Strategic Proxy Voting

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Abstract

Despite its importance, voting in the elections of corporate boards of directors remains relatively unexplored in the empirical literature. We construct a comprehensive dataset of 3,204,890 mutual fund votes in director elections that took place between July 2003 and June 2005. We find substantial systematic heterogeneity in fund voting patterns: some mutual funds are management friendly, and others are less so. We construct and estimate a model of voting in which mutual funds impose externalities on each other: the cost of opposing management decreases when other funds oppose it as well. We exploit fund heterogeneity to overcome the endogeneity problem induced by unobserved firm quality. We estimate all parameters in the voting model and show that strategic interaction between funds is economically and statistically significant. We then construct counterfactuals to compute the equilibrium distribution of votes under alternative specifications of strategic externalities. We use the counterfactuals to show that implementing confidential voting in board of director elections has potentially large consequences on the equilibrium number of funds withholding their votes from directors.

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The election of directors is the most important shareholder franchise.
Larry Sonsini, Chairman, NYSE Proxy Working Group (NYSE 2006)

1 Introduction

Shareholder voting is one of the key mechanisms through which shareholders can affect the policy of a corporation. Through voting, shareholders elect directors, decide on matters of change of control, amend corporations' bylaws, and pass non-binding shareholder resolutions. Among shareholders' voting rights, the right to vote in board of director elections is one of the most significant. The board of directors plays a central role in corporate governance: it appoints and monitors top management of a company. A board also approves mergers, acquisitions, and other major firm policies. In this paper we study how differences between shareholders, as well as interactions between them, shape their voting behavior in board of director elections.

Before examining proxy voting in board of director elections, it is useful to first lay out a benchmark – a hypothetical "straightforward" director election system. Our results can then be interpreted relative to this benchmark. In a straightforward director election system, voting in shareholder elections would respond only to director characteristics and behavior, which may affect the performance of the firm. For example, if shareholders are dissatisfied with the performance of a firm, they penalize the firm's directors with a bad voting outcome. Likewise, if directors have characteristics which leave them open to conflicts of interest, shareholders may respond by withholding their votes from these directors. In other words, all shareholders have the same incentive: to promote the behavior of directors that serves the best interests of the company. While shareholders might cast different votes in the same election, these differences are merely a consequence of noise. In this hypothetical "straightforward" director election system, the identity or characteristics of the shareholders casting proxy votes would not play a role.

In this paper, we focus on two features of proxy voting by mutual funds that indicate that proxy voting in director elections departs from our benchmark. First, we show that mutual funds systematically differ in their approaches to voting. Some mutual funds are consistently more likely to cast votes in favor of directors sponsored by the management than other funds. Second, we show that funds vote strategically: they are more likely to cast their vote in favor of a director it they think other funds will vote in favor of the director as well.

Funds seem to dislike voting against directors that are supported by the management. In its letter to the Securities and Exchange Commission (SEC), Alliance Capital Management opposed the adoption of proxy disclosure rules, fearing "retaliatory actions by corporate management if a fund votes against management" (Pugliese 2006). However, a fund's fears of retaliation may differ among funds. This notion is consistent with a widespread belief that mutual funds differ in their voting practices. Some funds are considered more activist than others, while other funds are considered more passive in their proxy voting. In fact, proxy advisory and solicitation firms have built their business models around this notion. Morrow & Co, Inc., an advisory and solicitation firm, advertises its services on its website by stating:

> *The final vote on any proposal at your shareholder meeting should never come as a surprise. Our ability to identify your current institutional ownership, combined with our knowledge of institutional voting guidelines and historical voting patterns, allow us to accurately predict the vote outcome on a variety of compensation and governance issues.* (Morrow & Co., Inc. 2006)

If only one fund votes against management, and others vote with management, management may retaliate against the objecting fund. It can do so by limiting its interaction with the fund to the minimal level required by the law. In its letter to the SEC, Mosaic Funds states that the "retaliation could be in the form of denial of access to company management in the course of our investment research on behalf of our shareholders" (Mason 2006). In addition to denial of access, the firm may terminate all current and potentially future business with the fund, such as managing the assets of their pension plans. It can therefore be costly for a single fund to vote against directors recommended by management. On the other hand, if all funds decide to vote against management proposed directors, the power of management to retaliate could be severely limited. It is much harder for management to stop communicating with all of its institutional investors. Similarly, management may have a hard time severing business relations will all mutual funds holding its shares, which may severely limit its choice of business partners. In the extreme case, if all funds vote against directors recommended by management, the management may resign and will not be able to retaliate. Therefore, it may be easier for a fund to vote against a director, if it knows other funds will vote against the director as well.

Such strategic interactions between funds are important because they amplify funds' equilibrium voting responses to factors that directly affect fund voting. For example, suppose the performance of a firm just decreased. First, every fund is more likely to withhold its vote on the firm's directors as a direct consequence of lower returns. Second, there is a multiplier effect: each fund also knows that all other funds are now more likely to withhold their vote. This provides an additional impetus for a fund to oppose management. Thus, the total effect of a decrease of returns on fund voting is larger than it would be in the absence of strategic interactions. As this example suggests, strategic interactions can be important when considering policy changes: any policy change that has a direct impact on fund voting will be amplified in equilibrium because of funds' incentive to vote against management only when other funds do so as well.

To explore the effects of mutual fund heterogeneity and strategic interaction between funds on proxy voting in board of director elections, we construct a comprehensive dataset of mutual funds' votes in their portfolio companies' director elections. The dataset includes 3,204,890 votes by 3,619 mutual funds in 14,132 director elections of 1,408 companies that took place between July 2003 and June 2005. Each vote is linked with company and director characteristics.

We first show that some funds are systematically more management-friendly than others. Our approach is somewhat similar to the approach discussed above by the proxy advisory and solicitation firm Morrow & Co, Inc., which uses "historical voting patterns [...] to accurately predict the vote outcome." We use a fund's past voting record as an empirical analogue of how management-friendly

the fund is, and therefore as a predictor of how it will vote in future elections. For example, we use Fidelity's average vote in director elections in 2004 in firms other than IBM to predict how Fidelity will vote in IBM board of director elections in 2005. We show that among funds who vote on the same director in the same meeting, funds with a higher average vote in other firms in the last calendar year are also more likely to vote for a given director. In other words, we show that the past voting record is a reasonable proxy for a fund's management friendliness and that management friendliness is an important factor in explaining mutual fund voting in board of director elections.

A naive way to approach our second question, the estimation of strategic interactions between funds, would be to see whether a fund voted for a particular director when other funds did so as well, after controlling for director and firm characteristics. In our setting, however, unobservable director quality induces a correlation in the votes of the funds that can be mistaken for the funds' strategic interactions. For example, suppose that Vanguard and Fidelity vote on a director and can observe how good directors are in monitoring management. This monitoring characteristic is not captured by our data, but Fidelity and Vanguard observe it, and vote accordingly. Vanguard is likely to vote "for" a director when Fidelity does so, not because it cares about Fidelity's vote, but because the director they are voting for is good. Such endogeneity problems make strategic interactions notoriously hard to identify.[1]

We exploit the heterogeneity in funds' management-friendliness to overcome this issue. Suppose Fidelity is voting on two identical directors, but the first director will be voted on by management-friendly funds, and the second director by management-unfriendly funds. The first director will get more support from funds other than Fidelity than the second director, even though they are otherwise identical. Fidelity should not intrinsically care about how management-friendly other funds are; the management-friendliness of the other funds is of interest only to the extent that it affects their votes. Therefore, if Fidelity's vote is higher for the first director, this indicates that Fidelity raised its vote in response to the higher vote by other funds. This observation forms the basis of our estimation.

Because voting is inherently a non-linear problem, we cannot use a standard linear instrumental variables regression approach. Instead, we use differences in funds' management-friendliness to obtain an estimate of directors' unobservable quality, which is the source of our endogeneity problem. Suppose there are two directors with the same observable characteristics and the same composition of funds, but the first director gets only "for" votes, while the second director gets only "withhold" votes. We can then conclude that the first director is a high-quality director and the second a low-quality director, at least from the funds' perspective. We can thus include an estimate of directors' unobservable quality in our estimation. Controlling for the estimated directors' unobservable quality implements a slightly modified version of the Imbens and Newey (2003) instrumental variables estimator, which we can use in our non-linear setting to solve our endogeneity problem. It also allows us to estimate the effect of all factors that affect fund voting, including the ones not observable to the researcher.

[1] See, e.g., Manski (1993) for a treatment of issues arising in an analogous problem of identifying peer effects.

We show that under a few simple assumptions, our estimates can be interpreted as parameters of a fund's optimal voting response, i.e. its best response function, in a game of voting. Under these assumptions the game between funds is a monotone supermodular game, which has several advantages (Van Zandt and Vives 2006). The model allows us to obtain comparative statics even in the presence of multiple equilibria. It allows us to interpret and compare the size of different effects on voting. For example, we can compare the economic effect of a change in management friendliness to the effect of a firm's decline in returns. An additional advantage of the model is that for any set of estimates, the model allows us to compute the most management favorable and least management favorable equilibrium, which bound all other equilibria of the voting game, which will allow us to construct counterfactuals.

We find that the effect of mutual fund friendliness on voting in board of director elections is of the same magnitude as the effects of firm and director characteristics. This indicates that who monitors the director can potentially be as important as the characteristics of the directors monitored and represents a significant departure from our benchmark "straightforward" director election system. We also find that funds' strategic considerations about how they expect other funds to vote play a large role in determining voting outcomes. This need for coordination is stronger when funds can expect more retaliation, such as in firms with weaker shareholder rights, and when voting on a CEO. The magnitude of strategic interactions estimated implies that when considering a change in policy that makes it easier to oppose management, we need to consider that the size of the direct effect of the policy can be significantly increased because of funds' interactions.

We can use our estimated model for more than simply understanding the size impact of management friendliness and fund interactions on voting in board of director elections. Because we estimate *all* parameters of the voting model, including the unobserved director quality, we can use the model to examine voting outcomes under counterfactual scenarios. We use the model to assess the potential impact of making voting in board of director elections confidential. Confidential proxy elections is one of the premier topics in shareholder activism that has remained relatively unexplored. In contrast with the previous literature, we show that confidential proxy voting can have a potentially large impact on voting in board of director elections by significantly increasing the number of funds opposing management.

Our results are most closely related to two strands of corporate governance literature. First, they are related to the literature on the determinants of board composition. These have been widely researched using outcome variables, such as board composition and director survival rates.[2] In contrast, we look directly at the votes cast in director elections, which provide a more natural test of which characteristics erode director support. It also allows us to shift focus to individual shareholders and to examine how interactions between individual shareholders shape the voting outcome.

[2] See Hermalin and Weisbach (2003) for an excellent survey of the literature on corporate boards. The main questions they discuss are: (i) How are board characteristics, e.g., composition and size, related to profitability? (ii) How do board characteristics affect the observable actions of the board? and (iii) What factors affect the makeup of boards and how do they evolve over time?

Second, several recent papers empirically study how the incentives of mutual funds affect their proxy votes. Davis and Kim (2006) demonstrate that voting on non-binding shareholder proposals by mutual funds does not seem to be influenced by their business ties with the portfolio firms. Likewise, Rothberg and Lilien (2005) do not find evidence of the effects of potential conflicts of interest on proxy voting records of large mutual funds. Matvos and Ostrovsky (2006) show that mutual funds' incentives to vote against bad mergers in acquiring companies are blunted because they realize a portion of merger gains in their holdings in the target. In the current paper, we study voting in elections of boards of directors and present evidence of fund heterogeneity and strategic interactions between funds in that particular setting. Unlike the papers mentioned above, we use a comprehensive dataset of proxy votes from a majority of mutual funds rather than a small subsample.

The remainder of the paper is organized as follows: In Section 2, we provide an institutional background on mutual fund voting in board of director elections. In Sections 3 and 4, we present the model of strategic proxy voting and discuss our estimation strategy in detail. We describe our data in Section 5, and then present our results in Section 6. We use the estimated model to construct counterfactuals in Section 7 and conclude in Section 8.

2 Institutional Background

A board of directors in the United States is formally both a principal in its relationship to the management, and an agent with respect to the shareholders. The board is responsible for providing guidance and monitoring management on behalf of the shareholders. The nominees for boards of directors in the U.S. are selected for election by the board itself (Monks and Minow 2001). Ninety-five percent of the boards of large U.S. companies have a nominating committee comprising non-executive directors whose role is to recommend a slate of directors for election to the board. Once the slate has been confirmed by the board, the company can start soliciting proxy votes for its list of directors. Shareholders can prepare a competing list of directors by entering into a proxy fight, which they must finance out of their own pocket.

When companies solicit proxy votes, they have to establish the beneficial owner who has the right to vote their shares. Shares are frequently formally held by depositories, which must establish the beneficial owner prior to the shareholder meeting. The recording date is the date on which the beneficial ownership of the security is established by the depository (the difference between the recording and meeting date is typically around two months).[3] The proxy materials are then mailed to the beneficial owners by the corporation (Heard and Sherman 1987).

The beneficial owners generally file their proxies with the secretary of the corporation. An inspector of elections is appointed by the corporation to oversee the count, which is performed by tabulators who can be firm employees. In a proxy contest, the dissidents can have their own

[3] The Midwest and Pacific depositories use a "cutoff date,"which is one or two days before the record meeting, to establish the beneficial owners (Heard and Sherman 1987).

representatives present at the count. Unless the corporation explicitly implements confidential voting, the voting decisions of individual shareholders are revealed to management. If voting is confidential, management is in principle informed only of the final tally of the votes, and not the votes of individual shareholders. Confidentiality, however, is not absolute and can be violated in a contested election.[4] Also, confidentiality does not apply to mutual funds; they must disclose their votes with the SEC in NP/X filings, which form the basis of our dataset, described in Section 5.

In the *plurality* voting system implemented by most corporations in the U.S., directors with the most "for" votes are elected. If directors run unopposed, shareholders cannot vote "against" a nominee, but can only "withhold" authority to cast the vote. The "withhold" vote therefore cannot prevent a nominee's election, and even a single "for" vote theoretically elects an unopposed director.[5] The "withhold" vote was introduced by the SEC, and was later interpreted by the SEC as a mechanism for shareholders to express their dissatisfaction with directors (ISS 2005).

While not legally binding, the withhold votes seem to have some power in disciplining management. When Michael Eisner, the Chairman and CEO of Disney, received a 43% withhold vote, it was the 7^{th} largest "withhold" vote in history, and the highest ever for a CEO. While Eisner's vote still formally elected him to the board, he stepped down as Chairman on the same evening. On May 16, 2003, Steve Case, Chairman of AOL, received a 22% withhold vote. Again, although formally elected to the board, he stepped down as Chairman the following day. These examples suggest that the relevant range of variation in withhold votes is between 0 and at most 50 percent, and that a 20% withhold vote can be considered a significant no confidence vote in the management (Stewart 2005). Therefore, a 10 percentage point change in the withhold vote represents a potentially large change in the support that management enjoys from shareholders.

Mutual funds have a fiduciary duty to their shareholders to conduct the fund's business in the shareholders' best interests. This duty has been interpreted by the SEC to extend to the right to vote proxies of shares in their portfolio (SEC 2003a).[6] To adhere to their fiduciary duty, mutual funds must provide written policies (guidelines) and procedures to ensure that they act in the best interests of their shareholders. With the advent of the SEC rule, "Disclosure of Proxy Voting Policies and Proxy Voting Records by Registered Management Investment Companies" (SEC 2003a), these proxy voting guidelines have had to be disclosed. The deadline for the disclosure of votes cast between July 1, 2003, and June 30, 2004—the first 12-month period in which votes had to be disclosed–was set for August 31, 2004.

Just as funds differ in their approaches to investing, they also differ in their approaches to proxy voting. Funds vary in how voting policies are set, in the policies themselves, and in who may vote the proxies. Some funds set voting guidelines and voting proxies on the fund level, while others

[4] See McGurn (1989) and Monks and Minow (2001) for an overview of specific confidential voting implementation and violations of confidentiality.

[5] This is not the case in the majority voting system, where "withhold" votes have the weight of an "against" vote and a candidate gets elected only if more than half of the votes cast are "for" (ISS 2005).

[6] The SEC allows the fund not to cast its vote if this is in the shareholders' best interests. However, a policy of abstaining is not considered to be in the shareholders' best interests. Proxy voting outside the U.S. is offered as an example of when casting a vote can be expensive (SEC 2003b).

do so at the firm level. There are also funds that use a mixed approach by organizing voting on the fund level, but setting policies that govern voting at the firm level. Vanguard, for example, has *fund-specific guidelines* to govern proxy voting by its funds. The oversight of proxy voting is delegated to the *fund level* Proxy Oversight Committee, which is ultimately responsible for casting the votes (Vanguard 2006). T. Rowe Price is an example of a fund using a mixed approach; it employs a *firm-wide proxy committee*, which develops guidelines for portfolio managers, who then cast votes on proposals for companies in their portfolio. If they deviate from the guidelines, they have to provide a written explanation as to why they deviated (T. Rowe Price 2006). Fidelity's proxy guidelines and proxy voting are centralized at the *firm level*.[7] The guidelines are developed by the Board of Trustees of Fidelity, and the votes are cast by FMR Investment & Advisor Compliance Department (Fidelity 2006).

