

Boards of Directors as an Endogenously Determined Institution: A Survey of the Economic Literature

Introduction

Most organizations are governed by a board of directors. In fact, having a board is one of the legal requirements for incorporation. Many nonincorporated entities also have a governing board of some sort, such as a state university's board of regents. Given the myriad boards in place today, it is reasonable to ask, why do they exist? What do they do? Can they be "improved"? These questions are at the heart of governance and, to a certain extent, management. As such, they have motivated much of the research on this topic.

This paper surveys the research on boards of directors in the economics and finance literature. Boards of directors are an economic institution that, in theory, helps to solve the agency problems inherent in managing an organization. Although boards satisfy numerous regulatory requirements, their economic function is determined by the organizational problems they help to address. Yet formal economic theory on boards has been quite limited. For example, the characteristics of agency problems that could lead to boards being the equilibrium solution have not yet been specified. Similarly, the conditions under which regulation of boards will lead to improvements are unknown.

Despite the absence of formal theory, we have a strong intuitive sense of the problems facing boards. A major conflict *within* the boardroom is between the CEO and the directors. The CEO has incentives to "capture" the board, so as to ensure that he can keep his job and increase the other benefits he derives from being CEO. Directors have incentives to maintain their independence, to monitor the CEO, and to replace the CEO if his performance is poor.

To some extent, the vacuum in formal theory has been filled by empirical work on boards. The "cost" associated with this approach, however, is that little of the empirical work on boards has been motivated by formal theory. Rather, it has sought to answer one of three questions:

1. How do board characteristics such as composition or size affect profitability?
2. How do board characteristics affect the observable actions of the board?
3. What factors affect the makeup of boards and how do they evolve over time?

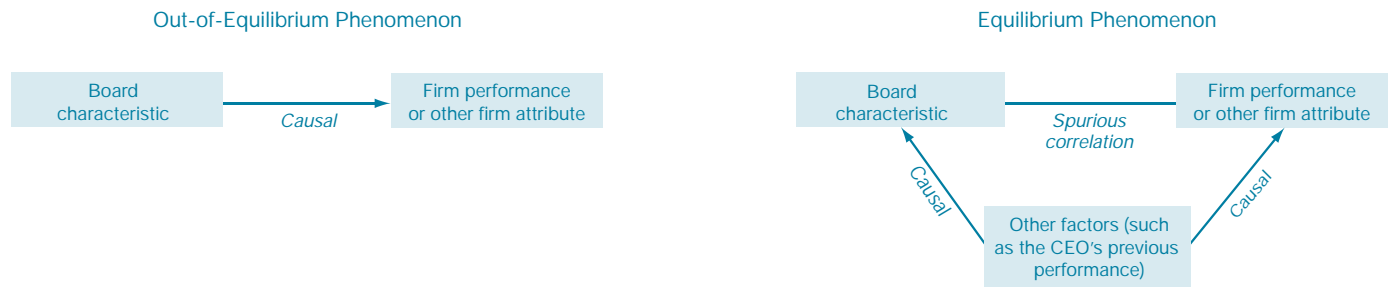
A key issue in this empirical work is how to proxy for the board's degree of independence from the CEO. Much of this work starts from the sometimes implicit assumption that

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Exhibit 1

Heuristic Illustration of the Distinction between Out-of-Equilibrium and Equilibrium Explanations for Certain Empirical Results



observable board characteristics such as size or composition are related to the level of board independence.¹

Research thus far has established a number of empirical regularities. First, board composition, as measured by the insider-outsider ratio,² is not correlated with firm performance.³ However, the number of directors on a firm's board is negatively related to the firm's financial performance. Second, board actions do appear to be related to board characteristics. Firms with higher proportions of outside directors and smaller boards tend to make arguably better—or at least different—decisions concerning acquisitions, poison pills, executive compensation, and CEO replacement, *ceteris paribus*. Finally, boards appear to evolve over time depending on the bargaining position of the CEO relative to that of the existing directors. Firm performance, CEO turnover, and changes in ownership structure appear to be important factors affecting changes to boards.

Two important issues complicate empirical work on boards of directors, as well as most other empirical work on governance. First, almost all the variables of interest are endogenous. The usual problems of joint endogeneity therefore plague these studies. For instance, firm performance is both a result of the actions of previous directors and itself a factor that potentially influences the choice of subsequent directors. Studies of boards often neglect this issue and thus obtain results that are hard to interpret.

