}_1$:	r^d_{11}	$\cdots$	r^d_{1K}
$\mathbf{d}_2$:	r^d_{21}	$\cdots$	r^d_{2K}
$\cdots$	$\cdots$	$\cdots$	$\cdots$
$\mathbf{d}_N$:	r^d_{N1}	$\cdots$	r^d_{NK}

Table A.4: Ranking of firms by directors

Ranks are numerical so that the sum in Table A.3 across rows equals to $N(N+1)/2$ and in Table A.4 to $K(K+1)/2$. Given this ranking and quota profiles, Gale-Shapley type algorithm produces stable matching between firms and directors. Then for a given firm c_{kt}

$$f(\bar{d}_{kt}|c_{kt};\theta)=\frac{1}{S}\sum_{s=1}^{S}\bar{d}^s_{kt}(c_{kt};\theta),$$

where $\bar{d}^s_{kt}$ is the average of attributes of directors matched with firm c_{kt} in draw s. Value $f(\bar{d}_{kt}|c_{kt};\theta)$ is an estimate of $\mathbb{E}[\bar{d}_{kt}|c_{kt};\theta]$.

[17] See text for discussion of assumption that ϵ and η are standard normal.

Given this value, and moment conditions 5, which becomes

$$m(\theta) = \frac{1}{KT}\sum_{t=1}^{T}\sum_{k=1}^{K} c_{kt}p_{kt}\big(\bar{d}_{kt} - f(\bar{d}_{kt}|c_{kt};\theta)\big)$$

SMM estimator is defined as

$$\hat{\theta} = \arg\min_{\theta\in\Theta} m(\theta)'Wm(\theta),$$

where W is a positive-definite weighting matrix of dimension $l \times l$, where l is the number of moments in $m(\theta)$. Assuming that random components of utility functions are *i.i.d.* across directors, firms, and time, for a fixed T as $K \to \infty$

$$\sqrt{K}(\theta - \hat{\theta}) \to N(0, (1 + 1/S)(J'\Omega J)^{-1}), \tag{7}$$

where matrix Ω is the probability limit of the inverse of variance of the moments used in estimation, and $J = \mathbb{E}[\partial m(\theta)/\partial\theta]$.

In all my specifications the number of moment conditions I use in estimation is strictly greater than the number of parameters I estimate. I use J-test to to check whether the model's moment conditions match the data well or not. It is known that

$$KT(1 + 1/S)\big(m(\hat{\theta})'\hat{\Omega}m(\hat{\theta})\big) \to \chi^2_{l-b},$$

where b is dimension of θ.

Although Michaelides and Ng (2000) find that $S = 10$ produces good small-sample performance, in my empirical implementation I use $S = 20$ simulated samples to be conservative.

A.3 Algorithm to calculate stable matching

Given ranks in Table A.3 and Table A.4 and quota profiles p and q, the following variation of original Gale-Shapley algorithms produces unique stable matching.

1. Start with a firm that still has a director position to fill
2. The firm's appointing committee offers a seat to the highest-ranked candidate they have not made offer yet
   (a) If director still has spots available as specified by his quota, he accept the offer
   (b) If director no longer accepts any offers (i.e. has already accepted offers up to number specified by his quota)
      i. If director prefers the firm that is making this offer to his lowest-ranked firm from which he already accepted an offer, he accepts the current offer, and resigns from the lowest-ranked firm on his list
      ii. If the firm that is making the current offer ranks lower than any firm on candidate's preference list that he already works for, he passes the offer. Firm continues looking, making the offer to the next-best candidate
3. Continue until there are no firms left that are looking to fill in director position

Table I: Data Definitions

This table defines variables used in the analysis, and their source of data.