Funds' different approaches to proxy voting can also be seen in their proxy voting guidelines. The guidelines of Vanguard and Fidelity, for example, differ on how director independence should be taken into account when voting in director elections. Vanguard's "factors for approval" of a board of directors place a great deal of weight on director independence. They consider whether the "nominated slate results in [a] board comprised of a majority of independent directors" and whether "all members of audit, nominating, and compensation committees are independent of management" (Vanguard 2006). Fidelity's rules, on the other hand, do not require director independence at all. Only insider membership on the compensation committee is a factor in casting a "withhold" vote, which does not rule out outside related directors on the committee (Fidelity 2006). At least in terms of rules which guide proxy votes, Vanguard is more likely to "withhold" its vote on insider and outside related directors than Fidelity.

Guidelines are, as their name suggests, not binding and can leave significant freedom of choice as to how the funds cast their votes. Even where guidelines have a clear recommendation, they do not have to be followed. For example, State Street Global Advisors voted "for" Warren Buffet to serve as a director on the board of Coca Cola, even though he is an affiliated director. Their justification was as follows:

> *We cannot deny an affiliation exists ... In his case, Mr. Buffet has more than enough skins [sic]and his membership on the audit committee is logical given that such a large personal stake will more than ensure he acts in his best interests, which are aligned with overall shareholders [sic] best interests ... SSgA policy currently recommends voting against Mr. Buffet. Based on the analysis above we have identified investment reasons for overriding policy.* (State Street Global Advisors 2006)

In the theoretical model that we present in the following section, which forms the basis of our empirical estimation procedures, we will assume that these votes are chosen optimally, taking into account the costs and benefits of a particular vote. The votes of other funds are taken into account as well, giving rise to strategic interactions that we will identify in Section 6.

[7] This does not apply to Fidelity's equity index funds, where the voting authority is held by Geode Capital Management, LLC, the investment adviser for these funds.

3 The Model of Strategic Proxy Voting

We model voting as an asymmetric information game between funds in which each fund faces an idiosyncratic shock to its payoff from voting not observed by other funds. There are n funds, indexed by $j \in \{1, 2, ..., n\}$, voting in electing director i to the board of directors. The director is represented by a vector of characteristics $q_i = (q_{11}, \ldots, q_{1m})$, which represent both director-specific characteristics such as age or committee membership, and firm-specific characteristics such as size of firm assets, its stock returns, or governance characteristics.

Each fund has a certain *management friendliness* parameter ν_j. As mentioned above, funds differ in their approaches to proxy voting. This parameter ν_j is intended to capture such systematic differences in fund voting on a scale of how favorable these are to management. One potential source of systematic differences in fund voting is proxy voting guidelines. If fund voting is to a degree determined by guidelines, then funds whose guidelines seem to favor management would vote with management more frequently. From the example above, one would expect Fidelity to be more management friendly than Vanguard.

Another potential source of systematic differences in fund voting is how proxy voting is organized and monitored. If some portfolio managers have to provide a written explanation of why they deviated from the voting guidelines, as in the T. Rowe Price example, they may be more willing to enforce the guidelines and withhold their vote more frequently than other funds. Funds which are more reliant on business from their portfolio companies are more likely to systematically support management in these firms. Fund managers also may simply differ in their beliefs on the optimal amount of management friendliness. Activist funds believe that withholding votes leads to better governance and hence, better returns, while other funds may believe that the benefits of withholding votes are small. All these potential sources may make a fund systematically more or less likely to vote with management.

Formally, management friendliness ν_j induces a systematic difference among funds: some funds realize higher payoffs from voting for a director than other funds. In particular, more management friendly funds, holding all else equal, have a higher marginal payoff to voting "for" than less management friendly funds. The fund's management friendliness ν_j is known to all funds.

The fund also privately observes an idiosyncratic director-specific shock ε_{ij}, which also affects the fund's payoffs from voting "for" and "withhold." This shock induces funds of the same management friendliness to vote differently on directors. It could arise, for example, if each fund, in addition to director characteristics q_i, observes an idiosyncratic signal of director quality. These shocks are drawn independently from a distribution $G(\varepsilon_{ij})$, and are mean zero $E(\varepsilon_{ij}) = 0$. All other characteristics and parameters of the funds and the directors are common knowledge.

Funds simultaneously cast their votes on director i. We denote by $\omega_{ij} \in \{0, 1\}$ the vote of fund j on director i, with 1 representing a "for" vote and 0 a "withhold" vote. The vector of all votes cast for director i is then $\omega_i = (\omega_{i1}, \ldots, \omega_{in})$; also, let $\omega_{i,-j} = (\omega_{i1}, \ldots, \omega_{i,j-1}, \omega_{i,j-1}, \ldots, \omega_{in})$.

After votes are cast, each fund realizes a payoff

$$U\left(q_i, \nu_j, \omega_{ij}, \omega_{i,-j}, \varepsilon_{ij}\right). \tag{1}$$

The payoff of the fund depends on director characteristics, its own vote, the votes of other funds, its own management friendliness, and its director-specific shock. Note that we assume that only the fund's own management friendliness enters the payoff function of a fund directly. The fund cares about other funds' management friendliness only to the extent that it affects other funds' votes. This restriction is the basis of our estimation. We also make several additional assumptions, discussed below.[8]

Assumption 1 *Voting has increasing differences in director characteristics, i.e.,*

$$\frac{\partial\left(U\left(q_i, \nu_j, 1, \omega_{i,-j}, \varepsilon_{ij}\right) - U\left(q_i, \nu_j, 0, \omega_{i,-j}, \varepsilon_{ij}\right)\right)}{\partial q_{ik}} \geq 0.$$

That is, we assume that higher values of characteristics q_{ik} are viewed positively by the funds (e.g., q_{ik} could represent the likelihood that the director will oppose excessive managerial pay), and that all else being equal, the fund is more willing to vote for a director with higher values of these characteristics.

Assumption 2 *Voting has increasing differences in management friendliness and the idiosyncratic shock, i.e.,*

$$\frac{\partial\left(U\left(q_i, \nu_j, 1, \omega_{i,-j}, \varepsilon_{ij}\right) - U\left(q_i, \nu_j, 0, \omega_{i,-j}, \varepsilon_{ij}\right)\right)}{\partial \nu_j} \geq 0.$$

$$\frac{\partial\left(U\left(q_i, \nu_j, 1, \omega_{i,-j}, \varepsilon_{ij}\right) - U\left(q_i, \nu_j, 0, \omega_{i,-j}, \varepsilon_{ij}\right)\right)}{\partial \varepsilon_{ij}} \geq 0.$$

This assumption formalizes the notion of the management friendliness parameter and the function of the idiosyncratic shock: a more management friendly fund has a higher incremental payoff of voting "for", holding director characteristics and voting of other funds fixed. It also states that a higher idiosyncratic shock increases the incremental return to voting with management.

Assumption 3 *Voting has increasing differences in other funds' votes, i.e.,*

$$U\left(q_i, \nu_j, 1, \omega_{i,-j}, \varepsilon_{ij}\right) - U\left(q_i, \nu_j, 0, \omega_{i,-j}, \varepsilon_{ij}\right) \geq U\left(q_i, \nu_j, 1, \omega'_{i,-j}, \varepsilon_{ij}\right) - U\left(q_i, \nu_j, 0, \omega'_{i,-j}, \varepsilon_{ij}\right)$$

whenever, vote by vote, $\omega_{i,-j} \geq \omega'_{i,-j}$.

This assumption introduces a specific form of inter-fund externalities: voting "withhold" is more costly when few other funds also vote "withhold," for the reasons outlined in the introduction. The presence of these externalities, in turn, implies that in equilibrium, funds will behave strategically:

[8] The implicit differentiability assumptions are made purely for expositional purposes and can easily be omitted.

all else being equal, a fund is less likely to vote against a director if it believes that few other funds will vote "withhold."

Assumptions 1-3 above imply that the set of equilibria of the voting game has a very special structure: there exists a pure-strategy equilibrium most friendly to management, and a pure-strategy equilibrium most hostile to management. All other equilibria are contained between these two extremes. Proposition 1 states this result formally:

Proposition 1 *There exists the lowest $\underline{\omega}_i^*$ and the highest $\overline{\omega}_i^*$ pure-strategy Bayesian Nash equilibrium of the voting game specified above. (These equilibria may coincide.) Each fund's equilibrium choices in both equilibria are weakly increasing in the fund's own management friendliness ν_j, other funds' management friendliness ν_k, $k \neq j$, and the vector of director qualities q_i.*

Proof. The game satisfies the assumptions of a monotone supermodular game in Van Zandt and Vives (2006):

- Condition 1 requires supermodularity and increasing differences in actions and parameters, which determine a fund's payoff $(q_{11}, \ldots, q_{1m}, \nu_j, \varepsilon_{ij})$, which are satisfied by Assumptions 1 - 3.

- Condition 2 requires that the beliefs of fund j about vectors $(q_{11}, \ldots, q_{1m}, \nu_k, \varepsilon_{ik})$ for all $k \neq j$ are first-order stochastically increasing given its own realization of $(q_{11}, \ldots, q_{1m}, \nu_j, \varepsilon_{ij})$. Given that the idiosyncratic shocks ϵ_{ij} are independent, management friendliness of funds ν is commonly known, and the characteristics q_i are common to all funds, this condition is trivially satisfied.

Consequently, Proposition 1 follows directly from Theorem 1 in Van Zandt and Vives (2006) ■

Remark 1 *In equilibrium, funds play threshold strategies in q_i, ν_j, and ε_{ij}.*

Remark 2 *The best response function of a fund is increasing in q_i, ν_j, ε_{ij} and the expected vote of other funds.*

Remark 2 allows us to write out the best response function of a fund in terms of observable quantities. The equilibrium best response function of a fund from Van Zandt and Vives (2006) is specified in terms of strategies of other funds, which are not observable. Remark 1 allows us to express a fund's strategy as a cutoff strategy in ε_{ij}, conditional on director quality q_i and the fund's management friendliness ν_j. Therefore there is a monotonic relationship between a fund's strategy and its expected vote, conditional on director quality q_i and the fund's management friendliness ν_j. We can thus replace other funds' strategies with their expected votes when writing down a fund's best response function.

4 Estimation

We want to estimate how a fund determines its vote, taking into account the strategies of other funds, the characteristics of the director voted on, and its own type. In the framework of the voting mode presented above, we want to estimate a fund's best response function. To estimate the model above, one would ideally observe all variables of a fund's best response function. Remark 2 allows us to express a fund's best response function as a function of other funds' expected vote, director characteristics, fund characteristics, and the idiosyncratic fund-director shocks.

$$\omega_{ij}^{*} = \omega_{ij}^{*}\left(q_i, \nu_j, \omega_{ij}, E_{\varepsilon_{i,-j}}\omega_{i,-j}, \varepsilon_{ij}\right) \tag{2}$$

Then one would directly estimate all the parameters of the model, including the parameter on other funds' expected vote, to test for the presence of strategic interactions. The problem one encounters is that director attributes are only partially observable. In the presence of unobserved director quality, the fund's vote and the vote of other funds holding the same company would be correlated even in the absence of strategic considerations. For example, suppose Fidelity and Vanguard are voting on electing Bob to the board of IBM. Bob is a good director, but this is not reflected in our measures of director characteristics. Then Fidelity's vote and Vanguard's vote on Bob would be correlated simply because of Bob's quality, which increases their probabilities of voting "for" Bob.

To circumvent the problem, we exploit the heterogeneity in funds' management friendliness. The management friendliness of other funds *does not* enter the payoff function of the fund directly. In other words, funds care about other funds' management friendliness only to the extent that it influences other funds' votes. Because more management friendly funds are more likely to vote for a director *holding all else equal*, we can exploit this variation to generate variation in other funds' expected votes. If a fund is to vote in two identical firms, where one is held by management-friendly funds and the other by management-unfriendly funds, it would vote "for" more frequently in a firm held by management-friendly funds if there were strategic considerations present. We will first explain how we construct the proxy for funds' management friendliness, and then the two-step estimation procedure for the best response function.

4.1 Constructing the proxy for funds' management friendliness

To implement our estimation procedure, we first need to construct a proxy for funds' management friendliness. We construct this proxy by using a fund's historical voting record. To proxy for a fund's type in year k, we average its votes in year $k-1$. Furthermore, to avoid any mechanical correlation, we calculate the fund's proxy by excluding its votes in the firm whose votes we are trying to explain. For example, when we calculate the proxy for Fidelity's management-friendliness when it votes in IBM's election of directors in 2005, we average its director votes in all elections except IBM elections in year 2004.

We could obtain a more precise proxy for funds' management friendliness by including firm controls. A fund is more likely to be management unfriendly if it votes "withhold" in firms in

which other funds voted "for." Firms in which a majority of funds vote "withhold" are probably bad firms, so voting "withhold" is less of a signal of management unfriendliness and more of a signal of firm quality. On the other hand, voting "for" in this situation would be a strong signal of a fund's management friendliness. A potential way to implement such a measure of management friendliness would be to follow Bertrand and Schoar (2003) and calculate the fixed effects of all funds. We chose the approach above because we wanted to avoid using information from future dates $t + s$ when analyzing a vote made at time t. For example, in trying to predict Vanguard's vote in IBM in 2004, we would also have been using information on Vanguard's vote in 2005. An alternative would be to calculate the fixed effect separately for each year. However, the fixed effect calculation takes into account voting in the company in question, which we wanted to avoid. In this case, our independent variable would potentially still be correlated with the dependent variable, since votes in IBM were used to construct a proxy meant to explain it.

Our proxy for funds' management friendliness is simple and constructed to avoid mechanistic correlation; it trades off these two features for precision in measuring management friendliness. In section 6.1 we show that in spite of its simplicity, this proxy performs well empirically.

4.2 Discussion of the identification assumption

Before we turn to the two step estimation procedure for the best response function, we address the basic assumption behind the identification of the strategic voting effect and potential problems with our instrument. The fundamental assumption in our estimation is that funds care only about other funds' friendliness insofar as it affects the expected vote of other funds. In other words, a fund should not update on director quality from observing which funds are voting on the director. There are several possible sources of heterogeneity in fund friendliness, and they have different implications for the validity of our instrument.

We have mentioned several sources of heterogeneity in section 3. Differences in proxy guidelines and differences in how proxy voting is organized and monitored within funds are two potential sources of differences in funds' management friendliness. If funds vote proxies differently because of differences in proxy guidelines, then the friendliness of other funds influences a fund's voting only through other funds' votes. Similarly, if fund managers simply differ in their beliefs on the optimal amount of management friendliness, then we may use fund heterogeneity to instrument for the expected vote of other funds. For example, Fidelity believes management friendliness encourages fund managers to take on riskier projects, which maximizes returns. Vanguard, on the other hand, believes that managers have to be penalized with "withhold" votes for poor performance if they are to work hard. Observing that Fidelity owns a particular company as opposed to Vanguard does not say anything about the quality of the directors of those companies. It does, however, allow us to predict how Fidelity and Vanguard may vote and in turn affect other funds' voting.

The main difficulty for our identification strategy is that funds do not purchase stocks randomly. First, suppose that funds which like to vote with management tend to hold the same stocks. Other funds' management friendliness then provides additional information on a fund's own management

friendliness, beyond the fund's past voting record. In other words, suppose we want to estimate how management friendly Vanguard is. If friendly funds buy similar stock, then looking at other funds who hold the same stock as Vanguard provides us with information on Vanguard's management friendliness. If other funds are management friendly, this means that Vanguard is likely management friendly as well, and if other funds are unfriendly, then Vanguard is likely unfriendly as well. In this scenario, funds who vote on directors in firms in which other funds are also management friendly, are in fact friendlier than their past voting record suggests, so they are more likely to vote "for" a director. We will address this concern by estimating a linear approximation to our model, which will allow us to include fund year fixed effect.

The second potentially problematic source of sorting is that management friendly funds may tend to hold stock in companies with directors who are good on an unobservable dimension. The following example demonstrates how this type of sorting would affect our identification. Suppose Fidelity invests only in companies which have "good" directors, and Vanguard invests only in companies which have "bad" directors. To estimate our model, we observe the behavior of T. Rowe Price in two companies. In the first company, Fidelity is the only other mutual fund, and in the second company, Vanguard is the only other mutual fund. Then T. Rowe Price will be more likely to "withhold" its vote in the company owned by Vanguard. It will do so because the director is a bad director, and not because Vanguard is an unfriendly fund. If this is the case, the management friendliness of funds holding a company is in fact a proxy for how good a director is on the unobservable quality. We attempt to alleviate the concern that this type of sorting is driving our results by addressing it from several angles, which are discussed in detail in section 6.3.

None of our attempts to address non-random stock holdings is perfect; they can only partially alleviate the endogeneity concerns. With more data, these endogeneity concerns may be addressed more directly. For example, if management friendliness is in fact driven by differences in guidelines, we might be able to use variation in guidelines as an instrument for management friendliness. If fund friendliness is driven by the different opinions of fund managers about the optimal voting policy, we may be able to exploit changes in fund managers to instrument for changes in fund friendliness.