Second, many empirical results on governance can be interpreted as either equilibrium or out-of-equilibrium phenomena. While it is generally difficult to distinguish between the two interpretations in a given study, they often have drastically different implications for policy. For example, one of the most consistent empirical relationships regarding boards of directors is that board size is negatively related to

firm profitability. The out-of-equilibrium interpretation of this finding says that limits on board size should be encouraged, or perhaps even mandated. In contrast, the equilibrium interpretation of this result implies that some other factor is causing both board size and profitability, so that such regulation would be at best useless and possibly counterproductive. Exhibit 1 illustrates. Both endogeneity considerations and the equilibrium nature of the results should be carefully considered when evaluating any study of boards or any other aspect of corporate governance.

Despite these issues, much has been learned about boards of directors in public corporations in the past fifteen years. Yet there is still much work to be done. This literature has proceeded in the opposite direction of the scientific method archetype; the empirical literature on boards in public corporations is fairly well developed, while theory is still in its infancy. It is likely that subsequent developments in theory will lead to more sophisticated empirical analyses. In addition, the governance of organizations other than for-profit corporations is a relatively unexplored area. Both theoretical and empirical work aimed at understanding these organizations is likely to bear fruit in the near future.

Several caveats are in order. First, in surveying the literature on boards of directors, we emphasize the aspects we know best. We have tried to be fair to all authors, but nonetheless plead guilty to spending a disproportionate amount of time on our own work. We apologize if we have neglected a favorite paper or misinterpreted it. Second, boards of directors are an important topic of research in many areas, not just economics. Important research has been conducted from both managerial and legal perspectives; we have omitted discussion of these literatures entirely. Kosnik (1990), Zajac and Westphal (1994), and Rediker and Seth (1995) provide good introductions to the

management literature on boards. From the legal literature, one particularly noteworthy study is Roe (1994). Finally, boards of directors are only one element of corporate governance systems; see Shleifer and Vishny (1997) for a broader survey of corporate governance.

Conceptual Issues

As with so much of economics, Adam Smith (1776) appears to be the first economist to address boards of directors:

The directors of [joint stock] companies, however, being the managers rather of other people's money than of their own, it cannot well be expected, that they should watch over it with the same anxious vigilance [as owners] Negligence and profusion, therefore, must always prevail, more or less, in the management of the affairs of such a company. (p. 700)

One hundred and fifty-six years later, Berle and Means (1932) took a largely similar view:

Control will tend to be in the hands of those who select the proxy committee and by whom, the election of directors for ensuing period will be made. Since the proxy committee is appointed by the existing management, the latter can virtually dictate their own successors. (p. 87)

Both quotes point out the agency issues that have typically caught economists' eyes. Until recently, however, economic theory was insufficiently developed to analyze such agency problems. But a "problem" these issues clearly seemed to be, and not only to economists. Much of the regulation of boards since Adam Smith's day has been driven by a desire to solve this problem. Even today, the press regularly chides boards for being insufficiently vigilant guardians of other people's money and being too much in management's hands. Similarly, we still hear calls for "reforms." For instance, the American Law Institute (1982), Lipton and Lorsch (1992), and Jensen (1993) have each made proposals that, if adopted, would impose restrictions on the workings of boards.

Yet one does not have to hold a Chicago Ph.D. to ask, if boards are so bad, why hasn't the market caused them to improve, or even replaced the corporate form with less problematic forms of organization? Or, put differently,

pointing out that an institution is not *first-best* efficient is not the same as demonstrating that outside regulation is needed. A reasonable possibility is that boards are the second-best-efficient solution to the various agency problems confronting any organization with such a potentially large divergence in interests among its members. As a matter of economic theory, the conditions under which we could expect such regulation to be welfare-enhancing are rather limited (see, for example, Hermalin and Katz [1993]).

Perhaps, then, before we rush to regulate boards, we should step back and question what problems boards do solve. That is, why are there boards?

Why Are There Boards of Directors?

One potential answer to the question of why boards exist is that they are simply a product of regulation. Between state incorporation laws and the stock exchange governance requirements, most firms are required to have a board that meets a multitude of requirements: it must have at least so many members, it must meet with at least some specified regularity, it may need to have various committees, and some fraction of the directors may be obligated to have some nominal independence from management.

Yet this cannot be the entire story. Governing boards are prevalent all over the world, in a variety of for-profit and nonprofit organizations; more importantly, the existence of governing boards *predates* these regulations. Furthermore, if boards existed simply to satisfy regulatory requirements, they would represent deadweight costs to firms, which subsequent lobbying presumably would have eliminated, at least somewhere in the world. In fact, the available evidence suggests the contrary: were boards a deadweight cost to the firm, we should expect them to all be at minimum size as fixed by regulation. Yet, in practice, boards are generally much larger than required by law.