Variable	Definition
Director characteristics (IRRC/Riskmetrics, BoardEx, and ExecuComp)	
CEO Director	Indicator variable, equals to 1 if a director is a CEO of a listed company, 0 otherwise
Executive Director	Indicator variable, equals to 1 if a director is an executive (but not CEO) of a listed company, 0 otherwise
Fast-track Career	Age at which director took his first director job. Defined similarly to Falato, Li, and Milbourn (2010). I follow their approach and use cohort-adjusted version of this variable, where I divide sample into three age cohorts, and define the variable as the difference between age at which director got her first job and the median age at which her cohorts got their first director job.
Selective College	Is a dummy variable which equals one if the director has attended a very competitive or more selective undergraduate institution based on Barron's rankings, and zero otherwise
Financial Expertise	Defined as having CPA or CFA certification, or having title "CFO", "Treasurer", or "Controller"
Legal Expertise	A director is classified as having legal expertise if she holds law degree, or has "counsel" or "attorney" title
Number of directorships	The total number of directorships director held in the previous year
Distance	Distance between the location of the appointee's main job (when available) and appointing firm's headquarters. The measure used in regression analysis is natural logarithm of one plus the distance
Female	Indicator variable. Equals to 1 if director is female, 0 otherwise
Attendance Problem	A dummy variable that is equal to one in a given fiscal year if a firm disclosed in its proxy statement that a director attended less than 75% of the meeting s/he was supposed to during that year
Degree	Measures the number of direct connections to other directors in sample. It equals to the number of unique members of director network the director had interactions with. The measure is normalized by the maximum degree possible
Closeness	Normalized measure of Degree that weights connections by their centrality in the network
Betweenness	Normalized measure of the number of geodesic paths of all directors in the network passing through each director
Firm Characteristics (Execucomp, Compustat, and CRSP)	
Firm Size	Total assets, in millions of dollars
ROA	Return on assets. The earnings before interest, taxes, depreciation, and amortization (EBITDA) divided by total assets
ROE	Return on equity. The earnings before interest, taxes, depreciation, and amortization (EBITDA) divided by total book value of common equity
Market-to-Book	The market value of common stock plus the book value of total debt divided by the book value of total assets
Return	Annual stock returns
Sales growth	Annual change in net sales divided by net sales in the previous year
Firm Risk	Standard deviation of daily stock returns over the past three years, annualized
R&D Intensity	Research and development expenses divided by the lagged one year assets
GIM Index	The index of 24 antitakeover provisions from Gompers, Ishii, and Metrick (2003). The data is available for years 1995, 1998, 2000, 2002, 2004, and 2006. For years not covered, I substitute the missing value with the value available in the prior year. For example, in 2001 value equals to 2000, and in years 2007, 2008 and 2009 value equals to the value recorded for 2006.
Compensation	Total director compensation as reported in SEC filings. Available per director starting 2006. This is the sum of the fees that were earned or paid in cash (CASH FEES), value of stock-related awards that do not have option-like features (STOCK AWARDS), value of option-related awards (OPTION AWARDS), value of non-equity incentive plans (NONEQ INCENT), change in pension value (PENSION CHG), and other compensation received by the director including perquisites and other personal benefits (OTHCOMP). In thousands of dollars, paid to director in the year s/he was hired
CEO Ownership	Percentage of the firm equity owned by CEO

Table II: Sample Distribution by Year

This table shows sample distribution by year. Sample consists of 16,158 outside directors appointments between 1996 and 2009 for firms covered by RiskMetrics (former IRRC) database. This table presents an overview of the dataset by showing the distribution of appointments by year. The next table offers a more detailed look at the distribution of new appointments across firms and directors. *Number of directors* is the total number of directors who served on boards in a given year. *Number of firms* is the total number of firms in the sample. The last row of the table presents the number of unique directors and firm in my sample. *New appointments* is the number of of outside director appointments observed in a given year. *Board size* is the average number of directors (including inside directors) on company's board. *Board seats* is the average number of outside directorships a director holds in a given year.

Year	Number of directors	Number of firms	New appointments	Board size	Board seats
1996	11,819	1,048	997	10.27	1.54
1997	12,313	1,190	1,074	9.83	1.51
1998	12,204	1,372	1,127	9.62	1.53
1999	13,363	1,307	1,156	9.64	1.50
2000	12,625	1,359	1,155	9.48	1.45
2001	12,509	1,310	1,235	9.26	1.41
2002	9,812	1,239	1,104	9.38	1.32
2003	10,003	1,272	1,499	9.37	1.29
2004	9,273	1,188	1,325	9.36	1.35
2005	10,001	1,220	1,117	9.35	1.23
2006	9,887	1,301	1,091	9.49	1.23
2007	9,991	1,275	1,059	9.32	1.21
2008	10,354	1,206	1,131	9.44	1.21
2009	10,467	1,226	1,088	9.56	1.22
All years	169,621	17,513	16,158	–	–
Unique	26,618	1,852	–	–	–

Table III: Distribution of new appointments

This table presents the distribution of new appointments across directors and firms in a given year. The first three column show the number of firms that made one, two, or three new appointments in a given year. The last four columns show the number of directors that accepted one, two, three, or four new directorships in a given year. In my sample none of the directors accepted more than four new positions in a given year.