4.3 Estimation of the voting model

Armed with a proxy for ν, we can estimate how a fund determines its vote, i.e. the funds' best response function. We will be estimating a logit approximation to the best response function in equation (2). Including the expected vote of every fund in the estimation would be infeasible. Instead, we replace it with the average expected vote of other funds, $\bar{\omega}^*_{i,-j} = \sum_{k \neq j} E_{\varepsilon_{ik}} \omega_{ij}$. For the purpose of this section, we will divide the vector of director characteristics q_i into a vector of characteristics observable by both the researcher and the funds, x_i, and a scalar "unobserved director quality" ζ_i, observed by funds, but not by the researcher. The best response function then takes the following form:

$$\omega_{ij} = \begin{Bmatrix} 1, \text{ if } \alpha + \beta_1 \nu_j + \beta_2 \bar{\omega}^*_{i,-j} + \beta_3 \zeta_i + \Gamma x_i + \varepsilon_{ij} \geq 0 \\ 0, \text{ if } \alpha + \beta_1 \nu_j + \beta_2 \bar{\omega}^*_{i,-j} + \beta_3 \zeta_i + \Gamma x_i + \varepsilon_{ij} < 0 \end{Bmatrix}. \tag{3}$$

The vote of a fund j on director i, ω_{ij}, is determined by the fund's own management friendliness ν_j, other funds' expected average vote, $\bar{\omega}^*_{i,-j}$, and director i's observable characteristics x_i and her unobserved quality ζ_i. Variables ζ_i, ε_{ij}, and $\bar{\omega}^*_{i,-j}$ are unobservable to the researcher, and so we cannot estimate (3) directly. Intuitively, the expected vote of other funds and management friendliness are not observed by the researcher; therefore they must be estimated instead. To estimate them, we assume that funds are using the equilibrium outcomes to generate their expectations of other funds' average vote. The average expected vote of other funds, $\bar{\omega}^*_{i,-j}$, is a function of funds' management friendliness, ν, and director $i's$ observable and unobservable characteristics, x_i and ζ_i, i.e., $\bar{\omega}^*_{i,-j} = \bar{\omega}^*_{i,-j}(\nu_1, \ldots, \nu_n, x_i, \zeta_i)$.[9] Other funds' management friendliness does not directly enter a fund's best response function (3). Therefore we use the average management friendliness of funds other than j to instrument for their vote. We can use the variation in $\nu_{i,-j}$ to identify β_2, the strategic interaction parameter, and coefficients Γ on observable director characteristics. We use a linear approximation to the equilibrium equation:

$$\bar{\omega}^*_{i,-j} = \delta + \gamma_1 \nu_{ij} + \gamma_2 \overline{\nu}_{i,-j} + \Gamma_1 x_i + r_{ij} \tag{4}$$

where $r_{ij} = \gamma_3 \zeta_i + \eta_{ij}$ and η_{ij} represents the error from the projection.

If our best response function (3) were linear, we would be in a linear instrumental variables setting. One would predict the average vote of other funds using the equilibrium equation, and then use the predicted vote instead of the actual vote of other funds. Because our outcome variable is binary, our structural equation is inherently non-linear. To estimate it, we use a slightly modified version of the Imbens and Newey (2003) instrumental variables estimator for non-additive error models.

To apply this estimator, we need to make the following additional assumption, which will allow us to later invert the equilibrium condition (4).

Assumption 4 *$\bar{\omega}^*_{i,-j}$ is continuous in $\overline{\nu}_{i,-j}$ and ζ_i.*

As we mentioned earlier, unobserved director quality is the source of endogeneity in our best response equation. If we could condition on this unobserved quality, the endogeneity problem would disappear. Imbens and Newey (2003) use the "selection" equation to estimate a function of the unobserved quality as a residual from the first stage regression. They show that conditioning on this function is sufficient to eliminate the endogeneity and to uncover all parameters of the structural equation. The intuition for the procedure in our case is the following: suppose one observes two

[9] It can also be a function of which equilibrium is chosen by the funds, in the case of multiple equilibria. We do not investigate the issue of equilibrium selection here; instead we assume that an equilibrium is chosen in some consistent way, e.g., the most management-friendly equilibrium is always chosen.

directors who have the same observable characteristics and whose firms are held by the same mutual funds. The first director obtains only "for" votes and the second director obtains only "withhold" votes. The first director thus has a higher unobservable quality than the first. This estimate of the unobserved quality serves to eliminate the endogeneity problem.

We proceed in two stages. In the first stage, we estimate the unobserved director quality and other funds' expected average vote from the equilibrium equation (4). We project the average vote of other funds in the election of director i on observable director characteristics, the fund's own management friendliness, and the average management friendliness of other funds $\bar{\nu}_{i,-j}$. From the first stage we generate an expected (fitted) value of other funds' average vote $\widehat{\bar{\omega}}^*_{i,-j} = \hat{\delta} + \hat{\gamma}_1 \nu_{ij} + \hat{\gamma}_2 \overline{\nu}_{i,-j} + \hat{\Gamma}_1 x_i$.

Because of the continuity assumption (4), combined with monotonicity from Proposition 1, we can invert the selection equation (4) and obtain an estimate of the unobserved director quality up to scale as a function of observables. To obtain this estimate, we average the residual from the first stage over all funds voting on director i:

$$\hat{\zeta}_i = \frac{1}{n} \sum_{k \neq j} \hat{r}_{ik} = \frac{1}{n} \sum_{k \neq j} \left(\omega^*_{i,-j} - \hat{\omega}^*_{i,-j} \right).$$

The averaging of the residual presents a departure from the approach of Imbens and Newey (2003). We average the residual because the unobserved director quality is not specific to every observation, as in the Imbens and Newey (2003) case; rather, it is specific to a director.[10] With a median of 141 funds voting on a director, we also obtain a precise estimate of qualities of individual directors as the average projection error $\frac{1}{n} \sum_{k \neq j} \eta_{ik}$ goes to zero. Note that $\hat{\zeta}_i$ can be arbitrarily re-scaled, since it is estimated only up to a constant factor.

In the second stage we estimate how fund voting is determined in our model of voting, i.e. we estimate all parameters of the structural best response function (3). We do so by replacing the expected average vote of other funds $\bar{\omega}^*_{i,-j}$ with their predicted value $\widehat{\bar{\omega}}^*_{i,-j}$ and replace the director unobserved quality with its estimate $\hat{\zeta}_i$: [11]

$$\omega_{ij} = \begin{Bmatrix} 1, \text{ if } \alpha + \beta_1 \nu_j + \beta_2 \widehat{\bar{\omega}}^*_{i,-j} + \beta_3 \hat{\zeta}_i + \Gamma x_i + \varepsilon_{ij} \geq 0 \\ 0, \text{ if } \alpha + \beta_1 \nu_j + \beta_2 \widehat{\bar{\omega}}^*_{i,-j} + \beta_3 \hat{\zeta}_i + \Gamma x_i + \varepsilon_{ij} < 0 \end{Bmatrix}. \tag{5}$$

Because the best response function of individual funds is being estimated, the coefficients on director characteristics $\hat{\Gamma}$ and the fund characteristic $\hat{\beta}_1$ represent only the direct response of funds to changes in parameters. Suppose we change a director characteristic that makes the funds more likely to vote "for." In equilibrium, a fund's response has two components: it raises its vote as

[10] Cooley (2006) uses a similar modification of the first stage.

[11] Our second departure from Imbens and Newey (2003) is that we replace the actual vote of other funds in the structural equation with its predicted value. Since our model is one of asymmetric information, we are interested in the effect of the expected vote of other funds, and not the effect of their actual vote. Becuse $\widehat{\bar{\omega}}^*_{i,-j}$ is orthogonal to $\hat{\zeta}_i$ by construction, this will not introduce a new endogeneity problem into the structural estimation.

a direct response to the change in the director characteristic, and the magnitude of this effect is captured by our parameter estimates. The fund also knows that other funds will raise their vote as well, therefore raising its own vote in response even more. To obtain the full response for a change in director characteristics, the equilibrium has to be recalculated, taking strategic interactions into account. Because of the monotone supermodular nature of the game, the highest and lowest equilibrium can be found using best response iterations. We present the best response iterations and calculate counterfactuals in Section 7.

Finally, we cannot use the asymptotic variance of the estimator from Imbens and Newey (2003) because of these departures from that estimator, and based on the fact that our proxy for the propensity to vote with management is a generated regressor. To obtain standard errors, we bootstrap our estimation procedure.

5 Data

In accordance with SEC requirements, mutual funds registered in the U.S. must annually report their votes in all annual and special meetings of their portfolio companies. The deadline for reporting is August 31, and the votes cover the period beginning on July 1 of the previous year and ending on June 30 of the current year. The funds were first required to report their votes in 2004.

For each vote, funds specify the name of the company, its ticker and CUSIP, the date of the meeting and the record date, a brief description of the question being voted on (director election, merger proposal, shareholder proposal, etc.), the sponsor of the proposal (management or shareholders), management's recommendation, and the vote of the fund. The SEC did not specify a particular format in which this information should be submitted. As a result, funds have complete freedom in how they report this information, and consequently the information is reported in a variety of different formats. After they submit the files to the SEC, their submissions become available on the SEC Filings & Forms website (EDGAR).[12] These submissions are known as "N-PX" filings. From the information available with the SEC, we identified all N-PX filings for two 12-month periods: 7/1/2003–6/30/2004 and 7/1/2004–6/30/2005. We used a script to download all of these submissions, resulting in 7767 text files. A typical submission is the N-PX filing of Vanguard 500 Index Fund for the year 2005.[13] Many of these files contain votes for several mutual funds, because a mutual fund management company is allowed to submit votes for some or all of its funds in a single file.[14]

We then manually reviewed a large number of these submissions to identify as many possible formats as we could find. Reviewing all submissions was not practical, because the total size of the submissions exceeded 7 gigabytes of data, and some filers change the formats used in their files.[15]

[12] http://www.sec.gov/edgar/searchedgar/webusers.htm.

[13] http://www.sec.gov/Archives/edgar/data/36405/000093247105001377/0000932471-05-001377.txt.

[14] E.g., Dreyfus Growth and Value Funds, http://www.sec.gov/Archives/edgar/data/914775/000091477505000014/0000914775-05-000014.txt.

[15] E.g., Hartford Series Fund, http://www.sec.gov/Archives/edgar/data/1053425/000095013505004942/0000950135-05-004942.txt.

However, we ensured that we identified the formats for the 100 largest active mutual funds, and for popular index fund families. In total, we identified 34 different formats.

We then wrote computer scripts to extract data from these formats to a single database, making the data operational. We applied all of these scripts to all files. Then, to filter out the records that were not correctly converted (i.e., when a wrong script was applied to a file, which occurred for 33 out of 34 scripts), we only retained the records for which the values of fund vote, management recommendation, and proposal sponsor coincided with one of several options, which we then mapped to the appropriate uniform values. These uniform values, along with the corresponding "raw" variable values, are given in the tables below. If the variable value was not in the table, it was discarded. For example, a record with the vote cast "fo" was discarded and did not count as a "for" vote; only "for" or "yes" counted.

Fund vote and management recommendation coding table

Against	For	Did Not	Withhold
against; agnst	for; yes	did not; abstain; no vote; non-vote; none; notcast; not voted; did not v; donotvote; not cast; unvoted; null	withhold; withheld; withhold; w'hold; whold

Sponsor coding table

Management	Shareholder
management; mgmt; mgt; mt; issuer	shareholder; s/h; shldr; shr; shrholdr

We retained records containing at least one of either the meeting date or record date, a CUSIP or a ticker, a valid fund vote, a valid management recommendation, and a valid sponsor. Next, we used an algorithm to sort out the director votes, and from these, extracted the last name, first name and suffix of directors. The details of these algorithms are available from the authors upon request.

There is an additional complication: some funds do not report their votes on individual directors, reporting instead whether they voted "for" the entire slate of directors or not (if they did not vote for the entire slate, they report either a "withhold" vote for the entire slate or "split" if they voted for some directors and withheld support for others). We automatically dropped such funds.

We then obtained all stock price and stock returns information from the monthly CRSP tapes. Industry benchmarks are calculated for all stocks with positive prices available on CRSP in the same two digit SIC code.

We used Compustat Industrial Annual files to construct accounting and financial company information. For our book value of assets, we use total assets (item 6). We define capex to assets as the ratio of capital expenditures (item 128) to total assets (item 6). We calculate cash flow to assets as income before extraordinary items (item 18) plus depreciation plus amortization (item 14) divided by total assets (item 6). We define leverage as liabilities (item 181) over total assets (item 6) and ROA as income before extraordinary items (item 18) over total assets (item 6).

To calculate q and book-to-market ratios, we had to obtain the market and book values of equity and assets in which we closely followed the variable construction used in Malmendier and Tate (2005). We calculate market equity as common shares outstanding (item 25) times fiscal year closing price (item 199). We calculate book equity as total stockholders' equity (item 216) minus preferred stock liquidating value (item 10) plus deferred taxes and investment tax credit (item 35), when available, minus post retirement assets (item 336), when available. If total stockholders' equity is not available, we calculate it as common equity (item 60) plus preferred stock carrying value (item 130) or, if that is not available, as total assets (item 6) minus total liabilities (item 181). If preferred stock liquidating value is not available, we replace it with preferred stock redemption value (item 56), and if that is not available, we replace it with the preferred stock carrying value. We construct the market value of assets as total assets (item 6) plus market equity minus book equity. We define q as the ratio of market value of assets to book value of assets and book to market as the ratio of book value of equity to market value of equity.

To obtain firm governance characteristics, we use the IRRC Governance database. The governance data is available only for years 2002 and 2004. We assign governance characteristics of a firm in 2003 and 2005 using data from 2002 and 2004, respectively. We obtained the director information from the Board Analyst Directors database. We removed any punctuation and stand alone letters from first and last names of directors in both databases to make the match with voting data feasible.

The voting data is first matched with CRSP and Compustat data on eight digit cusips. The unmatched data is then merged on six digit cusips, and then on the firm ticker. The IRRC governance data is matched on six digit cusips and then on tickers.

The Board analyst data is then matched using director names directly. If there is no other director sitting on the board of the company (as identified by its ticker) in a particular year, we match the voting data with Board Analyst data using the director's last name, the firm ticker, and the year. If the directors have the same last name, but differ in first name, we match by last name and first name. For the remaining data, we use the ticker, year, first name, last name and the suffix of the director.

For ease of interpretation and comparison, we retained only votes sponsored by the management in which management recommended a "for" vote. We are left with a sample of 3,917,007 director votes for which we have extracted director names. We then restrict the sample to elections in which at least 10 funds cast votes and votes were cast using proxies from ordinary common shares (share codes 10 and 11).

5.1 Summary Statistics

In our dataset we observe 14,132 director elections in 2,651 shareholder meetings of 1,408 companies. In these elections, we observe 3,619 mutual funds casting 3,204,890 votes. The summary statistics for the director elections are presented in Table 1. The average number of directors elected in a shareholder meeting is 5.32. The variation in the number of directors voted on in a shareholder

meeting is substantial, ranging between 3 and 10 for the 10^{th} percentile and 90^{th} percentile of elections by number of directors voted on, respectively. In these elections, each director is voted on by an average of 227 funds. A director election at the 10^{th} percentile of the number of funds voting has 55 funds casting votes on a director, while the 90^{th} percentile election has 484 funds casting their votes on a director.

Before we proceed to our main analysis, we present some major features of the data. We first describe the distribution of votes in boards of directors, our dependent variable in the estimation. Then we proceed to examine the differences in simple means of votes according to select director and firm characteristics. The distribution of director votes is presented in Figure 1. Most directors obtain less than 10% of "withhold" votes. While there are almost no directors obtaining "withhold" votes in the 15% to 30% range, a significant number of directors obtain "withhold" votes by more than 30% of the funds. This bimodal nature of the distribution of votes is more visible in Figure 2, where we present the distribution of votes for directors who obtained at least a 5% "withhold" vote. As we can see from Table 1, the average director in our sample receives support from 91.45% of funds, so the average director has 8.55% of funds voting "withhold." We can see that the distribution is very skewed, as only 2.33% of funds "withhold" their vote on the median director. Notice, however, that the 10^{th} percentile of directors obtains only 62.81% support, which signifies that 37.19% of funds "withhold" support from these directors.

The summary statistics for director characteristics are presented in Panel A of Table 2. Employees represent 19.22 percent of directors up for election; 68.86 percent are outside directors, and the remaining are outside related directors. CEOs comprise 10.1 percent of our director sample. S&P 500 companies comprise 28 percent of our dataset, but the sample spans a wide range of companies by size, profitability and other measures, as can be seen in Panel B of Table 2.

Simple comparisons of means in Panel A of Table 3 provide the first look at which director characteristics are correlated with board of director voting outcomes. We look at three types of director characteristics: their independence from management, their membership on board committees, and whether they held the prominent positions of CEO or Chairman. We find the largest differences in average votes by cutting the data by director independence. Independent directors on average obtain 5.43% of "withhold" votes, which is 2.69 percentage points fewer than received by insider directors, who on average obtain 8.13% of "withhold" votes. Outside related directors realize on average the worst voting outcome, with the average outside director realizing a 15.5% "withhold" vote. The prominent positions of CEO and Chairman are correlated with more fund support in elections. CEOs on average realize 0.79 percentage points fewer "withhold" votes than other directors. Similarly, Chairmen also on average receive more support from funds than other directors, averaging 0.60 percentage points fewer "withhold" votes than other directors. Similarly, the mean vote of directors who are committee members differs from those who are not. Audit committee members, on average, realize fewer "withhold" votes than other directors. Nominating committee, compensation committee, executive committee and governance committee directors, on the other hand, realize more "withhold" votes than the average director. In particular, nominat-

ing and compensation committee members receive 0.68 and 0.52 percentage points fewer than the average director, respectively.

Panel B and Panel C of Table 3 presents the mean vote cast by firms in a calendar year cut by firm characteristics. Firm size and S&P 500 membership reveal the largest differences in the mean of votes cast in board of director elections. Directors in the largest firms receive fewer "withhold" votes than directors in the smallest firms. 6.16% of votes cast in board of director elections in firms in the largest size quintile are "withhold" votes. This represents 2.19 percentage points fewer "withhold" votes, or 27% fewer than the percentage of "withhold" votes cast in firms in the smallest size quintile. Similarly, directors in S&P 500 firms on average obtain 6.04% of "withhold" votes as opposed to directors of non S&P 500 firms, who obtain on average 9.01% "withhold" votes.