Given their prevalence over time, across boundaries, and in different organizational forms, there must be an explanation for boards other than a regulatory-based one. A more plausible hypothesis is that boards are a market solution to an organizational design problem, an endogenously determined institution that helps to ameliorate the agency problems that plague any large organization. Whatever their virtues or problems, boards of directors are part of the market solution to the contracting problems inside most organizations. We

believe that viewing boards of directors from this perspective is the most useful way to study how they are structured and function.

Our point of departure therefore is that a board of directors is the equilibrium solution (albeit possibly second best) to *some* agency problems confronting the firm. But what agency problems do they solve? And why are boards the solution?

The canonical agency problem exists between a firm's owners, its shareholders (who are generally seen as unable to control management directly), and management (who, as Smith feared, tend to be insufficiently vigilant or trustworthy when it comes to other people's property). One solution to this problem is to provide management with strong incentives contractually. But this begs the question of *who* provides these incentives and *who* ensures that the incentive contracts are structured optimally? In most large corporations, the shareholders are too diffuse, rationally plagued by a free-rider problem, and, for the same reason, too uninformed to set managers' compensation.

This problem, as well as the underlying direct control problem, could be alleviated in situations in which a large outside shareholder has sufficient incentive herself to tackle them. Consequently, many models have explored the role of a large outside shareholder (see Shleifer and Vishny [1986], for example). While there are certainly instances in which large shareholders play an important governance role, this is also certainly not a universal solution.⁴ Moreover, the stage on which a large shareholder plays this role is often the board itself; that is, her power works through her position on the board or her control of some number of directors. Ultimately, the theoretical literature on boards will derive the board as part of the equilibrium solution to the contracting problem between diffuse shareholders and management.

One idea explaining why boards have emerged is that the directors' mutual monitoring was critical for inducing shareholders to trust the directors with their money. For example, suppose that there were S shareholder dollars that potentially could be stolen, and that the penalty to a director (monetary, criminal, or reputational) was p , with $S > p > 0$. In addition, suppose that any director can costlessly prevent such theft. Then, N directors will "steal" if $S/N > p$. Clearly, there exists an $N > 1$ such that stealing is a strictly dominated strategy. In a similar vein, Meissner (2000) has explored the issue of how bank directors in early nineteenth-century New England limited self-dealing. His argument is that the total amount of side payments a given director would have to make to his fellow directors to bribe them to approve a bad loan on his behalf would ultimately prove prohibitive vis-à-vis the

gains the given director could expect. To be sure, these ideas are neither complete models, nor do they necessarily explain the *continued* existence of boards today.

How Are Boards Structured and What Do They Do?

Even without a complete theory of *why* there are boards, we can still explore *how* boards are structured and *what* they do. Boards are generally made up of a mixture of insiders and outsiders; how is this mixture determined and what are the incentives of different directors? Conditional on composition, do boards function as they should? That is, is their performance optimal (at least in a second-best sense)?

One modeling approach is to see the board as the "principal" to management's "agent" in a classic principal-agent framework. Although such principal-agent modeling provides many insights, it is not particularly useful for explaining board-specific phenomena: for example, why the ratio of insiders to outsiders matters or changes, or why management seems to have such influence on the selection of directors.

Outside directors are often thought to play the monitoring role inside boards. Yet their incentives are not clear. Fama (1980) and Fama and Jensen (1983) emphasize the fact that they have incentives to build reputations as expert monitors.⁵ However, a reputation as a director who does not make trouble for CEOs is potentially valuable to the director as well. Moreover, as Holmstrom (1999) observes, wanting to be *seen* as doing the right thing and *doing* the right thing are not always the same. The incentives facing the outside directors that result from these divergent forces are an important underlying factor in many of the studies surveyed below.

Hermalin and Weisbach (1998) offer a more board-specific model. They focus on one of the primary board tasks: the hiring and firing of management. In their model, the board must decide whether to keep a CEO or to replace him. The firm's performance provides a signal of the CEO's ability, and the board may, if it chooses, obtain an additional, costly signal. The board's inclination to obtain this signal is, in turn, a function of its independence from the CEO. A board's independence depends on a bargaining game between the board and the CEO: the CEO prefers a less independent board, while the board prefers to maintain its independence. When the CEO has bargaining power—specifically, when the CEO has demonstrated that he is a "rare commodity" by performing exceptionally well—the board's independence declines.