Year	Number of firms that hired the following number of directors:			Number of directors accepted the following number of directorships:			
	1	**2**	**3**	**1**	**2**	**3**	**4**
1996	501	173	50	807	89	4	0
1997	583	169	51	783	114	17	3
1998	542	201	61	855	119	10	1
1999	624	173	62	892	108	12	3
2000	593	188	62	957	76	10	4
2001	583	218	72	1,007	91	14	1
2002	528	198	60	944	69	6	1
2003	407	327	146	1,334	70	7	1
2004	398	279	123	1,236	38	3	1
2005	491	211	68	1,048	33	1	0
2006	469	239	48	1,006	38	3	0
2007	510	189	57	996	27	3	0
2008	513	213	64	1,049	36	2	1
2009	516	199	58	1,029	28	1	0

Table IV: Summary Statistics

This table shows descriptive statistics for variables used in the analysis. Sample consists of 16,158 outside directors appointments between 1996 and 2009 for firms covered by RiskMetrics (former IRRC) database. Panel A shows basic statistics. Panel B shows pairwise correlations between variables of interest. Refer to Table I for variable definitions.

Panel A: Descriptive Statistics

			Percentile		
	Mean	SD	25th	50th	75th
Director Characteristics					
CEO Director	0.074	0.185	0	0	0
Executive Director	0.121	0.256	0	0	0
Director Age	59.740	9.387	44	61	67
Selective College	0.332	0.290	0	0	1
Financial Expertise	0.117	0.343	0	0	0
Legal Expertise	0.082	0.238	0	0	0
Number of Directorships	1.821	1.393	1	2	2
Distance (miles)	192.958	681.250	75.318	150.762	572.573
Female	0.072	0.264	0	0	0
Attendance Problem	0.021	0.169	0	0	0
Director network measures					
Degree	22.759	31.512	8.000	19.000	32.000
Closeness	1.807	0.740	0.465	1.305	2.296
Betweenness	0.193	0.673	0.092	0.221	0.569
Firm Characteristics					
Firm Size (assets, billions)	8.724	25.248	1.063	3.514	12.383
ROA	0.124	0.165	0.053	0.119	0.160
ROE	0.215	3.141	0.124	0.260	0.387
Market-to-Book	1.808	1.195	1.094	1.461	1.930
Return	0.114	1.158	−0.081	0.046	0.172
Sales Growth	0.107	0.318	0.040	0.093	0.145
Firm Risk	0.482	1.545	0.223	0.361	0.503
R&D Intensity	0.018	0.043	0	0	0.021
Dividend yield	1.124	1.719	0.225	0.362	1.413
GIM Index	9.103	2.652	7.0	9.0	11.0
Director compensation (thousands)	165.84	270.27	85.11	148.27	212.69
CEO Ownership	2.194	6.188	0.160	0.379	1.820
Proportion of Independent Directors	0.572	0.204	0.429	0.750	0.833

Panel B: Pairwise Correlations of Director Characteristics

Variable	D	C	B	SC	FC	CEO	Age
Degree (D)	1.000						
Closeness (C)	0.471	1.000					
Betweenness (B)	0.594	0.327	1.000				
Selective College (SC)	0.175	0.104	0.127	1.000			
Fast-track career (FC)	−0.125	−0.024	−0.101	−0.027	1.000		
CEO Director (CEO)	0.031	0.072	−0.019	−0.008	0.013	1.000	
Age	0.098	0.059	0.104	0.003	0.005	−0.078	1.000

Table V: Logit Estimates

The table contains estimated coefficients from three specifications of a probit model. The dependent variable is 1 if director is hired in year t, and 0 otherwise. Variable definitions are given in Table I. *CEO Director*, *Executive Director*, *Selective College*, *Financial Expertise*, *Legal Expertise*, and *Female* are dummy variables. Distance is $\log(d+1)$ between director's permanent location and appointing firm's headquarters. Accounting variables, i.e. ROA, Return, Assets, are defined as 0 for directors who do not sit on any other board, and as an average of firms where director currently sits. I include year fixed effects in all specifications. I report marginal probabilities rather than coefficients. For the binary variables, changes in marginal probability are reported for the change in variable from 0 to 1. For other variables, I report marginal changes in probability when independent variable changes by 1 standard deviation.