We also look at mean votes in firms with respect to their absolute performance and performance relative to their industry. Directors in firms which performed in the lowest quintile of absolute returns receive a somewhat lower percentage of "withhold" votes. Their average "withhold" vote is 8.17% as opposed to directors in firms in the highest return quintile, who receive on average 8.39% "withhold" votes. This fact seems to suggest that directors in firms with higher returns potentially receive a worse outcome in board of director elections. If instead of comparing firms on their absolute returns, we compare them on their returns relative to their industry, the results paint a different picture. Directors in firms which are in the bottom quartile of their two digit SIC industry obtain on average 0.46 percentage points more "withhold" votes than other directors.

6 Results

6.1 Fund Heterogeneity

Our proxy for management friendliness of a fund is the fund's average director vote in the previous calendar year in companies other than the one under observation. For example, to measure Fidelity's friendliness when it votes on a director in IBM in 2005, we average Fidelity's director votes in companies other than IBM in 2004. We want to show that funds differ in management friendliness, and that funds' past voting records capture these differences in a meaningful way. The purpose of this section is to show that the past voting record predicts fund voting, and not to focus on the magnitude of the effect, which will be discussed in section 6.2.2. We run a linear regression to predict a fund's vote using its past voting record as an explanatory variable. We omit strategic interactions between funds and unobservable director quality from the estimation.[16] This simplifies the analysis substantially but alters the magnitudes of the coefficients, which cannot be interpreted as parameters of the underlying voting model.

The past voting record of a fund in other companies is a highly statistically significant predictor of fund voting. Table 4 column 1 shows the unconditional correlation between a fund's vote on a director and its past voting record on directors in other firms. A 10 percentage point decrease in the average vote in other firms in the past year increases the probability that a fund will "withhold"

[16] We also repeat the procedure using logits and conditional logits and obtain qualitatively similar results.

its vote from a director by 5.75 percentage points. The distribution of a fund's average vote in the previous year in firms other than the one under observation is presented in Table 1. Most of the density lies between values of 0.8 to 1, with the 10^{th} percentile of the distribution at 0.91 and the 90^{th} percentile at 1. A fund in the 90^{th} percentile of propensity to vote with management is 5.2 percentage points more likely to vote with management than a fund in the 10^{th} percentile.

Funds' past voting records could simply proxy for firm characteristics in which the funds invest. For example, suppose Fidelity invested only in firms with high returns and Vanguard only in firms with low returns. In response to high returns, Fidelity would vote "for" directors in the firms it owned last year and this year. Vanguard, on the other hand, would punish the directors of its portfolio firms for their bad returns by withholding its vote in the last calendar year and in the current election. As a result, the past voting record would be correlated with current voting even if there were no differences in management friendliness of Fidelity and Vanguard. To control for this possibility, we include measures such as last year return, log book assets and other standard firm characteristics to proxy for the quality of directors and firms in column 2 of Table 4. In the same column we also include governance characteristics of a firm, measured by the Gompers, Ishii, and Metrick (2003) index. Again, suppose Fidelity holds firms in which management has a great deal of power and Vanguard holds firms in which management has little power. Fidelity, being powerless against management, would vote "for" directors in firms it owns. Vanguard, on the other hand, would "withhold" its vote, knowing it could influence the management. Thus, past votes in other firms predict the votes of Fidelity and Vanguard even if their attitudes towards management do not differ. Column 2 in Table 4 shows that even controlling for the financial and governance firm characteristics above, a fund's vote is still correlated with its past voting record in other firms.

An additional source of variation we control for are director characteristics. Proxy voting guidelines frequently target director characteristics. For example, funds look upon outside directors more favorably, at least according to guidelines. Seats on committees put directors in a decision-making position, but also expose them to bear the consequences of committees' decisions. Suppose some funds hold shares in firms which have boards stacked with inside directors, while other funds hold firms whose boards comprise outside directors. This would induce a correlation in funds' votes and their past voting record that would not be the result of differences in funds' attitudes towards management. We control for director characteristics in column 3 of Table 4. Even after including firm and director characteristics simultaneously in column 4, a fund's vote is predicted by its average vote in the past calendar year in other firms, and this effect is statistically significant at one percent.

Up to this point, we have been controlling for observable firm and director characteristics. There is still a possibility that some directors are better than others, but that this quality is not captured by the controls in our data. If Fidelity happens to hold firms with good directors and Vanguard holds firms with bad directors, then their current vote would be correlated with their past vote. To address this issue, we compare funds' voting on the same director in an election, therefore controlling for all director characteristics. Funds whose average vote last year in other firms was

higher should be more likely to vote for this director. We show that this is indeed the case in columns 5-7 in Table 4. We do so by including a fixed effect for each shareholder meeting, and in a separate specification, a fixed effect for each director election. Among funds who vote on the same director in the same meeting, funds with a higher average vote in other firms in the last calendar year are also more likely to vote for a given director. The past voting record predicts fund voting even when controlling for the quality of the director being voted on. In other words, some funds tend to vote "for" directors more frequently than others, i.e. some funds are more management friendly than others, and their past voting record captures these differences in a meaningful way.

6.2 Estimating the voting model

Now that we have a proxy for funds' management friendliness, we can estimate the model of voting presented in section 3. The object we are estimating is the fund's best response function. In other words, we are estimating how, in equilibrium, a fund's vote changes in response to changes in the expectation of other funds' vote, the type of director that is being voted on, and the fund's own management friendliness.

The naive approach to estimating a voting model, in which we condition a fund's voting on the average vote of other funds, is inappropriate because of unobserved director quality. If a director is a good director, we expect all funds to vote for her even in the absence of strategic interaction. We resolve the endogeneity problem by estimating unobserved director quality in the first stage of our estimation and replacing the actual average vote of other funds with its prediction. We obtain variation in expected voting of other funds using our instrument, the average past voting record of the other funds.

6.2.1 First Stage

Two determinants of fund voting in our model are not directly observable: the expected average vote of other funds, and the unobservable dimension of director quality. Because these two characteristics are not directly observable, we must first estimate them. We assume that funds understand the equilibrium they are playing, and form expectations of other funds' voting by extrapolating equilibrium outcomes. Suppose Fidelity tries to predict how Vanguard will vote on director Bob who is nominated for IBM's board of directors. Fidelity first looks at Vanguard's past voting record to determine its management friendliness. Then it looks at whether Bob is an outside director, what committees he sits on, and whether IBM was profitable last year. To predict Vanguard's vote on Bob, it looks at past votes of all funds, and tries to extrapolate how funds such as Vanguard vote on directors such as Bob.

We use an analog of the fictional Fidelity procedure in the first stage of our estimation procedure to generate a fund's expectation of the average vote of other funds. We use a linear regression to predict the average vote of funds other than the one under observation. We regress the average vote of funds other than Fidelity on Bob's characteristics, the characteristics of IBM and on the average past voting record of funds other than Fidelity. In other words, the dependent variable in

the first stage is the average vote of all other funds who are voting on that director in that election. We regress their average vote on the average past voting record of these funds, firm and director controls and the management friendliness of the fund under observation.

We are interested in the variation in the average vote of other funds that is caused by our instrument, the average management friendliness of other funds. The results of the first stage are reported in Table 5. The average past voting record of funds voting on the director is strongly correlated with their vote. The coefficient ranges between 1.07 for the specification with firm and director controls, to 1.29 for the specification with no controls. The coefficient is highly statistically significant at 1 percent across all specifications. A 10 percentage point increase in the average past voting record of other funds is correlated with a 10.7 percentage point increase in their average vote.

To uncover the unobserved director quality, we take the residual from the regression above and average it over the funds voting on a director. A high residual from the first stage tells us that the director obtained a higher vote than predicted by its characteristics and the characteristics of the funds which voted on her.

6.2.2 Second stage: Estimating the parameters of the model

Having estimated the expected average vote of other funds and director unobservable quality, we now have all determinants of a fund's vote from our model. We estimate it using a simple logit where the dependent variable is the fund vote. The explanatory variables are the fund's own past management friendliness, the expected average vote of the other funds, the estimate of director unobserved quality, and a set of firm and director controls.

Before we interpret the results of the estimation, we have to remember that a change in firm or director characteristics has two effects on fund voting. The first effect is the direct effect. If IBM's last year returns were higher, Fidelity is more likely to vote "for" directors in IBM, holding all else equal. Fidelity also knows other funds are more likely to vote "for" IBM directors, as a result of higher returns. Therefore it increases Fidelity's probability of voting "for" even higher; this is the indirect effect. We start by examining the indirect effect and then turn to interpreting the effects of firm, director and fund characteristics on fund voting.

Strategic complementarity. One of the major benefits of data on fund voting is the ability to examine the interactions between funds. We show that funds are significantly more likely to withhold their vote, if they expect other funds to do so as well. From Table 6 we see that the expected average vote of other funds is a strong determinant of fund voting. The strategic effect is highly statistically significant across specifications. It ranges from 7.42 in the specification without firm or director controls, to 5.08 for the specification in which we control for director and firm characteristics simultaneously. The expectation of the average vote of other funds is determined in the equilibrium and is therefore endogenous to the model. To shed some light on the economic magnitude of this coefficient, one has to consider an out of equilibrium shock to the expectation

of other funds' average vote. In other words, the experiment we are considering is: how would Fidelity's vote change if it made a mistake and overestimated the expected average vote of other funds. If a fund's expectation of the average vote of other funds increases by 10 percentage points, the log odds of a "for" vote increase by 0.508.

To put this coefficient in context, consider a fund which withheld its vote on a director with a 20% probability. Suppose that in equilibrium the fund expected all other funds to withhold their votes with a 20% probability as well. If this fund instead made a mistake and expected all other funds to withhold their votes with only a 10% probability, its own probability of voting "withhold" would decrease by 6.9 percentage points to 13.1%, decreasing its probability of voting "withhold" by 35 percent.

An alternative way of interpreting the coefficient is a back of the envelope calculation of the indirect effect multiplier. Suppose the direct effect of changing a director characteristic decreases all funds' vote probability of voting "withhold" with 20% probability to 10%. In addition to that response, each fund now knows that all other funds will lower their vote by 10 percentage points. Each fund's best response is to decrease its log odds of a "withhold" vote further by 5.08 * 10% = 0.508, shifting the probability of a "withhold" vote from 10% to 6.3%. All funds know that, so an additional iteration decreases the log odds by (10% - 6.3%) * 5.08 = 0.188, decreasing the probability of funds voting "withhold" from 6.3% to 5.3%. After two iterations of the indirect effect multiplier, the direct effect of a 10 percentage point decline in the "withhold" vote translates to a total decline of 14.7%. The complete effect of changing a director characteristic is then almost 50% larger than it would be in the absence of funds' strategic interactions.

We obtain additional insight into the economic significance of strategic complementarity in the counterfactuals section. Instead of conducting out of equilibrium experiments, we simulate equilibria for different sizes of the strategic complementarity parameter. We can then compare the distribution of votes in the different simulated equilibria.

Fund heterogeneity. In section 6.1 we show that if we compare two funds which are voting on the same director, the fund whose average vote last year in other firms was higher is more likely to vote for this director. In other words, we showed that a fund's voting record from the previous year is a good proxy for how management friendly a fund is, and that this management friendliness affects fund voting. To understand the magnitude of this effect, however, we have to jointly estimate all factors that determine a fund's vote.

Funds' management friendliness remains a statistically significant and economically large determinant of fund voting even when we estimate the full model of voting. From Table 6, we can see that the coefficient on a fund's own management friendliness is remarkably stable across different specifications of controls at between 5.33 and 5.62. To understand the economic magnitude of this effect, consider changing a fund's management friendliness from the 10^{th} percentile to the 90^{th} percentile. This change increases a fund's log odds of a "for" vote by 1.124. To put this magnitude in perspective, consider the following example. Suppose the management unfriendly 10^{th} percentile

fund were to "withhold" the vote with a 20% probability. If the fund were to change to a management friendly fund at the 90^{th} percentile of management friendliness, she would withhold with only 7.5% probability. If we consider the case of AOL chairman Steve Case, who resigned after receiving a 22% withhold vote, such a change in fund behavior is potentially very large. Furthermore, we have only considered the change in voting of a single fund, ignoring the equilibrium reinforcement that would take place were all funds to become more management friendly at the same time. This example therefore provides a lower bound on the change in director support were all funds voting on a director to change from a 10^{th} percentile management friendly fund to a 90^{th} percentile management friendly fund.

As we will see below, fund heterogeneity in management friendliness is at least as economically important in determining fund voting as firm performance and director and governance characteristics.

Firm and director characteristics. As we mentioned above, a change in firm or director characteristics has a direct and indirect effect. The coefficients of the best response function which we interpret in this section represent the magnitudes of the direct effect, which gives us a lower bound on the equilibrium size of the effect. Furthermore, all direct effects are reinforced by the same mechanism of strategic voting. Therefore if the direct effect of a change in last year's return is economically greater than the direct effect of changing governance characteristics, then the overall effect of increasing last year returns on voting will also be larger than the overall effect of changing governance characteristics on voting.

The firm and director effects are what Manski (1993) calls the exogenous or contextual effects. The first group of exogenous effects we look into are measures of the firm's last year performance. The previous year stock return seems to be the most robust performance measure that funds respond to: a two standard deviation move in the stock return increases the log odds ratio of a director obtaining a "for" vote by 0.1. Returning to our canonical example, this change in returns would decrease the likelihood of a "withhold" vote of a fund from 20% to 18.4%. Again, one has to keep in mind that this is only the direct magnitude of the effect.

We can also examine whether funds consider director performance relative to the industry when casting votes. In other words, are directors penalized if their company's industry is doing poorly, or do the funds take industry performance into account. It seems that funds penalize directors with "withhold" votes for returns only relative to their industry. The coefficient on the industry return is statistically indistinguishable from zero. If a firm manages to switch from the bottom return quartile of its two digit SIC industry, the log odds of a "withhold" vote decrease by 0.11. In our example, this would reduce the probability of a "withhold" vote from 20% to 18.3%. Funds seem to penalize directors with an increased probability of a "withhold" vote for poor performance in their industry, rather than their firm's absolute performance.

One of the central interests in corporate governance is the effect of a firm's governance characteristics. The benefit of examining fund voting is that we obtain direct insight into the effect of

governance characteristics on the behavior of funds monitoring boards of directors. Two outcomes are possible: funds could "withhold" their vote more frequently in firms with weaker shareholder rights to force the directors to increase shareholder rights. Alternatively, funds may "withhold" their vote more frequently in firms with stronger shareholder rights, where they may be able to exert more pressure on directors. The latter seems to be the case in the data. Funds are more likely to "withhold" their vote from a director in a more dictatorial firm, such as a firm with a higher GIM index. A 10 point increase in the index increases the log odds of a "for" vote by 0.2. The direct effect of a 10 point increase in the GIM index decreases a fund's probability of a "withhold" vote from 20% to 17%. A similar phenomenon, where funds seem to vote against directors on whom they may be able to exert more pressure, can also be seen in fund voting on the CEO and Chairman. The CEO and Chairman on average realize fewer "withhold" votes than other inside directors. If we compare a CEO to a similar inside director whose probability of a "withhold" vote is 20%, the CEO is 5.1 percentage points less likely to receive a "withhold" vote.

Funds frequently address a director's relationship with the firm as a reason to "withhold" the vote in their guidelines. Funds are least likely to "withhold" their vote on an outside director. Outside related directors whose employer has a financial relationship with the firm or who are former employees of the firm, however, are more likely to obtain a "withhold" vote than inside directors. A potential explanation is that mutual funds understand that both outside related and inside directors are not free of conflicts of interests. Outside related directors have available substitutes in outside directors. The latter may not be good substitutes for inside directors, who have significantly more information on the company. An outside director's log odds ratio of a "for" vote is 0.95 higher than that of an inside director in the same firm. To put this coefficient in context, consider an inside director that receives a 20% "withhold" vote; the same director as an outsider would obtain only an 8.8% "withhold" vote, leading to a 56 percent decrease in the probability of a withhold vote.

Funds' proxy guidelines also target committee members and specify that funds are to withhold votes if they are dissatisfied with the decisions or the composition of the committee. Compensation committee members are the only committee members who receive on average lower "withhold" votes. Other committee memberships are either statistically indistinguishable from zero or increase the probability of a "withhold" vote. Acting as the chair of the nominating committee carries the largest overall negative effect, with a log odds of a "withhold" vote increasing by 0.22 for membership in the nominating committee, and a 0.23 increase for acting as the chair. Committee membership seems to have a smaller economic effect on fund voting than director independence from management. One potential reason is that we observe a director's membership on the committee, but do not observe the actual performance of the committees. For example, a director on the compensation committee should only receive a "withhold" vote if the firm paid excessive or poorly structured management compensation. So committee membership, conditional on poor performance of the committee, could still have a large impact on directors' votes. Furthermore, evaluating the work of a committee consumes more fund resources than determining whether the

director is independent. Some funds may therefore be reluctant to collect information on committee performance, and therefore not "withhold" their vote on the basis of committee membership.