Exhibit 2

Timing in the Hermalin-Weisbach Model

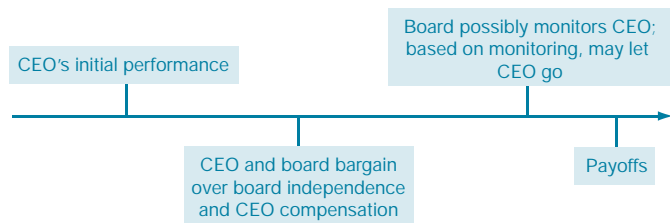


Exhibit 2 illustrates the timing of the Hermalin-Weisbach model. Alternatively, poor firm performance reduces a CEO’s perceived ability relative to that of a potential replacement, increasing the likelihood that the board will replace him.

The Hermalin-Weisbach model derives a number of predictions about the dynamics of the CEO and board’s relationship. In particular, it predicts:

1. A CEO who performs poorly is more likely to be replaced than one who performs well.
2. CEO turnover is more sensitive to performance when the board is more independent.
3. The probability of independent directors being added to the board rises following poor firm performance.
4. Board independence declines over the course of a CEO’s tenure.
5. Accounting measures of performance are better predictors of management turnover than stock price performance.
6. There should be long-term persistence in corporate governance.
7. The stock price reaction to management changes should be negative if the CEO is fired based on private information, but positive if the manager is fired on the basis of public information.
8. A CEO’s salary should be insensitive to past performance at relatively low levels of past performance, but sensitive at relatively high levels of past performance.

There is strong empirical evidence to support the first five of these predictions. For instance, Weisbach’s (1988) results are consistent with the first two predictions; Bhagat and Black (2000) and Hermalin and Weisbach (1988) find results that are consistent with the third and fourth predictions; and, likewise,

the fifth prediction is supported by numerous studies, of which Weisbach (1988) is one example. To the best of our knowledge, the last three predictions have not been empirically tested.

There are other stylized facts about boards that do not, as of yet, arise as equilibria from formal models.⁶ Why, for instance, are directors reluctant to challenge the CEO (see, for example, Mace [1986])? Why does board *size* appear to affect performance (Yermack 1996)? Why are boards an effective way of supplying information to management, as some suggest (see, for example, Mace [1986])? Finally, why are boards an effective way to groom future CEOs (Vancil 1987)? As the trend toward careful modeling of economic institutions continues, boards will prove fertile ground for future research.

Empirical Studies on Boards of Directors

In contrast to the relative paucity of theoretical work on boards, there is a large empirical literature on the subject. Excluding case-based studies (such as Mace [1986] and Vancil [1987]), this research can be broadly characterized as estimating one or more of the equations in the system:

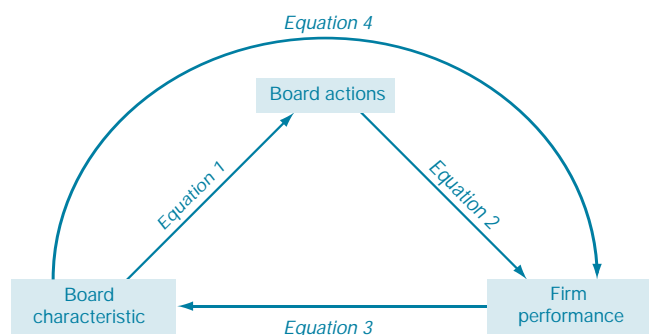
- (1) $a_{t+s} = \phi c_t + \varepsilon_t$
- (2) $p_{t+s} = \beta a_t + \eta_t$
- (3) $c_{t+s} = \mu p_t + \xi_t$,

where c denotes a characteristic or characteristics of the board (such as composition or size); a denotes an action (such as dismissal of the CEO); p denotes firm performance (such as profits); t indexes time ($s \geq 0$); ϕ , β , and μ are parameters (more accurately, function operators) to be estimated; and ε , η , and ξ denote the rest of the specification (plus errors). Typically, the entire system is not estimated simultaneously, so joint endogeneity is handled using lags (that is, $s > 0$) on the equation of interest. Observe, from the first two equations, that it is possible to study directly the relationship between board characteristics and firm performance; that is,

- (4) $p_{t+s} = \beta(\phi c_t + \varepsilon_t) + \eta_t$.

A number of studies have directly estimated this equation. Indeed, such studies are more prevalent than studies of the component equations (this is especially true for the “middle” equation of performance as a function of board actions).⁷ Exhibit 3 offers a graphic illustration of these four equations.