	(1)			(2)		
	Coeff	Marg Prob	SE	Coeff	Marg Prob	SE
CEO Director	0.284	0.023	(0.003)	0.361	0.027	(0.042)
Executive Director	0.120	0.011	(0.045)	0.163	0.013	(0.052)
Selective College	0.071	0.013	(0.087)	0.030	0.006	(0.064)
Financial Expertise	0.096	0.008	(0.091)	0.003	<0.000	(0.014)
Legal Expertise	0.218	0.010	(0.106)	0.174	0.002	(0.188)
Female	-0.078	-0.022	(0.012)	-0.089	-0.020	(0.062)
Age	-0.680	-0.036	(0.006)	-0.481	-0.028	(0.039)
No Directorships	0.154	0.023	(0.007)	0.094	0.008	(0.051)
Distance	-0.004	-0.005	(0.012)	0.001	<0.000	(0.163)
ROA	-0.010	-0.008	(0.018)	-0.012	-0.007	(0.025)
RET	0.163	0.012	(0.005)	0.124	0.011	(0.005)
Sales Growth	0.029	0.004	(0.034)	0.019	0.002	(0.013)
Log (Assets)	0.008	0.009	(0.012)	0.011	0.010	(0.008)
Degree				0.187	0.007	(0.074)
Closeness				0.029	0.005	(0.096)
Betweenness				-0.251	-0.082	(0.159)
Δ Degree				0.004	0.003	(0.024)
Δ Closeness				0.045	0.008	(0.039)
Δ Betweenness				0.023	0.003	(0.044)
Year FE	Yes			Yes		
No Obs	169,621			169,621		
Pseudo R^2	0.158			0.233		

Table VI: Simulated Method of Moments Estimates of Matching Model

Table reports simulated method of moments estimates of several empirical specifications described in the text. Variable definitions are given in Table I. Estimation is based on 17, 18, 22, and 25 moments in specifications (1) through (4), respectively. For coefficients I report standard errors are in parenthesis, for the J-test I report p-values.

Model	(1)	(2)	(3)	(4)		(1)	(2)	(3)	(4)
DIRECTOR PREFERENCES					APPOINTING FIRM PREFERENCES				
Log (assets)	8.206	7.118	8.472	1.643	CEO Director	2.841	2.288	2.175	1.219
	(0.461)	(2.147)	(1.467)	(0.021)		(0.137)	(0.872)	(0.564)	(0.211)
Log (compensation)	5.628	4.024	5.767	6.394	Executive Director	0.378	0.262	1.190	0.402
	(2.210)	(0.718)	(1.849)	(3.142)		(0.193)	(0.106)	(0.081)	(0.062)
Distance	−2.712	−3.690	−3.062		Selective College	1.142	0.732		
	(0.487)	(0.929)	(0.546)			(0.475)	(0.290)		
$ROA_{t-3,t-1}$	0.891				Fast-track	−0.889			
	(0.639)					(0.060)			
$ROE_{t-3,t-1}$	1.314				# of Directorships		1.348		
	(1.504)						(0.312)		
$RET_{t-3,t-1}$		13.440			Distance		−1.271	−1.477	
		(2.098)					(0.285)	(0.491)	
$VOL_{t-3,t-1}$		−5.204			Age			0.182	
		(0.476)						(0.185)	
Market-to-Book			−0.954		Lawyer				0.598
			(0.072)						(0.021)
Sales Growth			5.791		Banker				0.311
			(0.154)						(0.071)
R&D Intensity			−0.109		Female			−1.302	
			(0.421)					(0.278)	
GIM Index				0.629	Attendance problem				0.124
				(0.908)					(0.171)
CEO Ownership				0.052					
				(0.187)					
Proportion of Independent Dir				0.018					
				(0.006)					
J-test	8.405	25.612	10.224	8.719					
	(0.395)	(0.001)	(0.510)	(0.892)					

Table VII: Estimated parameters of the model that includes network measures

Table reports simulated method of moments estimates of several empirical specifications described in the text. Variable definitions are given in Table I. The changes in network measures capture director's gain in network measures from accepting new position. For firms, they measure average gain of outside directors from attracting new director to the board. Plain network measures capture firm's preferences for directors who are better connected. Estimation is based on 21 moments for the first model, and on 20 moments for the second and third specification. Third specification is a random-effect model with varying coefficient on Δ Closeness in appointing firm's preference equation. Variation in the coefficient is linked to the CEO's ownership stake in the firm. For coefficients I report standard errors are in parenthesis, for J-statistic I report p-values.