Director unobserved quality. Unobserved director quality plays a large role in determining fund voting. We uncover unobserved director quality as the vote a director obtains in excess of the vote predicted by its characteristics and the management friendliness of the funds voting. We uncover this residual quality only up to a scale, and therefore its coefficient in Table 6 has no natural interpretation. Nevertheless, we can evaluate the economic importance of these differences in director quality. A two standard deviation change in unobserved director quality is 0.316 in the specification controlling for firm and director observable characteristics. An equivalent change in director quality increases the log odds by 2.68, which is larger than any of the observable firm or director effects above. This result demonstrates the importance of accounting for unobserved director heterogeneity, especially when trying to predict the distribution of votes for counterfactuals.

6.2.3 Differences in strategic complementarities

Up to this point, our empirical model constrained funds' need for coordination to be identical across all types of directors and firms. The implicit assumption was that it may be costlier or less beneficial to vote "withhold" against certain directors or firms, but that the additional cost of voting "withhold" alone did not change. This assumption suppresses some of the potential richness of strategic interactions in the data. For example, suppose that the director voted on is a CEO, and that if she receives a high enough number of "withhold" votes, she will resign and will not be able to retaliate against funds which voted "withhold." In a firm with weak shareholder rights, it takes a higher number of "withhold" votes to topple a CEO. Therefore the benefit of casting a "withhold" vote in firms with weak shareholder rights is smaller and funds are less likely to vote against a CEO. Furthermore, a fund will vote "withhold" only if it expects a high enough "withhold" vote, which will topple the CEO. Therefore its probability of voting "withhold" will respond more strongly to how it thinks other funds will vote. In this section we allow for the possibility that a fund's response to the expected vote of other funds differs across different types of directors and firms. To implement the more flexible specification, we estimate the expected vote of other funds and directors' unobserved quality as in the previous specification. In addition to all of the terms in the second stage logit, we also introduce an interaction of the expected average vote of other funds.

First we look at an empirical analog to the example above. In the example, a fund's need to vote "withhold" only when other funds do so as well is stronger in firms with weaker shareholder rights. In other words, safety in numbers is a more important consideration in firms where shareholders have few rights. The results presented in column 2 of Table 7 confirm this hypothesis. A fund's voting in firms with weaker shareholder rights (a higher GIM index) is affected more by the expected vote of other funds than by voting in firms with stronger shareholder rights. An out of equilibrium 10 percentage point increase in other funds' average expected vote raises the log odds of a "for" vote by 0.30. This response would increase by an additional 0.22 if a firm's governance deteriorated

by 10 points on the GIM index. This result suggests that funds' need for coordination with other funds increases significantly in firms with weaker shareholder rights.

Funds' need for safety in numbers may also differ across different types of directors. Executive directors, particularly the CEO, have most of the power to retaliate against funds. They can block funds' access to information or cut business ties with the objecting funds. If CEOs are more willing to retaliate against funds which voted against them rather than against other directors, safety in numbers may be a more important consideration when voting on a CEO. The results in column 3 in Table 7 demonstrate that this is indeed the case. An out of equilibrium 10 percentage point increase in other funds' average expected vote decreases the log odds of a "withhold" vote by 0.47. If the director is a CEO, the log odds decrease by an additional 0.24. Equivalently, a fund would decrease its probability of a "withhold" vote from the initial probability of 20% to 13.5% for the average director and to 9.1% for the CEO. One might consider that a similar mechanism that reinforces the need of funds to coordinate their "withhold" votes on a CEO to a greater extent would also work for a Chairman. This does not seem to be the case, as we can see from column 4 in Table 7. It seems that, unlike in the case of the CEO, the funds do not need to coordinate their "withhold" votes on the Chairman any more than they do on other directors.

6.3 Alternative Explanations: funds' management friendliness and stock holdings

We have estimated the voting model and examined the results of the estimation. Now we address some alternative explanations for the result that funds increase their vote in response to an increase in the average expected vote of other funds. As mentioned in section 4.2, mutual funds do not randomly select stocks for investment. If more management friendly funds hold different stocks than management unfriendly funds, then holdings could induce a correlation in fund voting that would be mistaken for strategic interaction. We examine two types of non-random stock holding that could be problematic for our identification.

If management friendly funds hold similar stocks, then other funds' average management friendliness could simply be a more precise estimate of a fund's own management friendliness. To address this problem, we want to compare a fund's voting in firms where other funds are relatively more or relatively less friendly. To do so, we would ideally include fund year fixed effects into the specification in order to control for that problem. It is unclear whether the methodology used above can be extended to include fund fixed effects directly.[17] Instead, we approximate the best response function with a linear function. This enables us to estimate strategic interactions using a standard instrumental variables specification, in which we include fund year fixed effects. Again, our dependent variable is the average vote of other funds voting on a director, instrumented using the other funds' average management friendliness. In the estimation, we condition the first and the second stage on the fund we are observing. The estimates are presented in Table 8. We can see that

[17] The problem arises in the second stage of the estimation; we cannot simply include fund year dummies in the logit because of the well-known consistency problems in such specifications.

the expected average vote of other funds, instrumented using the average management friendliness of other funds, is highly statistically significant even after including fund year fixed effects. The magnitudes of the coefficient of expected average other funds vote ranges between 0.54 and 0.68. If a fund's expectation (out of equilibrium) of other funds' voting increases by 10 percentage points, her probability of voting "withhold" decreases by 5.4 to 6.8 percentage points. Interestingly, the economic significance of the strategic interaction using a linear model is very close to the one using the logit model above. From these results it seems unlikely that our results would be driven by management friendly funds simply holding shares in companies.

Another alternative explanation is that management unfriendly funds hold companies in which directors have a low unobservable quality. In other words, activist funds purchase stocks in firms which are bad, and, in particular, which are bad on an unobservable characteristic. Mutual funds have less scope for direct activist behavior than hedge funds or individual activist investors, being limited by their diversification requirements. Nevertheless, this type of sorting would invalidate our identifying assumption that the other funds' management friendliness is excluded from a fund's payoff. A firm held by management friendly funds would be a better firm than predicted by its observable characteristics. Hence, the average management friendliness of other funds would proxy for an unobserved firm characteristic.

We first examine which *observable* firm characteristics are correlated with the average management friendliness of funds holding the firm. If activist funds acquire shares in bad companies, we should expect them to hold firms which are bad on observable and unobservable characteristics. In fact, observable firm characteristics such as past returns and governance characteristics should be particularly strongly correlated with fund friendliness, if we expect unobservable firm quality, which is neither captured by accounting numbers nor by stock returns, to matter as well. Table 9 presents the correlation of observable firm characteristics with the average management friendliness of funds holding shares in the firm. If activist mutual funds acquire shares in companies which are bad, one would expect these firms to also either exhibit bad performance or poor governance. This does not seem to be the case. Neither last year stock price return, nor the firm's accounting return on assets nor its governance characteristics are correlated with the average management friendliness of funds holding shares in the firm. The only individual firm performance characteristic that is correlated with management friendliness is whether the firm performed in the bottom quartile of its industry, which is only marginally statistically significant at 10%. However, activist funds *do not* seem to hold these firms. On the contrary, firms which perform poorly relative to their industry tend to be owned by management friendly funds, suggesting it is management friendly funds which hold bad firms. Combined, these results do not seem to support the view that management unfriendly funds hold shares in companies which are bad. Instead, mutual fund friendliness is correlated with the book size of a firm's assets, its leverage, book to market, membership in the S&P 500, and the industry return. These variables are highly correlated with determinants of mutual funds' management styles as in Goetzmann and Brown (1997). They show that mutual funds can be classified in several groups according to their investment style, and some of the determinants of styles are size of

the firm, firm's market to book ratio and S&P 500 membership. Mutual funds also tend to invest in similar industries. The correlation of average mutual fund friendliness and firms' observable characteristics seems to be consistent with the standard determinants of fund style, but does not seem to be consistent with activist funds purchasing companies which are bad on an unobservable quality.

As we mentioned above, if activist funds hold companies which are bad on an unobservable characteristic, then a fund's past voting record in other companies is not only proxying for the fund's management friendliness, but also for firms' unobservable quality. Suppose that is indeed the case. Then, to predict the quality of a firm, one has to look at both its observable characteristics and which funds hold the firm. If the funds holding the firm voted against other firms in their portfolio in the past, then this firm is also a part of a portfolio of bad firms. Therefore this firm is likely worse than one would predict from its observable characteristics. A fund's past voting record in other firms then contains information both about the fund's actual friendliness and about the quality of the firm in question. When we predict a fund's voting using its past voting record, as we did in Table 4, column 4, controlling for firm characteristics, the fund's past voting record encompasses two effects. A high past voting record in other firms is correlated with a fund's vote because the fund is management friendly. The past voting record in other firms is also correlated with a fund's vote in the firm because all firms in the portfolio are of similar unobserved quality. The election fixed effect should absorb all firm information that was up to this point absorbed in a fund's past voting record. If a fund's past voting record in other companies were proxying for unobserved firm quality, then its effect on a fund's vote should be diminished after the inclusion of fixed effect, because the fixed effect would absorb the effect of the unobserved quality. Therefore one would expect the coefficient on the past voting record to disappear or at least to decrease substantially after the inclusion of director fixed effects. The size of the coefficient is barely affected by the inclusion of the firm effects, as we can see from column 5 Table 3. The coefficient changes from 0.568 in the specification with firm and director characteristics, to 0.561 with firm meeting fixed effects. Thus this is an additional reason why it is unlikely that the past voting record of a fund in other companies proxies for an unobserved quality of the firm in question.

7 Counterfactuals: Equilibrium impact of strategic complementarity and confidential voting

At this point we have estimated all parameters which determine voting in our model. We can now use the model to generate counterfactuals in order to examine the consequences of board of director elections. We also examine the potential impact of implementing confidential proxy voting in board of director elections. We do so by comparing simulated equilibria under different specifications of strategic complementarity. This exercise also allows us to examine the equilibrium consequences of altering the strength of strategic complementarities, rather than interpreting its economic significance as a response to out of equilibrium changes in beliefs.

In this section we first describe the construction of counterfactuals. Then we test the performance of our model in-sample by comparing the distribution of realized votes to the distribution of votes predicted by the model. We then use counterfactuals to examine the consequences of implementing confidential proxy voting in board of director elections.

7.1 Constructing counterfactuals

To construct counterfactuals, we alter the model we estimated and find the resulting equilibrium. The criterion for an equilibrium profile is whether, holding all other funds' strategies fixed, a fund wants to change its own strategy. If we have found a profile in which no fund wants to change its strategy, we have arrived at an equilibrium. The benefit of modeling this game as a monotone supermodular game is that we know that an equilibrium exists, and furthermore, we do not have to check every possible strategy profile to find it (Van Zandt and Vives 2006). Suppose we start at the strategy profile in which all funds vote "for" a director with certainty. Then we check, for every fund, how they would respond, were this the case. We then take their response as given, and ask again how each fund would respond if all other funds played the strategy from the previous iteration. If we reach a profile in which no fund wants to change its strategy, we have found an equilibrium. Van Zandt and Vives (2006) not only guarantee that this equilibrium exists, but also that this process will lead to an equilibrium that bounds all other equilibria of the game. This is the most management friendly equilibrium; if a fund withholds its vote on a director in this equilibrium, it will do so in any other equilibrium of this game. Similarly, if we repeated this process, but started at a strategy profile where all funds "withhold" their vote, we would converge to an equilibrium that would provide an additional bound on equilibria of this game. If a fund votes "for" a director in this equilibrium, it will vote "for" the director in any other equilibrium.

To obtain our counterfactuals, we first have to specify funds' strategies. Using Remark 1, we can specify a strategy of fund j, given its own type, director characteristics and other funds' expected average vote, by a cutoff c_{ij}. For realizations of the idiosyncratic shock ε_{ij} below c_{ij}, the fund votes "withhold," and for realizations higher than c_{ij}, it votes "for." The cutoff for fund j can be obtained from our best response function as $c_{ij} = -\left(\alpha + \beta_1 \nu_j + \beta_2 E\omega_{i,-j} + \beta_3 \zeta_i + \Gamma x_i\right)$. The logistic specification of the best response function allows us to obtain a closed form expression for the expected vote from a fund's strategy $\Pr\left(\omega_{ij} = 1\right) = \frac{\exp(-c_{ij})}{1+\exp(-c_{ij})}$.

Van Zandt and Vives (2006) show that the highest equilibrium of a monotone supermodular game can be obtained by iterating the best response function from the highest strategy profile. Let c_{ij}^t be the cutoff value for the strategy and $\Pr\left(\omega_{ij}^t = 1\right)$ the expected vote of fund j after the t^{th} iteration of the best response function. In t^{th} iteration we calculate the strategy of every fund by calculating its cutoff, c_{ij}^t, holding the expected vote of other funds fixed from the iteration $t-1$. From the strategy, we can calculate the expected vote for each fund, which we then average over funds other than j. In iteration $t+1$ we recalculate the strategies of every fund. Holding the expected vote of other funds fixed from t^{th} by inserting the average expected vote into the best response function, we calculate a new cutoff. Van Zandt and Vives (2006) show that these iterations

converge to the highest equilibrium if we start from the highest strategy profile, where everyone votes "for" with probability 1. Equivalently, to find the lowest equilibrium strategies, repeat the iterations above, starting with $\Pr\left(\omega_{ij}^1 = 1\right) = 0$ for all i, j.

The following set of equations specifies the iterations of the best response function that lead to the highest and lowest equilibrium of our game. We start by setting the strategy of every fund to vote "for," $\Pr\left(\omega_{ij}^1 = 1\right) = 1$ and iterate the following two equations until convergence. We repeat the procedure by starting with $\Pr\left(\omega_{ij}^1 = 1\right) = 0$ to obtain the lowest equilibrium.

$$\begin{aligned} c_{ij}^t &= -\Big(\alpha + \beta_1 \nu_j + \beta_2 \bar{\omega}_{i,-j}^{t-1} + \beta_3 \hat{\zeta}_i + \Gamma x_i \Big) \\ \bar{\omega}_{i,-j}^t &= \sum_{k \neq j} \Pr\left(\omega_{ik}^t = 1\right) = \sum_{k \neq j} \frac{\exp\left(-c_{ij}^t\right)}{1 + \exp\left(-c_{ij}^t\right)} \end{aligned}$$

The first equation specifies the strategy of a fund, given the expected average vote of other funds in the previous iteration. The second equation simply calculates the expected vote of other funds given their strategies.

7.2 Performance of the model

We first perform an in-sample test of our model by simulating out the equilibrium voting under the estimated parameters, and comparing it to the actual voting. The highest and lowest simulated equilibrium are so close that we present only the results for the highest, most management friendly equilibrium. We calculate director support by averaging the probability of a "withhold" vote for all funds voting on a director. Figure 3 presents the distribution of the percentage of funds supporting a director in an election for the simulated equilibrium. The results are presented in Panel A of Table 10. The model matches the qualitative features of the data. It also matches quantitative features of the data for the distribution of votes for directors who received support above the 10^{th} percentile of distribution of support.

As we can see from Figure 3, the model's qualitative predictions match the data relatively well. The simulated distribution of votes is bimodal and the second mode is formed in the lowest 10^{th} percentile of directors. In other words, most directors receive a few "withhold" votes, but there is a mass of directors who receive a relatively high "withhold" vote. Few directors receive support between these two modes.

While a significant number of directors obtain no "withhold" votes in the data, our model does not replicate this empirical fact. The reason is that we are comparing an actual realization of votes to the average probability of funds supporting a director. Using a logit model, no fund will ever vote for a director with probability 1; therefore, the mean expected support will be lower than 1 by construction. To match this empirical fact, we would have to draw a set of specific idiosyncratic shocks, ε_{ij}, which would then yield a number of directors obtaining no "withhold" votes.

The quantities are well matched for a significant part of the distribution of director votes. 75%

of directors obtain "withhold" votes from less than 5.3% of funds in the actual data and 3.2% of funds in the simulated equilibrium. Also, there are almost no directors obtaining between 15% to 30% of "withhold" votes. The biggest difference between the realized vote and the predicted vote is in the level of support obtained by the 10 percent of directors with the highest level of "withhold" votes. In the data, the 10 percent of directors with the lowest support experience a large drop in support, from 5.2% "withhold" for the 75^{th} percentile director, to 31.7 percent for the 90^{th} percentile director. Consistent with the data, our model also predicts a large decrease in the support of these directors; however, the model predicts they will obtain a 90.1% "withhold" vote. In other words, our model predicts the correct number of directors which have a particularly bad voting outcome, but it estimates that their vote will be worse than it actually is. This difference is probably a consequence of the functional form assumptions in our estimation. We have to keep this deviation from the data in mind when interpreting the counterfactual results.

7.3 Confidential Voting

Confidential proxy voting is at the forefront of shareholder activism; the proposals for its implementation consistently rank among the most common shareholder proposals submitted by institutional investors (Romano 2003). The Council of Institutional Investors, one of the shareholder rights groups, lists confidential voting as one of the six inviolable shareholder rights (Council of Institutional Investors 2006). While considered one of the premier issues by shareholder activists, there has been little empirical work on confidential proxy voting. One of the reasons seems to be that the research is plagued with endogeneity problems that do not seem to have a straightforward solution. Given the lack of direct tests to assess the impact of confidential voting, we turn to an alternative way of addressing the question. We use our estimated model of voting to ask how voting would have looked were it confidential. This approach is less than perfect, and we lay out several of its possible shortcomings below. It does, however, offer an alternative approach to a potentially important policy which has received limited attention. In contrast with the prior literature on confidential voting, our results suggest a potentially large impact of implementing confidential voting on board of director elections.