Exhibit 3
The Joint-Endogeneity Problem Plaguing Work
on Boards of Directors



The Board's Influence on Corporate Performance

We begin by reviewing the literature that has estimated the “composite” equation, 4. Two board characteristics have been used as the independent variable: board composition (typically measured by the proportion of outside—nonmanagement—directors on the board) and board size.

Board Composition and Corporate Performance

Probably the most widely discussed question regarding boards is, does having more outside directors increase corporate performance? A number of papers have addressed this question using several methods. The first method has been to examine contemporaneous correlations between accounting measures of performance and the proportion of outside directors on the board. MacAvoy et al. (1983), Hermalin and Weisbach (1991), Mehran (1995), Klein (1998), and Bhagat and Black (2000) all report insignificant relationships between accounting performance measures and the fraction of outside directors on the board. A second approach, suggested by the work of Morck et al. (1988), is to use Tobin's Q as a performance measure, the idea being that it reflects the “value added” of intangible factors such as governance. Hermalin and Weisbach (1991) and Bhagat and Black (2000) use this approach and find, as with accounting performance measures, that there is no noticeable relationship between the proportion of outside directors and Q. Finally, Bhagat and Black (2000) examine the effect of board composition on long-term stock market and accounting performance. Once again, they do not find any relationship

between board composition and firm performance. Overall, there is little to suggest that board composition has any cross-sectional relationship to firm performance.⁸

An important issue to consider when evaluating these studies is the endogeneity of board composition. Hermalin and Weisbach (1998) suggest that poor performance leads to increases in board independence. In a cross-section, this effect is likely to make firms with independent directors look worse, because this effect leads to more independent directors on firms with historically poor performance. Both Hermalin and Weisbach (1991) and Bhagat and Black (2000) have attempted to correct for this effect using simultaneous-equation methods. In particular, these papers lagged performance as an instrument for current performance. Still, even correcting for endogeneity in this manner, there does not appear to be an empirical relationship between board composition and firm performance.

MacAvoy and Millstein (1999) argue that one reason why researchers have heretofore generally failed to detect a relationship between measures of board independence and firm performance is that they have used “old” data—that is, data that preceded boards taking an activist role. In their provocative study, MacAvoy and Millstein find evidence that CalPERS' grading of board procedures—presumably, in part, a proxy for independence—is positively correlated with accounting-based measures of performance. Although MacAvoy and Millstein could be correct in their assertion that boards have gone from being “managerial rubber-stamps to active and independent monitors,” one needs to question how the “rubber-stamp” regime could have, as they seem to assert, lasted for all but the past ten years or so of the history of the corporate form. Because CalPERS' grading of board procedures is recent, it is impossible to test directly the authors' assertion about history by applying their procedure to the “old days” considered by other researchers. Even within their time frame, it would also be interesting to see whether their results hold up using a richer set of control (right-hand-side) variables than they employ (their right-hand side is limited to year, industry, and CalPERS grade).

The generally poor results obtained in estimating the “composite equation” are not surprising—errors from both underlying equations are present, so the signal-to-noise ratio is low. In particular, firm performance is a function of so many different factors that it is difficult to imagine that the effect of occasional board meetings, etc., would be detectable (especially as the case-study literature—Mace [1986] and Lorsch and MacIver [1989]—suggests that the vast majority of these meetings result in no significant actions).

A somewhat more successful approach has been to measure the impact on firm value of *changes* in board composition. Rosenstein and Wyatt (1990) examine the stock price reaction on the day of the announcement that outside directors will be added to the board. They find that on average there is a statistically significant 0.2 percent increase in stock prices in response to the announcement of these appointments.

In many ways, the Rosenstein and Wyatt approach is a cleaner test of the relationship between board composition and ultimate value than the other studies considered above; the Rosenstein and Wyatt approach controls for all firm-specific effects and tests directly for the desired effect. Controlling for firm-specific effects is critical because—as Hermalin (1994) predicts and Kole (1997) and Hermalin and Wallace (forthcoming) confirm—there is no reason to imagine that a specific board composition (for example, percentage of outsiders) is optimal for *all* firms. Hence, the impact of board composition on performance could be difficult to identify cross-sectionally.

However, there is a potential drawback to the Rosenstein and Wyatt approach. Presumably, firms change their board structure to improve their operations and, thus, ultimately their value. Thus, all *change* announcements, to the extent that they are unexpected, should cause a positive change in the stock price. If this is true, then the Rosenstein and Wyatt results tell us nothing about the value of outsiders per se. Yet if only the addition of outsiders increased firm value, while other changes were neutral or lowered firm value, then we have to ask why this is allowed to happen and why firms do not continually add outsiders to boost value. In their follow-up paper, Rosenstein and Wyatt (1997) address some of these concerns. Overall, they find no definitive effect of adding an insider to the board. In some specifications, however, they find that adding an insider *increases* the stock price. Hence, the original Rosenstein and Wyatt effect could, as we have suggested, simply reflect value increase associated with the change, rather than anything in particular about outsiders.