Model	(1)	(2)	(3)		(1)	(2)	(3)
Director preferences				Appointing firm preferences			
Δ Degree	0.179	0.109	0.213	Degree	0.081		
	(0.027)	(0.031)	(0.041)		(0.096)		
Δ Closeness	1.568	2.917	2.561	Closeness	1.062	1.368	0.971
	(0.033)	(0.438)	(0.075)		(0.054)	(0.037)	(0.194)
Δ Betweenness	−0.047	0.203	0.360	Betweenness	0.826	0.756	0.849
	(0.035)	(0.094)	(0.102)		(0.117)	(0.022)	(0.256)
Log (assets)	1.170			Δ Closeness		0.871	
	(0.398)					(0.016)	
Log (compensation)	2.124	4.682	3.911	Δ Betweenness		0.490	0.587
	(0.290)	(1.552)	(0.628)			(0.031)	(0.109)
$RET_{t-3,t-1}$	0.226			Selective College		0.468	0.397
	(0.078)					(0.040)	(0.062)
Sales growth	0.714			μ			1.208
	(0.395)						(0.058)
				β			−2.718
							(0.227)
				σ			0.061
							(0.002)
J-test	2.866	21.702	25.320				
	(0.992)	(0.027)	(0.005)				

Table VIII: Results for a subsample of CEO directors

Table reports simulated method of moments estimates of several empirical specifications described in the text. Variable definitions are given in Table I. Variable RET^+ is defined as $RET_{t-3,t-1}$ if it is in the top 10% of the distribution, and 0 otherwise; RET^0 is $RET_{t-3,t-1}$ if $RET_{t-3,t-1}$ is not in the top and bottom decile, and 0 otherwise; and RET^- is $RET_{t-3,t-1}$ if it is in the bottom decile, and 0 otherwise. Estimation is based on 21 moments in specification (1) and on 12 moments in specification (2). For coefficients I report standard errors are in parenthesis, for J-statistic I report p-values.

Model	(1)	(2)		(1)	(2)
CEO Director preferences			Appointing firm preferences		
Log (compensation)	1.672	2.780	Log (assets)	1.370	2.528
	(0.024)	(0.131)		(0.471)	(0.362)
Δ Closeness	0.373	0.218	Δ Closeness	2.913	3.696
	(0.249)	(0.076)		(0.180)	(0.215)
Log (assets)	0.890		Sales Growth	0.526	
	(0.026)			(1.180)	
Distance	−8.851		$RET_{t-3,t-1}$	0.312	
	(0.154)			(0.472)	
$RET_{t-3,t-1}$	8.667	12.166	RET^+		0.918
	(1.814)	(0.282)			(0.114)
			RET^0		
			RET^-		0.865
					(0.074)
J-test	7.509	14.617			
	(0.756)	(0.012)			

Table IX: Results for a subsample of executive directors, CEOs are excluded

Table reports simulated method of moments estimates of several empirical specifications described in the text. Variable definitions are given in Table I. Variables RET^{+}, RET^{0}, and RET^{-} defined similarly to the above table. Estimation is based on 21 moments for specification (1), and 13 moments for specification (2). For coefficients I report standard errors are in parenthesis, for J-statistic p-values are reported.

Model	(1)	(2)		(1)	(2)
Executive Director preferences			Appointing firm preferences		
Log (assets)	2.177	1.561	Log (assets)	3.181	1.627
	(0.464)	(0.382)		(0.483)	(0.228)
Log (compensation)	6.812	4.286	Δ Closeness	2.120	2.970
	(1.603)	(0.090)		(0.037)	(0.811)
Δ Closeness	1.866	3.735	Sales Growth	0.177	
	(0.191)	(0.740)		(0.390)	
Distance	-0.571	-2.891	$RET_{t-3,t-1}$	0.242	
	(0.115)	(0.306)		(0.741)	
$RET_{t-3,t-1}$	0.034		RET^{+}		-0.368
	(0.019)				(0.808)
			RET^{-}		0.422
					(0.509)
J-test	11.062	18.762			
	(0.438)	(0.002)			

Table X: Reasons for joining the board and for refusing board membership. Reproduced from Lorsch and MacIver (1989) p.24, p.26

Scale: 1 = Most Important, 5 = Least Important

Panel A: Reasons for Joining	
Quality of top management	1.78
Opportunity to learn	1.93
Challenge as director	2.08
Prestige of the firm	2.22
Potential growth of the firm	2.41
Opportunity to work with board members	2.66
Personal prestige	2.98
Compensation	3.61
Major stock ownership	4.37

Panel B: Reasons for Refusing to Join	
Lack of time	1.72
Meeting conflicts	2.19
Conflict of interest	2.30
Could not play useful role	2.68
No interest in firm's industry	2.78
Uncertainty about firm's future	2.97
Personal liability	2.97