The problem with conducting empirical research on confidential proxy voting is that the literature has not been able to identify a natural experiment that would yield exogenous changes in confidentiality policies of firms. Therefore, empirical studies of confidential voting are subject to endogeneity concerns: the fact that a firm has decided to change its confidentiality policy is indicative of changes in the firm or in its environment. Romano (2003), for example, tries to address the endogeneity concern by using a firm fixed effects approach. However, the fact that the firm enacted confidential voting in a particular year is in itself evidence that something about the firm has changed, and can therefore not be controlled for with fixed effects. These endogeneity concerns have been one of the main hindrances in the development of the literature on confidential proxy voting.

The second problem with confidential voting is that it differs among firms, making it hard to

distinguish when confidentiality is only a formality versus when voting is in fact confidential. For example, confidentiality frequently does not apply to proxy fights. Vote tabulators can be independent third parties, or company employees who are sworn to secrecy (McGurn 1989) and (Monks and Minow 2001). The differences in their incentives not to reveal the individual shareholder vote to management may lead to significant differences in the level of confidentiality. These differences in de facto levels of confidentiality make it even harder to empirically examine the impact of confidentiality in proxy voting.

In our model, we cannot directly impose confidential voting. We can, however, assume that a direct effect of confidential voting would be a decrease in externalities exhibited by fund voting. We postulated that strategic externalities arise because it is easier for managers to punish a fund if it is among the "dissenters" rather than a part of a big group. In a confidential voting system, funds' votes are anonymous. Therefore management has significantly less information to pinpoint which funds it should retaliate against, reducing the need for funds to hide in a group. Therefore, the imposition of confidential voting should reduce the need for strategic interaction between funds.

An additional disadvantage of using counterfactuals is that our model of voting may be misspecified. This is especially a concern for large changes in the underlying economic environment. One concern is that "withhold" votes have no legal consequences, and therefore the impact of the voting outcome on directors may change when we change the underlying economic environment. In the current environment, where most directors obtain all "for" votes, a 20% "withhold" vote can be considered a cause for a director's resignation. If the equilibrium changed to one in which most directors obtained at least 40 percent of "withhold" votes, a 20% "withhold" vote may be considered a good outcome for a director, rather than a signal of shareholder dissatisfaction.

With these caveats in mind, let us look at the benefits of using counterfactual analysis in the context of confidentiality of board of director elections. The first advantage of using counterfactual analysis is the absence of endogeneity problems. The change in confidentiality is exogenous from the perspective of the agents in the model: there are no endogeneity concerns, because we exogenously changed their environment. We also do not have to worry about how narrowly confidentiality is defined by a firm or whether it will be respected. The counterfactual calculation is simulating equilibria that can be interpreted as moving to a de facto more confidential voting system.

Our results suggest that if implementing confidential voting leads to even a relatively small decrease in strategic complementarities, it would potentially lead to a large increase in the number of "withhold" votes that directors receive and to a decline in the variance of the distribution of director votes. We recalculate the highest equilibrium[18] for every director election under three different values of the strategic complementarity parameter, β_2. In addition to replicating the observed equilibrium, we reduce the strength of strategic externalities by half by calculating the equilibrium under $\beta_2 = 2.54$. Last, we reduce the strength of strategic externalities further, to a quarter of the estimated value, $\beta_2 = 1.27$. For every value of the parameter, we calculate the

[18] The highest and the lowest equilibrium are empirically very close, so we will present results only for the highest equilibrium.

percentage of mutual funds supporting a particular director in an election. The results are presented in Panel B of Table 10. The distribution of the percentage of funds supporting a director in simulated elections is also presented in Figures 3, 4 and 5.

A decrease in strategic externalities increases the probability of funds voting "withhold" and decreases the variance in the distribution of director votes. From Table 10, Panel B we can see that the probability of obtaining a "withhold" vote increases throughout the distribution of director votes as the strength of strategic complementarity decreases. Funds' incentives to vote "for," when other funds do so, decrease, leading to an increased "withhold" vote. The smaller externality also leads to less reinforcement.

To put the size of the effect in perspective, first consider the case of reducing strategic complementarities by half, to $\beta_2 = 2.54$. From Panel B Table 10 and Figure 4, we can see that in this scenario less than 10% of directors receive "withhold" votes from less than 15% of funds voting. More than 20% of funds will "withhold" their vote in 50% of directors. Over 41% of directors receive "withhold" votes from more than 22% of funds, potentially surpassing the disastrous vote received by Steve Case of AOL. This is a large shift in the distribution of votes, if we compare it to the actual vote realization, where, for example, the 75^{th} percentile director received "withhold" votes from only 5.2% of funds. Decreasing the strategic complementarity parameter by an additional quarter of the estimated value, to $\beta_2 = 1.27$, shifts the distribution of votes even further, as we can see in Figure 5. Under this specification, the 10^{th} percentile director has 35.4% of funds voting "withhold" and the median director receives "withhold" votes from 46% of directors.

The counterfactual analysis above is in terms of the "withhold" vote realized. It does not address welfare consequences of the policy change, nor does it touch upon the effect the policy might have on outcomes like director turnover. As explained above, "withhold" votes have no legal consequences in plurality voting. A 22% "withhold" vote can be considered disastrous in an environment in which the director receiving it is in the bottom quartile of support received. A 22% vote, which puts a director squarely in the top 10% of support received, on the other hand, can be considered an accomplishment. To examine the impact of implementing confidential voting on director turnover is beyond the scope of this paper.

8 Conclusion

Voting in board of director elections is one of the main governance tools that shareholders have at their disposal. Prior empirical literature on boards of directors used outcome variables such as board composition and director survival rates to understand this process. We explore shareholder voting more directly, by constructing a comprehensive dataset of 3,204,890 mutual fund votes in director elections that took place between July 2003 and June 2005.

Votes by individual mutual funds allow us to analyze the behavior of these funds and the interactions among them. We find substantial systematic heterogeneity in fund voting patterns with some mutual funds being more management friendly and others less so. This heterogeneity

among funds has a large economic effect on voting, on par with firm and director characteristics. This indicates that who monitors the director can potentially be as important as the characteristics of the directors monitored.

We then estimate a model of voting in which mutual funds impose externalities on each other: the cost of opposing management decreases when other funds oppose it as well. To estimate the model, we exploit fund heterogeneity. We compare fund voting in two otherwise identical firms; one in which other funds are management friendly owners, and another in which other funds are management unfriendly. Management friendly owners are ceteris paribus more likely to vote for directors, providing us with variation in voting of other funds. We show that strategic interaction between funds is an economically and statistically significant factor in determining fund voting. It significantly reinforces the direct effect other factors, such as director independence, have on the voting outcome. We use the estimated model to examine the impact of implementing confidential voting in board of director elections. We find, in contrast with the previous literature, that confidential voting can have a large impact on the number of funds withholding their vote from a director.

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Table 1
Election and Fund characteristics

The sample contains 2651 board of director elections of directors sponsored by the management between 2003 - 2005. It contains data on 14132 directors who were up for election to a board of directors between 2003 - 2005, and were recommended for election by the management. The data also contains 4690 fund years. Number of directors up for election is the number of directors voted on in a shareholder meeting on a given date. Number of funds voting on a director is the number of funds casting votes on a director in a board of directors election on a given day. The average "withhold" vote per director is the percentage of funds casting a "withhold" vote in a given director election. Fund's management friendliness is the percentage of "for" votes cast by a fund in board of director elections in the previous calendar year in firms other than the firm under observation. Data sources: SEC/Edgar (N/PX), Board Analyst Directors

Variable	Mean	St. Dev	p10	Median	p90	N
Number of directors up for election	5.3	3.2	2	4	10	2651
Number of funds voting on director	226.8	216.5	55	141	484	14132
Average "withhold" vote per director	8.5%	16.8%	37.2%	2.3%	0.0%	14132
Fund's management friendliness	0.91	0.14	0.80	0.96	1.00	4690

Table 2
Firm and Director Summary Statistics

Panel A contains data on 14132 directors who were up for election to a board of directors between 2003 - 2005 and were recommended for election by the management. The sample in Panel B contains 2640 firm year observations on firms, which held director elections between 2003 - 2005. The industry return is the value weighted return of the firms two digit SIC industry. The omitted category from Outside Director and Outside Related Director is an Inside Director. Data sources: SEC/Edgar (N/PX), CRSP, Compustat, IRRC Governance, Board Analyst Directors

Panel A: Director Meeting characteristics

Variable	Mean	N
CEO	10.1%	14132
Chairman	9.9%	14132
Founder	1.8%	14132
Outside Director	68.9%	14132
Outside Related Director	11.9%	14132
Audit Chair	0.6%	14132
Audit Member	37.0%	14132
Compensation Chair	4.7%	14132
Compensation Member	35.9%	14132
Executive Chair	1.4%	14132
Executive Member	15.2%	14132
Governance Chair	3.7%	14132
Governance Member	30.1%	14132
Nominating Chair	3.9%	14132
Nominating Member	34.0%	14132

Panel B: Firm Year Characteristics

Variable	Mean	St. Dev	Median	N
Last Year Return	13.6%	62.3%	4.9%	2617
ROA	3.7%	10.1%	4.0%	2640
Industry Return	4.1%	23.9%	3.7%	2640
Return Below Industry Quartile	21.5%	41.1%	0.0%	2617
Assets	12961	67534	1801	2640
Q	1.88	1.19	1.50	2618
Book to Market	0.52	0.41	0.47	2618
Leverage	0.56	0.24	0.56	2635
Cash flow to Assets	0.08	0.10	0.08	2599
Capex to Assets	0.05	0.05	0.03	2448
S&P 500	28.0%			2640

Table 3
Average Vote by Director and Firm Characteristics

Panel A presents the percentage of funds which cast "withhold" votes in director elections by director characteristics. Column (1) presents the percentage of "withhold" votes cast by funds on directors without the characteristic, and column (2) the percentage of "withhold" votes cast on directors with the characteristic. Column (2) - (1) presents the difference in the means for the two groups. Panel B presents the percentage of funds which cast "withhold" votes in director elections by firm characteristics. The columns in Panel B provide the same statistics as those in Panel A. Panel C presents the percentage of votes cast "withhold" in director elections in the highest and lowest quintile of firms sorted on firm characteristics. Column (2) - (1) presents the difference in the mean of the highest and lowest quintile. Data sources: SEC/Edgar (N/PX), CRSP, Compustat, IRRC Governance, Board Analyst Directors

Panel A: Director Characteristics

	Statistic	(1) No	(2) Yes	(2) - (1) Difference
CEO	Mean Vote "withhold"	7.10%	6.31%	-0.79%***
	N	2892481	312409	
Chairman	Mean Vote "withhold"	7.08%	6.48%	-0.60%***
	N	2901745	303145	
Founder	Mean Vote "withhold"	6.92%	12.88%	5.95%***
	N	3151266	53624	
Audit Member	Mean Vote "withhold"	7.16%	6.78%	-0.38%***
	N	2039791	1165099	
Compensation Member	Mean Vote "withhold"	6.84%	7.36%	0.52%***
	N	2102955	1101935	
Executive Member	Mean Vote "withhold"	6.99%	7.18%	0.19%***
	N	2662735	542155	
Governance Member	Mean Vote "withhold"	6.91%	7.27%	0.36%***
	N	2181221	1023669	
Nominating Member	Mean Vote "withhold"	6.79%	7.47%	0.68%***
	N	2113145	1091745	
Outside Director	Mean Vote "withhold"		5.43%	
	N		2255142	
Inside Director	Mean Vote "withhold"		8.13%	
	N		583578	
Outside Related Director	Mean Vote "withhold"		15.05%	
	N		366170	

Panel B: Firm Characteristics

	Statistic	(1) No	(2) Yes	(2) - (1) Difference
S&P 500	Mean Vote "for"	9.01%	6.04%	-2.96%***
	N	1057646	2147244	
Return Below Industry Quartile	Mean Vote "for"	7.11%	6.65%	-0.46%***
	N	2584239	611175	

Panel C: Firm Characteristics (lowest versus highest quintile)

	Statistic	(1) Lowest Quintile	(2) Highest Quintile	(2) - (1) Difference
Return Quintile	Mean Vote "for"	8.17%	8.39%	0.23%***
	N	556346	526097	
Size Quintile	Mean Vote "for"	8.35%	6.16%	-2.19%***
	N	206316	1582128	
Book to Market Quintile	Mean Vote "for"	6.86%	6.19%	-0.66%***
	N	905476	422917	

Table 4
Propensity to Vote with Management (Linear Projection)

The dependent variable is a vote cast by a fund in a board of directors election; it takes the value of 1 if the vote is "for" and 0 otherwise. Own management friendliness is calculated as the average vote of a fund in the previous calendar year on firms other than the firm under observation. The industry return is the value weighted return of the firms two digit SIC industry. The governance index is the governance index from Gompers, Ishii, Metric (2003). The omitted category from Outside Director and Outside Related Director is an Inside Director. Data sources: SEC/Edgar (N/PX), CRSP, Compustat, IRRC Governance, Board Analyst Directors

	(1) Vote "for"	(2) Vote "for"	(3) Vote "for"	(4) Vote "for"	(5) Vote "for"	(6) Vote "for"	(7) Vote "for"
Own Management Friendliness	0.575	0.569	0.572	0.568	0.561	0.560	0.556
	[0.0422]***	[0.0426]***	[0.0422]***	[0.0427]***	[0.0140]***	[0.0139]***	[0.0046]***
Firm Characteristics							
Last Year Return		-0.006		-0.007			
		[0.0012]***		[0.0012]***			
ROA		0.072		0.119			
		[0.0296]**		[0.0293]***			
Industry Return		-0.006		-0.002			
		[0.0044]		[0.0042]			
Return Below Industry Quartile		0.000		0.000			
		[0.0011]		[0.0011]			
Log Assets		-0.002		-0.002			
		[0.0006]***		[0.0006]***			
Q		-0.003		-0.002			
		[0.0004]***		[0.0004]***			
Book to Market		0.005		0.005			
		[0.0019]**		[0.0020]***			
Leverage		0.038		0.030			
		[0.0025]***		[0.0024]***			
Cash flow to Assets		-0.005		-0.068			
		[0.0285]		[0.0282]**			
Capex to Assets		-0.028		0.021			
		[0.0151]*		[0.0150]			
S&P 500		0.026		0.024			
		[0.0022]***		[0.0022]***			
Governance Index		0.001		0.000			
		[0.0002]***		[0.0002]			
Director Characteristics							

Outside Director			0.068	0.066		0.048	
			[0.0019]***	[0.0018]***		[0.0061]***	
Outside Related director			-0.034	-0.031		-0.042	
			[0.0015]***	[0.0014]***		[0.0077]***	
CEO			0.028	0.031		0.015	
			[0.0013]***	[0.0013]***		[0.0054]***	
Chairman			0.019	0.018		0.012	
			[0.0008]***	[0.0008]***		[0.0038]***	
Founder			-0.031	-0.021		-0.010	
			[0.0019]***	[0.0018]***		[0.0139]	
Audit Chair			0.000	0.000		0.000	
			[0.0000]	[0.0000]		[0.0000]	
Audit Member			-0.013	-0.011		-0.008	
			[0.0005]***	[0.0004]***		[0.0031]**	
Compensation Chair			-0.001	0.000		0.002	
			[0.0015]	[0.0009]		[0.0057]	
Compensation Member			-0.021	-0.019		-0.015	
			[0.0006]***	[0.0006]***		[0.0034]***	
Executive Chair			0.008	0.007		0.009	
			[0.0018]***	[0.0016]***		[0.0061]	
Executive Member			-0.002	-0.008		0.000	
			[0.0007]***	[0.0007]***		[0.0047]	
Governance Chair			0.012	0.021		-0.013	
			[0.0037]***	[0.0037]***		[0.0244]	
Governance Member			0.008	0.001		0.001	
			[0.0017]***	[0.0015]		[0.0083]	
Nominating Chair			-0.018	-0.023		0.003	
			[0.0038]***	[0.0038]***		[0.0240]	
Nominating Member			-0.022	-0.014		-0.019	
			[0.0017]***	[0.0015]***		[0.0083]**	
Election (Firm Date) FE					Y	Y	
Director Election (Director Date) FE							Y
Constant	0.402	0.381	0.374	0.361	0.415	0.398	0.419
	[0.0398]***	[0.0402]***	[0.0396]***	[0.0402]***	[0.0129]***	[0.0146]***	[0.0042]***
Observations	2815651	2492499	2815651	2492499	2815651	2815651	2815651
R-squared	0.07	0.08	0.09	0.09	0.09	0.10	0.10

Robust standard errors in brackets

* significant at 10%; ** significant at 5%; *** significant at 1%

Table 5
First Stage: Equilibrium Projection

The dependent variable is the average vote of other funds voting on the director in the shareholder meeting, where the "for" vote takes the value of 1 and 0 otherwise. Average management friendliness of other funds is the average management friendliness of funds voting on the director in the shareholder meeting. Own management friendliness is calculated as the average vote of a fund in the previous calendar year on firms other than the firm under observation. The industry return is the value weighted return of the firms two digit SIC industry. The governance index is the governance index from Gompers, Ishii, Metric (2003). The omitted category from Outside Director and Outside Related Director is an Inside Director. Data sources: SEC/Edgar (N/PX), CRSP, Compustat, IRRC Governance, Board Analyst Directors