These questions highlight the difficulties encountered when interpreting the results from much of the empirical literature on boards. Specifically, either these papers are estimating equilibrium phenomena or they are estimating an out-of-equilibrium situation (recall Exhibit 1 and the related discussion). If the equilibrium interpretation is correct, it is hard to explain how certain actions could consistently increase firm value. In contrast, if one believes the out-of-equilibrium interpretation, one must first address the issue of how the firms arrived at this out-of-equilibrium situation.

Board Size and Corporate Performance

Board composition notwithstanding, Jensen (1993) and Lipton and Lorsch (1992) suggest that large boards can be less effective than small boards. The idea is that when boards become too big, agency problems (such as director free-riding) increase within the board and the board becomes more symbolic and less a part of the management process. Yermack (1996) tests this view empirically and finds support for it. He examines the relationship between Tobin's Q and board size on a sample of large U.S. corporations, controlling for other variables that are likely to affect Q. Yermack's results suggest that there is a significant negative relationship between board size and Q. Confirming the Yermack finding, Eisenberg et al. (1998) document that a similar pattern holds for a sample of small and midsize Finnish firms. The data therefore appear to reveal a fairly clear picture: board size and firm value are negatively correlated.

Another measure of the importance of board size is how participants in the marketplace view it. In a novel approach, Gertner and Kaplan (1996) examine the boards of a sample of reverse-leveraged buyouts. Their idea is that these firms are more likely than ongoing public firms to choose a "value-maximizing" board. Gertner and Kaplan find that, in this sample, boards tend to be smaller than in otherwise similar firms. Wu (2000) considers the evolution of board size over the 1991-95 period. She finds that board size decreased on average over this period and that the decrease can be explained at least partially by pressure from active investors such as CalPERS. Market participants seem to think that small boards do a better job of monitoring management than do large boards.

Although striking, these results nevertheless raise some questions. For instance, why, if they are destructive to firm value, do we see large boards? Perhaps large boards are uniformly bad because size exacerbates some free-riding problems among directors vis-à-vis the monitoring of management. But then why does the market permit them to exist—why hasn't economic Darwinism eliminated this unfit organizational form? These questions raise the issue of whether an equilibrium phenomenon or an out-of-equilibrium situation is being estimated—that is, are we on the left or right side of Exhibit 1? And if we are on the right side, what is the "other factor"? Sorting out the appropriate interpretation of these results on board size and corporate performance seems like a particularly useful topic for future research.

Boards of Directors and Particular Tasks

In addition to studying the relationship between board characteristics and firm performance, a number of studies have examined how boards accomplish some of the responsibilities commonly assigned to directors. In terms of our heuristic system of equations, these studies can be thought of as estimates of actions, a ; as a function of characteristics, c (that is, estimating equation 1).

This approach has several advantages relative to looking at the effect of boards on overall firm value. First, there are many factors affecting performance. Hence, this approach is potentially more powerful because it is less prone to unobservable factors contaminating the statistical relationship. Second, when examining particular tasks of directors, it is less likely that the endogeneity of board composition will affect the results. In general, this type of test is much cleaner than the tests relating composition to firm performance.

CEO Turnover

The most commonly discussed responsibility of the board is to choose and monitor the firm's CEO (see Mace [1986], for example). Indeed, rather than make day-to-day decisions, directors appear to play a crucial role in picking the firm's CEO and, as suggested by Mace (1986) and Vancil (1987), to view their primary responsibility as monitoring and potentially replacing him. Therefore, one way to evaluate the board's effectiveness is to look at the quality of these decisions.

A large number of papers have documented a positive relationship between CEO turnover and poor performance in large corporations as well as in other types of organizations.⁹ In addition, Denis and Denis (1995) document that firm performance generally improves following a CEO turnover, especially a forced turnover. The standard interpretation of this relationship is that it measures the board's monitoring ability; when performance is poor, the board is more likely to find the current CEO unacceptable and make a change.