	(1) Other Fund's Avg. Vote "for"	(2) Other Fund's Avg. Vote "for"	(3) Other Fund's Avg. Vote "for"	(4) Other Fund's Avg. Vote "for"
Average Management Friendliness	1.2902	1.1326	1.1943	1.0735
of Other Funds	[0.0204]***	[0.0226]***	[0.0183]***	[0.0216]***
Own Management Friendliness	0.0029	0.0026	0.0023	0.0021
	[0.0023]	[0.0020]	[0.0020]	[0.0019]
Firm Characteristics				
Last Year Return		-0.0057		-0.0066
		[0.0006]***		[0.0006]***
ROA		0.0869		0.1337
		[0.0124]***		[0.0121]***
Industry Return		-0.0199		-0.0143
		[0.0014]***		[0.0014]***
Return Below Industry Quartile		-0.0006		-0.001
		[0.0005]		[0.0005]*
Log Assets		-0.003		-0.0029
		[0.0002]***		[0.0002]***
Q		-0.0017		-0.0011
		[0.0002]***		[0.0002]***
Book to Market		0.0053		0.0059
		[0.0005]***		[0.0006]***
Leverage		0.0353		0.0281
		[0.0009]***		[0.0009]***
Cash Flow to Assets		-0.0233		-0.0858
		[0.0122]*		[0.0119]***
Capex to Assets		-0.0177		0.0312
		[0.0064]***		[0.0062]***
S&P 500		0.0171		0.016
		[0.0010]***		[0.0010]***
Governance Index		0.0004		-0.0001
		[0.0001]***		[0.0001]
Director Characteristics				
Outside Director			0.0659	0.0651
			[0.0009]***	[0.0009]***
Outside Related Director			-0.0345	-0.0304
			[0.0007]***	[0.0007]***
CEO			0.0277	0.0301
			[0.0008]***	[0.0008]***
Chairman			0.0202	0.0179

			[0.0003]***	[0.0003]***
Founder			-0.0265	-0.0201
			[0.0010]***	[0.0010]***
Audit Chair			0	0
			[0.0000]	[0.0000]
Audit Member			-0.0119	-0.0111
			[0.0003]***	[0.0003]***
Compensation Chair			-0.0059	-0.0017
			[0.0005]***	[0.0005]***
Compensation Member			-0.0197	-0.0198
			[0.0003]***	[0.0003]***
Executive Chair			0.0014	0.0039
			[0.0007]*	[0.0008]***
Executive Member			-0.0038	-0.0078
			[0.0003]***	[0.0004]***
Governance Chair			0.0081	0.0194
			[0.0016]***	[0.0017]***
Governance Member			0.0042	0.0016
			[0.0006]***	[0.0007]**
Nominating Chair			-0.0188	-0.0233
			[0.0015]***	[0.0017]***
Nominating Member			-0.0189	-0.015
			[0.0006]***	[0.0006]***
Constant	-0.2595	-0.1217	-0.1998	-0.089
	[0.0180]***	[0.0201]***	[0.0163]***	[0.0196]***
Observations	2815651	2492499	2815651	2492499
R-squared	0.02	0.03	0.07	0.07

Robust standard errors in brackets
* significant at 10%; ** significant at 5%; *** significant at 1%

Table 6
Best Response Function

The dependent variable is a vote cast by a fund in a board of directors election; it takes the value of 1 if the vote is "for" and 0 otherwise. The predicted vote of other funds is the fitted value of the corresponding column in Table 5. Unobserved quality is the average residual from the specification of the corresponding column in Table 5 , averaged within a director in a meeting pair. Own management friendliness is calculated as the average vote of a fund in the previous calendar year on firms other than the firm under observation. The industry return is the value weighted return of the firms two digit SIC industry. The governance index is the governance index from Gompers, Ishii, Metric (2003). The omitted category from Outside Director and Outside Related Director is an Inside Director. Data sources: SEC/Edgar (N/PX), CRSP, Compustat, IRRC Governance, Board Analyst Directors

	(1) Vote "for"	(2) Vote "for"	(3) Vote "for"	(4) Vote "for"
Predicted Vote of Other Fund	7.42	5.61	6.35	5.08
	[0.769]***	[0.682]***	[0.836]***	[0.712]***
Unobserved Quality	8.44	8.48	8.39	8.47
	[0.106]***	[0.109]***	[0.110]***	[0.114]***
Own Management Friendliness	5.33	5.44	5.53	5.62
	[0.293]***	[0.296]***	[0.300]***	[0.304]***
Firm Characteristics				
Last Year Return		0.06		0.08
		[0.025]**		[0.027]***
ROA		0.63		1.20
		[0.396]		[0.410]***
Industry Return		-0.06		0.01
		[0.089]		[0.087]
Return Below Industry Quartile		-0.11		-0.11
		[0.021]***		[0.021]***
Log Assets		0.01		0.01
		[0.013]		[0.014]
Q		-0.03		-0.01
		[0.008]***		[0.009]
Book to Market		-0.11		-0.09
		[0.048]**		[0.051]*
Leverage		0.35		0.25
		[0.063]***		[0.065]***
Cash Flow to Assets		0.17		-0.56
		[0.382]		[0.400]
Capex to Assets		-0.38		0.29
		[0.219]*		[0.223]
S&P 500		0.12		0.10
		[0.039]***		[0.038]**
Governance Index		0.02		0.02
		[0.004]***		[0.004]***
Director Characteristics				
Outside Director			0.91	0.95
			[0.043]***	[0.045]***
Outside Related Director			-0.46	-0.43
			[0.019]***	[0.012]***
CEO			0.31	0.36

			[0.024]***	[0.026]***
Chairman			0.24	0.25
			[0.021]***	[0.019]***
Founder			-0.15	-0.12
			[0.030]***	[0.023]***
Audit Chair			-0.11	-0.12
			[0.011]***	[0.011]***
Audit Member			0.06	0.01
			[0.036]	[0.021]
Compensation Chair			-0.24	-0.27
			[0.015]***	[0.016]***
Compensation Member			0.10	0.10
			[0.048]**	[0.042]**
Executive Member			-0.02	-0.12
			[0.014]	[0.013]***
Governance Chair			-0.09	0.00
			[0.059]	[0.059]
Governance Member			-0.01	-0.06
			[0.023]	[0.022]**
Nominating Chair			-0.17	-0.22
			[0.059]***	[0.056]***
Nominating Member			-0.30	-0.23
			[0.024]***	[0.022]***
Constant	-8.56	-7.38	-8.03	-7.32
	[0.684]***	[0.613]***	[0.735]***	[0.631]***
Observations	2833725	2508241	2833725	2508241

Robust standard errors in brackets

* significant at 10%; ** significant at 5%; *** significant at 1%

Table 7
Best Response Function

The dependent variable is a vote cast by a fund in a board of directors election; it takes the value of 1 if the vote is "for" and 0 otherwise. The predicted vote of other funds is the fitted value of the corresponding column in Table 5. Unobserved quality is the average residual from the specification of the corresponding column in Table 5 , averaged within a director in a meeting pair. Own management friendliness is calculated as the average vote of a fund in the previous calendar year on firms other than the firm under observation. The industry return is the value weighted return of the firms two digit SIC industry. The governance index is the governance index from Gompers, Ishii, Metric (2003). The omitted category from Outside Director and Outside Related Director is an Inside Director. Data sources: SEC/Edgar (N/PX), CRSP, Compustat, IRRC Governance, Board Analyst Directors

	(1) Vote "for"	(2) Vote "for"	(3) Vote "for"	(4) Vote "for"
Predicted Vote of Other Fund	4.944	3.004	4.719	4.894
	[1.077]***	[1.216]**	[1.087]***	[1.085]***
Unobserved Quality	8.235	8.24	8.232	8.234
	[0.126]***	[0.126]***	[0.126]***	[0.126]***
Own Management Friendliness	6.325	6.326	6.326	6.325
	[0.355]***	[0.355]***	[0.355]***	[0.355]***
Predicted Vote of Other Fund * Governance Index		0.218		
		[0.060]***		
Predicted Vote of Other Fund * CEO			2.38	
			[0.609]***	
Predicted Vote of Other Fund * Chairman				0.518
				[0.417]
Firm Characteristics				
Last Year Return	-0.045	-0.045	-0.045	-0.045
	[0.030]	[0.030]	[0.030]	[0.030]
ROA	2.445	2.525	2.462	2.447
	[0.548]***	[0.545]***	[0.548]***	[0.548]***
Industry Return	0.101	0.099	0.101	0.102
	[0.113]	[0.113]	[0.113]	[0.113]
Return Below Industry Quartile	-0.059	-0.061	-0.058	-0.059
	[0.026]**	[0.026]**	[0.026]**	[0.026]**
Log Assets	-0.001	0	-0.001	-0.001
	[0.017]	[0.017]	[0.017]	[0.017]
Q	-0.011	-0.01	-0.011	-0.011
	[0.010]	[0.010]	[0.010]	[0.010]
Book to Market	0.067	0.073	0.068	0.067
	[0.070]	[0.071]	[0.070]	[0.070]
Leverage	0.223	0.23	0.221	0.223
	[0.082]***	[0.082]***	[0.082]***	[0.082]***
Cash Flow to Assets	-1.232	-1.309	-1.247	-1.233
	[0.541]**	[0.537]**	[0.541]**	[0.541]**
Capex to Assets	0.383	0.432	0.387	0.382
	[0.305]	[0.303]	[0.304]	[0.305]
S&P 500	0.108	0.11	0.107	0.108
	[0.046]**	[0.046]**	[0.045]**	[0.046]**
Governance Index	0.009	-0.191	0.008	0.009
	[0.004]**	[0.054]***	[0.004]*	[0.004]**
Director Characteristics				

Outside Director	0.209	0.21	0.226	0.212
	[0.079]***	[0.079]***	[0.080]***	[0.080]***
Outside Related Director	-0.13	-0.13	-0.137	-0.13
	[0.041]***	[0.041]***	[0.041]***	[0.041]***
CEO	0.119	0.121	-2.073	0.111
	[0.042]***	[0.042]***	[0.546]***	[0.040]***
Chairman	-0.032	-0.031	-0.051	-0.504
	[0.026]	[0.026]	[0.024]**	[0.371]
Founder	-0.001	-0.007	0.02	0.004
	[0.035]	[0.035]	[0.036]	[0.035]
Audit Chair	-0.033	-0.032	-0.037	-0.034
	[0.017]*	[0.017]*	[0.017]**	[0.017]**
Audit Member	-0.071	-0.074	-0.071	-0.071
	[0.022]***	[0.022]***	[0.022]***	[0.022]***
Compensation Chair	-0.115	-0.115	-0.12	-0.116
	[0.025]***	[0.025]***	[0.025]***	[0.025]***
Compensation Member	-0.072	-0.081	-0.091	-0.078
	[0.044]	[0.044]*	[0.044]**	[0.044]*
Executive Member	-0.018	-0.018	-0.016	-0.018
	[0.017]	[0.017]	[0.017]	[0.017]
Governance Chair	0.235	0.235	0.229	0.23
	[0.075]***	[0.075]***	[0.075]***	[0.075]***
Governance Member	0.008	0.008	0.009	0.008
	[0.029]	[0.029]	[0.029]	[0.029]
Nominating Chair	-0.374	-0.374	-0.368	-0.369
	[0.075]***	[0.074]***	[0.075]***	[0.075]***
Nominating Member	-0.065	-0.064	-0.069	-0.066
	[0.032]**	[0.032]**	[0.032]**	[0.032]**
Constant	-7.039	-5.275	-6.834	-6.992
	[0.946]***	[1.080]***	[0.958]***	[0.955]***
Observations	2492499	2492499	2492499	2492499

Robust standard errors in brackets

* significant at 10%; ** significant at 5%; *** significant at 1%

Table 8
Linear Fixed Effects IV

The dependent variable is a vote cast by a fund in a board of directors election; it takes the value of 1 if the vote is "for" and 0 otherwise. The predicted vote of other funds is the average vote of other funds voting on the director instrumented using the average management friendliness of other funds, which is calculated as the average vote of a fund in the previous calendar year on firms other than the firm under observation. The industry return is the value weighted return of the firms two digit SIC industry. The governance index is the governance index from Gompers, Ishii, Metric (2003). The omitted category from Outside Director and Outside Related Director is an Inside Director. Data sources: SEC/Edgar (N/PX), CRSP, Compustat, IRRC Governance, Board Analyst Directors

	(1) Vote "for"	(2) Vote "for"	(3) Vote "for"	(4) Vote "for"
Predicted Vote of Other Fund	0.6751	0.5668	0.6428	0.5366
	[0.0055]***	[0.0081]***	[0.0061]***	[0.0087]***
Firm Characteristics				
Last Year Return		-0.0005		-0.0012
		[0.0004]		[0.0004]***
ROA		0.0225		0.0455
		[0.0067]***		[0.0068]***
Industry Return		-0.0085		-0.0077
		[0.0009]***		[0.0009]***
Return Below Industry Quartile		-0.0006		-0.0009
		[0.0004]*		[0.0004]**
Log Assets		0.001		0.001
		[0.0001]***		[0.0001]***
Q		0.0003		0.0005
		[0.0001]*		[0.0001]***
Book to Market		-0.002		-0.0015
		[0.0005]***		[0.0005]***
Leverage		0.0137		0.0115
		[0.0008]***		[0.0008]***
Cash Flow to Assets		0.0048		-0.0234
		[0.0066]		[0.0066]***
Capex to Assets		-0.0136		0.0075
		[0.0041]***		[0.0041]*
S&P 500		0.0132		0.0133
		[0.0005]***		[0.0005]***
Governance Index		0.0002		0
		[0.0001]***		[0.0001]
Director Characteristics				
Outside Director			0.0229	0.0294
			[0.0006]***	[0.0008]***
Outside Related Director			-0.0128	-0.0149
			[0.0006]***	[0.0006]***
CEO			0.0088	0.0131
			[0.0006]***	[0.0007]***
Chairman			0.0062	0.0076
			[0.0006]***	[0.0006]***
Founder			-0.0086	-0.0087
			[0.0010]***	[0.0010]***

Audit Chair			0	0
			[0.0000]	[0.0000]
Audit Member			-0.0043	-0.0049
			[0.0003]***	[0.0003]***
Compensation Chair			-0.0008	-0.0009
			[0.0006]	[0.0007]
Compensation Member			-0.0067	-0.0084
			[0.0003]***	[0.0003]***
Executive Chair			0.0034	0.0031
			[0.0010]***	[0.0011]***
Executive Member			-0.0015	-0.0037
			[0.0003]***	[0.0004]***
Governance Chair			0.0053	0.0114
			[0.0025]**	[0.0029]***
Governance Member			0.0029	0.0006
			[0.0007]***	[0.0007]
Nominating Chair			-0.0076	-0.0129
			[0.0025]***	[0.0029]***
Nominating Member			-0.0081	-0.0067
			[0.0007]***	[0.0007]***
Fund Year FE	Y	Y	Y	Y
Constant	0.303	0.3758	0.323	0.3936
	[0.0051]***	[0.0073]***	[0.0055]***	[0.0077]***
Observations	2815651	2492499	2815651	2492499

Robust standard errors in brackets
* significant at 10%; ** significant at 5%; *** significant at 1%

Table 9
Average Management Friendliness of Funds Holding a Firm

The dependent variable is average management friendliness of mutual funds holding shares in a firm. A fund's management friendliness is calculated as the average vote of a fund in the previous calendar year on firms other than the firm under observation. The industry return is the value weighted return of the firms two digit SIC industry. The governance index is the governance index from Gompers, Ishii, Metric (2003). The omitted category from Outside Director and Outside Related Director is an Inside Director. Data sources: SEC/Edgar (N/PX), CRSP, Compustat, IRRC Governance, Board Analyst Directors

	(1) Average Management Friendliness	(2) Average Management Friendliness	(3) Average Management Friendliness	(4) Average Management Friendliness
Last Year Return		-0.001		-0.001
		[0.001]		[0.001]
ROA				0
				[0.018]
Industry Return		0.025		0.024
		[0.002]***		[0.002]***
Return Below Industry Quartile				0.002
				[0.001]*
Log Assets	0.003	0.003	0.003	0.005
	[0.000]***	[0.000]***	[0.000]***	[0.000]***
Q				0
				[0.000]
Book to Market				-0.008
				[0.002]***
Leverage				-0.005
				[0.002]**
Cash Flow to Assets				-0.021
				[0.017]
Capex to Assets				0.005
				[0.011]
S&P 500	0.014	0.015	0.014	0.01
	[0.001]***	[0.001]***	[0.001]***	[0.001]***
Governance Index			0	0
			[0.000]	[0.000]
Constant	0.885	0.883	0.886	0.88
	[0.003]***	[0.003]***	[0.003]***	[0.004]***
Observations	2454	2431	2266	2062
R-squared	0.22	0.3	0.24	0.35

Robust standard errors in brackets
* significant at 10%; ** significant at 5%; *** significant at 1%

Table 10
Simulated Equilibria

Panel A compares the distribution of the percentage of funds casting a "withhold" vote on a director in an election for the observed director votes and the simulated equilibrium. The parameters used in the simulated equilibrium are obtained from column 4 of Table 6. Panel B compares three simulated equilibria. All parameters, with the exception of the parameter of strategic complementarities (other funds' expected vote), are obtained from column 4 of Table 6. All simulated equilibria presented are the most management friendly equilibria, construction of which is described in detail in Section 7.1 (Constructing Counterfactuals).