An important issue in all of these studies is the distinction between voluntary and involuntary turnovers, which is usually difficult to make and, in some cases, impossible. Studies take different approaches to dealing with the issues of voluntary turnover: some ignore the issue, some exclude observations pertaining to CEOs at retirement age, and some make a detailed effort to distinguish forced departures from voluntary turnovers. Nonetheless, voluntary turnovers are unlikely to be related to performance, and the negative relationship between performance and CEO turnover is extremely robust across

samples. Therefore, the measured negative relationship between turnover and performance probably reflects boards firing CEOs (that is, the difficulty in distinguishing the two types of turnover merely adds noise to the *dependent* variable and thus is irrelevant beyond its impact on the standard errors).

Simply documenting a relationship between poor performance and an increased probability of a CEO turnover, although suggestive of board monitoring, is nonetheless far from conclusive. After all, a sense of failure or pressure from outside shareholders could explain this relationship. To better identify the role played by the board, Weisbach (1988) interacts board composition and firm performance in a CEO turnover equation. His results indicate that when boards are dominated by outside directors, CEO turnover is more sensitive to firm performance than it is in firms with insider-dominated boards. This result holds when firm performance is measured either by market-adjusted stock returns or by an accounting measure of performance. This result is consistent with the view that outsider-dominated boards—those a priori likely to be independent of management—are responding to corporate performance when they make CEO retention decisions. In contrast, turnover in insider-dominated boards is not performance-driven, suggesting that insider-dominated boards make turnover decisions for reasons unrelated to corporate performance.

The most plausible interpretation of this finding is that boards controlled by outside directors do a better job of monitoring the CEO than do boards controlled by inside directors. However, a possible alternative explanation is that inside directors make their turnover decisions on the basis of inside information. Since by definition this information is not known to market participants, it will not be incorporated into the stock price. This interpretation implies that even though insider-dominated boards are responding to performance, the performance they are responding to is not measurable by an outside observer. A point against the inside-information explanation is that such information is likely to be correlated with measurable performance (at least ex post), suggesting that CEO turnover in insider-dominated boards would still be somewhat responsive to measured performance.

In addition, there is a theoretical reason to favor the monitoring explanation over the asymmetric information explanation. Inside directors' careers tend to be tied to the CEO's, which gives them incentives to advance the CEO's career regardless of the stock price. Moreover, any potential inside information that inside directors use to justify a firing has to reflect negatively on the CEO without reflecting negatively on them; otherwise, shareholders would likely

respond to the CEO's dismissal by demanding a clean sweep of top management. Consistent with this point is evidence from Borokhovich et al. (1996) and Huson et al. (2000), who find that outsider-dominated boards are more likely than insider-dominated boards to replace a CEO with someone from outside the firm.¹⁰

Yermack (1996) and Wu (2000) perform a similar analysis of CEO turnover, measuring the impact of board size on the relationship between CEO turnover and firm performance. These papers estimate similar equations to Weisbach's (1988), except that they substitute an interaction of the log of board size with firm performance for Weisbach's interaction of board composition with firm performance. Both Yermack and Wu find a positive and significant coefficient on this interaction term, which indicates that firms with smaller boards have a stronger relationship between firm performance and CEO turnover than firms with larger boards. This finding is consistent with the view that smaller boards are more effective overseers of the CEO than larger boards. In particular, in response to poor performance, they may not be paralyzed by free-riding or otherwise plagued with inertia in the way that larger boards are. It is also possible that smaller boards are more effective at obtaining inside information that ultimately will be reflected in measured performance. However, this analysis begs the now familiar question of whether we are observing an equilibrium or a disequilibrium phenomenon; or, put differently, could we ever observe firms with boards that are "too small," rather than just "too large"?

Perry (2000) breaks down the cross-sectional relationship between CEO turnover and firm performance by whether the outside directors are paid using incentives. He finds that the relationship between CEO turnover and firm performance is stronger when boards have incentives. This finding suggests that providing explicit incentives to directors leads them to make better decisions. It is also consistent with the view that outside directors who receive incentive pay tend to have a professional rather than a personal relationship with the CEO and thus are relatively more independent.

The key issue in interpreting these studies is whether the relationships they uncover are causal. In other words, do the particular attributes of the board—such as composition, size, or compensation—directly affect the board's monitoring? Or might boards that are independent for other reasons tend to have certain characteristics and therefore monitor more effectively? Reality is sufficiently complex that neither question can receive a simple yes or no answer. Yet because a board dominated by a CEO will not monitor regardless of its visible characteristics, we suspect that the second question is more often the one deserving an affirmative answer. That is, we tend to see independence as the true causal variable, with size, compensation, and board composition as correlates. A board

made up of directors who wish to be independent of management will prefer to be paid with incentives and to arrange themselves, in terms of size and composition, in a way that best facilitates oversight of management.