Panel A: Actual Distribution of Director Votes versus Distribution of Director Votes in the Simulated Equilibrium

Variable	N	Mean	St. Dev	p10	p25	p50	p75	p90
Actual Votes	10274	8.26%	16.53%	31.67%	5.23%	2.30%	0.91%	0.00%
Estimated Model	10274	12.21%	29.04%	90.11%	3.16%	2.27%	1.66%	1.30%

Panel B: Simulated Equilibria

Level of strategic complementarity (β_2)	N	Mean	St. Dev	p10	p25	p50	p75	p90
Estimated (β_2=5.08)	10274	12.21%	29.04%	90.11%	3.16%	2.27%	1.66%	1.30%
Half of Estimated (β_2=2.54)	10274	30.02%	24.90%	92.48%	27.48%	20.47%	17.17%	14.67%
Quarter of Estimated (β_2=1.27)	10274	51.38%	18.17%	93.15%	53.61%	45.76%	40.93%	36.36%

Figure 1
Distribution of Director Votes

The figure presents the distribution of director voting outcomes in board of director elections. The voting outcome is the percentage of funds voting "withhold."

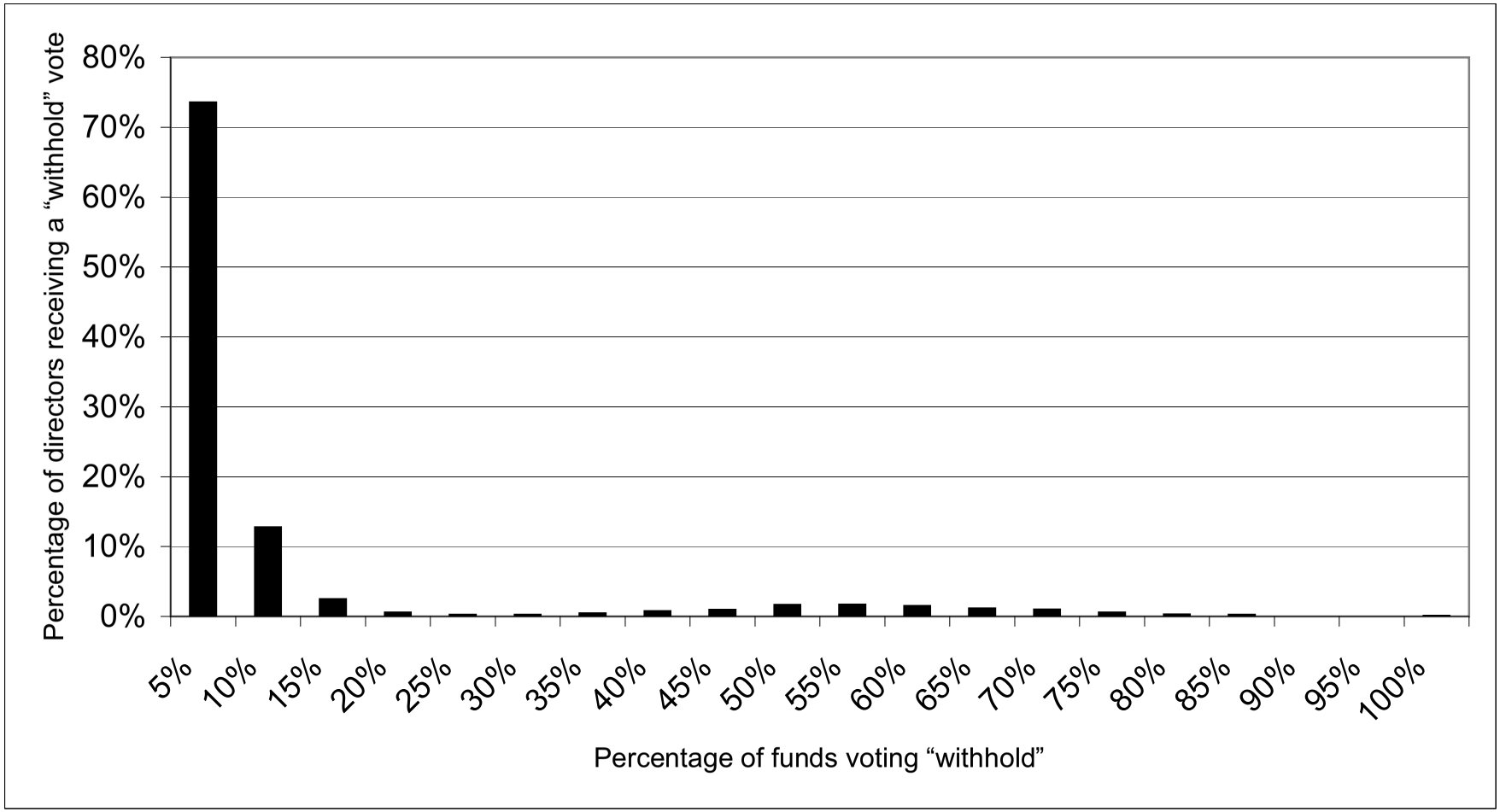

Figure 2
Distribution of Director Votes

The figure presents the distribution of director voting outcomes in board of director elections. The voting outcome is the percentage of funds voting "withhold." The sample is restricted to directors with at least 5% of funds voting "withhold."

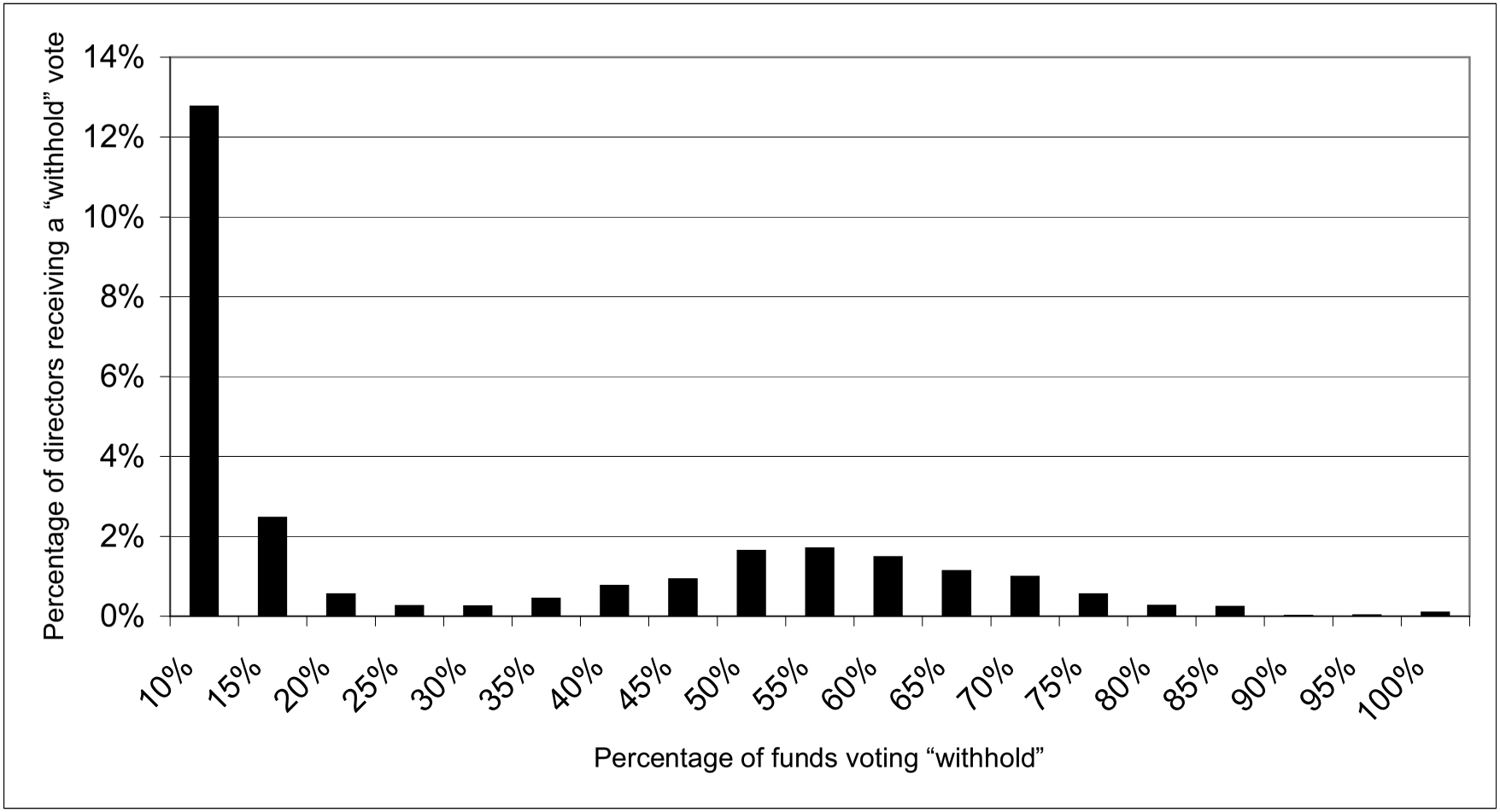

Figure 3
Distribution of Director Votes in the Simulated Equilibrium

The figure presents the distribution of director voting outcomes in board of director elections a simulated equilibrium. The voting outcome is the percentage of funds voting "withhold." All parameters are obtained from column 4 of Table 6. The equilibrium presented is the most management friendly equilibrium, construction of which is described in detail in Section 7.1.

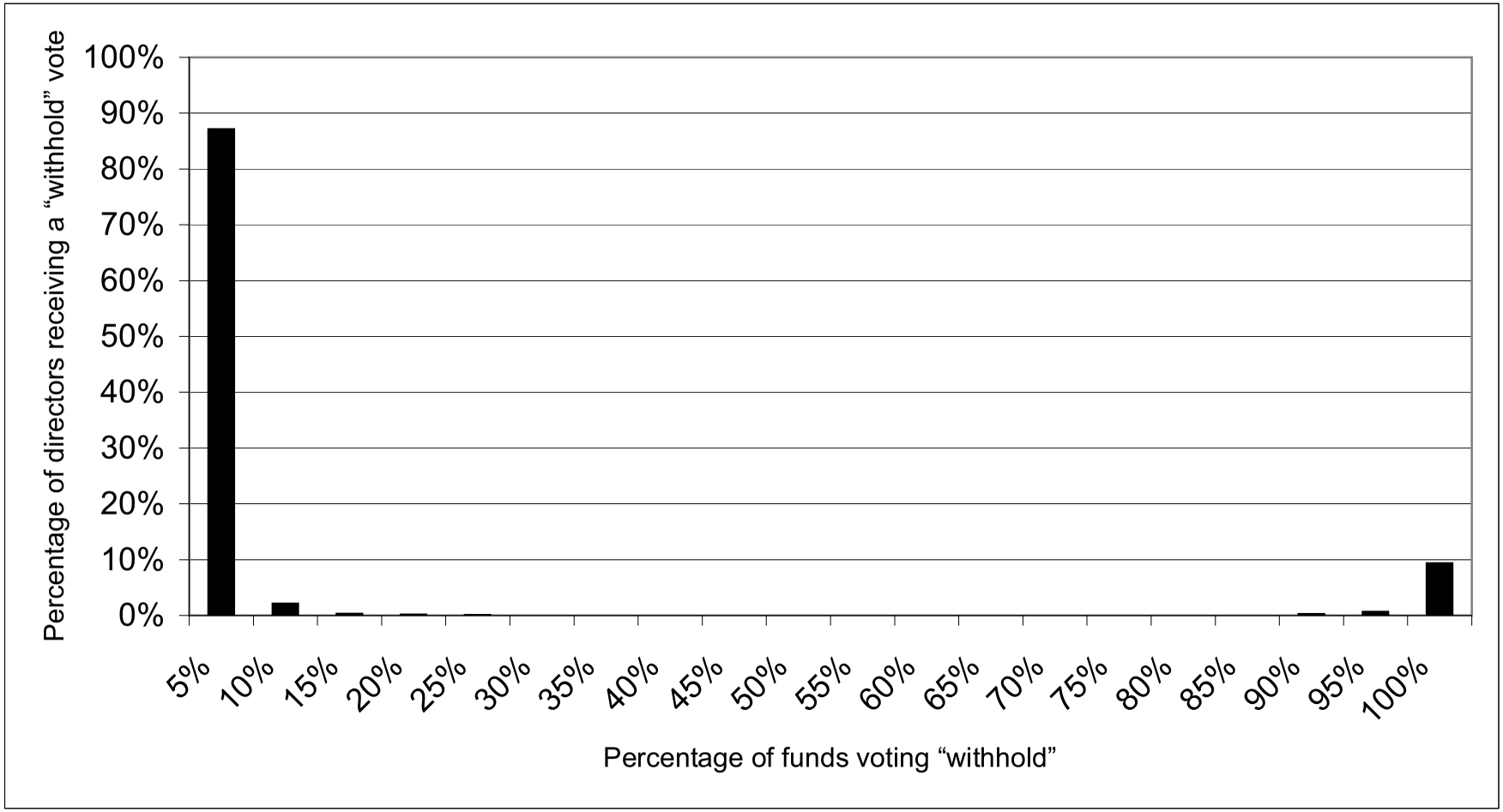

Figure 4

Distribution of Director Votes in the Simulated Equilibrium (strategic complementarity = 1/2)

The figure presents the distribution of director voting outcomes in board of director elections a simulated equilibrium. The voting outcome is the percentage of funds voting "withhold." All parameters, with the exception of the parameter of strategic complementarities (other funds' expected vote), are obtained from column 4 of Table 6. The parameter on other funds' expected vote is set at 2.54, half the size of the estimated parameter. The equilibrium presented is the most management friendly equilibrium, construction of which is described in detail in Section 7.1.

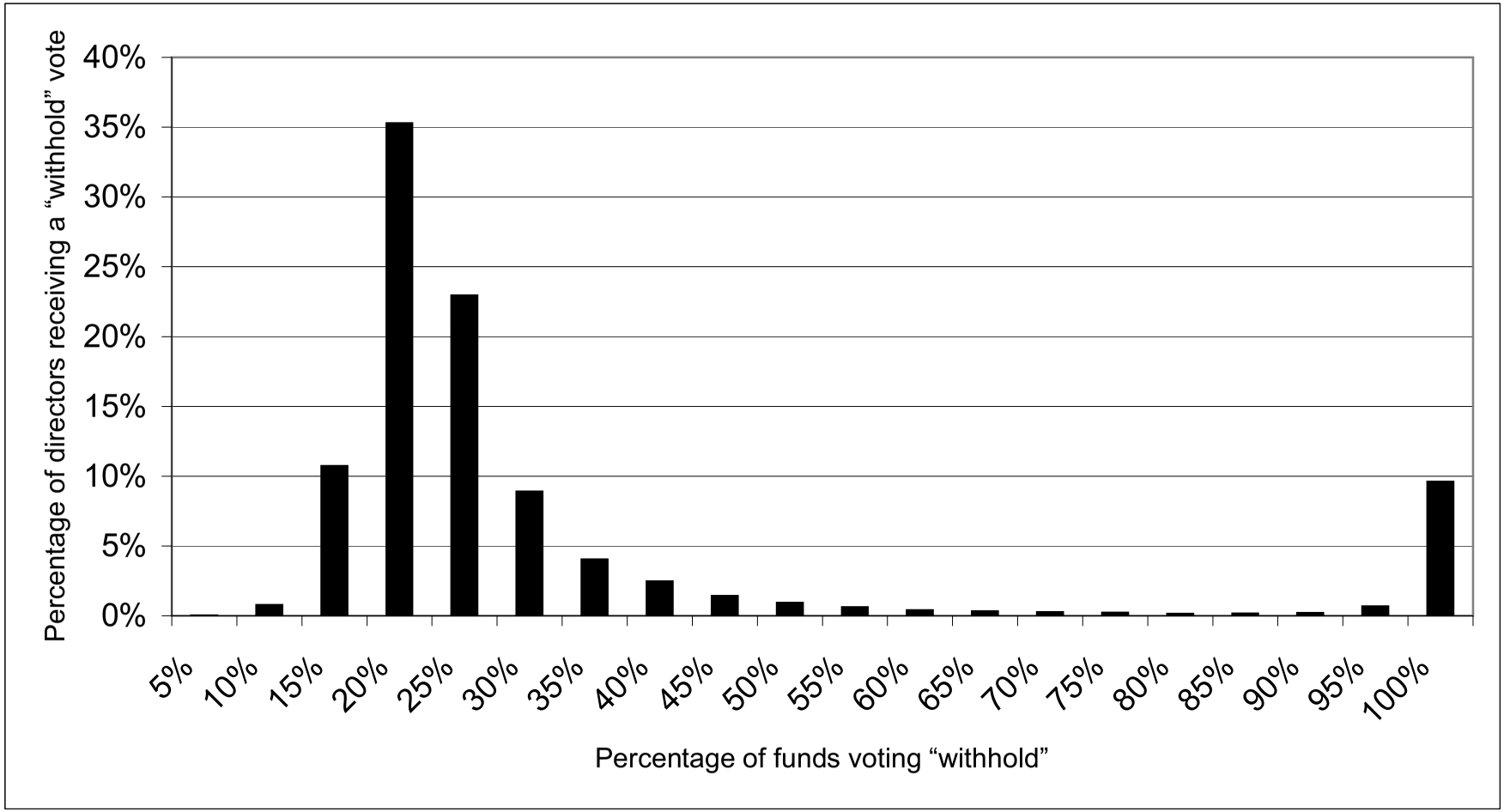

Figure 5
Distribution of Director Votes in the Simulated Equilibrium (strategic complementarity = 1/4)

The figure presents the distribution of director voting outcomes in board of director elections a simulated equilibrium. The voting outcome is the percentage of funds voting "withhold." All parameters, with the exception of the parameter of strategic complementarities (other funds' expected vote), are obtained from column 4 of Table 6. The parameter on other funds' expected vote is set at 1.27, half the size of the estimated parameter. The equilibrium presented is the most management friendly equilibrium, construction of which is described in detail in Section 7.1.