Evidence from the Takeover Market

The active takeover market of recent years has provided a laboratory for studying the actions of boards and for evaluating the relative merits of different kinds of directors. Shivdasani (1993) uses the takeover market as a means to study boards and their role in corporate governance. He estimates the probability of a firm being taken over by a hostile bidder during the takeover wave of the 1980s. This is a sensible approach because boards potentially affect takeover probabilities in two ways. First, boards can affect the quality of governance and hence influence the desirability of a firm as a target. Second, they can affect the takeover process itself by controlling the ease with which a bidder can acquire the firm.

Arguably, Shivdasani's most interesting finding is that when outside directors have more additional directorships, it is less likely that the firm will be acquired in a hostile takeover. There are three potential interpretations of this finding. Higher quality directors could do a better job and hence be asked to sit on more boards. In addition, by doing a good job as directors, they reduce the likelihood of their firms' becoming takeover targets. Alternatively, directors in higher demand will turn down directorship opportunities at poorly managed firms, which are more prone to being acquired. A third, less charitable, interpretation is that outside directors who hold many directorships do so because they have established a reputation for supporting management and not "rocking the boat." A firm in which the directors will likely support management poses a tough fight for hostile bidders and therefore is a less desirable acquisition target.

In addition, Shivdasani finds that who controls board seats appears to affect the takeover process. The dominance of board seats by management and affiliated blockholders decreases the probability of a hostile bid, while significant board seat holdings by *unaffiliated* blockholders increases it. Overall, the paper suggests that boards affect takeover probabilities by influencing both the quality of the company's management and the process of a takeover.

In a paper complementing the Shivdasani study, Cotter, Shivdasani, and Zenner (1997) analyze the effect of governance on the cross-sectional distribution of target firms' abnormal returns during the tender offer process. Cotter et al. find that when a target's board contains a majority of outside directors, the target receives a return approximately 20 percentage points higher than that of a similar firm without a majority of outside

directors on the board. This finding suggests that, conditional on a firm being acquired, outside directors do a better job of negotiating on behalf of shareholders than do insiders. Together, the two papers suggest that the board composition of a potential target is an important factor in the takeover process.

Understanding the reaction of boards to takeover bids ultimately requires understanding the incentives of the directors. Harford (2000) documents that directors, in particular, outside directors, have pecuniary incentives to resist the takeover bid. Following an acquisition, target directors generally lose their seats on the board and the associated directorship incomes. Harford finds that they make up some of the financial loss through gains on the equity they hold in the firm. However, on average, the gain on the equity is too small to compensate the directors for the loss of directorship income. Therefore, Harford concludes that, at the margin, financial considerations will lead outside directors in the direction of resisting possible acquisitions that are in the shareholders' interest.

Byrd and Hickman (1992) analyze the role of boards of *acquiring* companies. They measure the stock price reaction to these firms when an acquisition is announced. Across all firms, they find an average abnormal drop in the acquirer's stock price of 1.33 percent over the two days surrounding the announcement of the acquisition. Byrd and Hickman then divide the sample according to whether the firms have boards with more than 50 percent independent directors. The subsample of firms in which at least 50 percent of the directors are independent exhibits a very small stock price drop of 0.07 percent, while the other subsample, containing a minority of independent directors, has a larger stock price fall of 1.86 percent. These two abnormal returns are significantly different from each other at the 5 percent significance level. This finding indicates that the market perceives firms with independent boards as making better acquisitions (or at least fewer bad ones).

Poison Pills

Brickley et al. (1994) analyze the impact of the board on the decision to adopt a poison pill. As a matter of corporate finance theory, the impact of adopting a poison pill on firm value is ambiguous. Pills can serve to protect current management at the expense of shareholders, but they can also serve to increase the firm's (shareholders') bargaining position in the face of a potential takeover. Brickley et al. find that the stock market reaction to poison pills is positive when the board has a majority of independent directors and negative when it does not. This result suggests that firms with a majority of outside

directors—that is, with presumably more independent directors—adopt pills to further shareholders' interests, while firms with insider- (management-) dominated boards use them as a means of entrenching management at the shareholders' expense.

Executive Compensation

Another role of the board is to set and oversee the firm's policies for compensating management. A view, prevalent since at least Berle and Means (1932), is that CEOs exert control or influence over their boards to extract "excessive" levels of compensation. To examine this view, Core et al. (1999) study the relationships among board composition, ownership structure, and CEO pay. Their results suggest that firms with weaker governance structures tend to pay their CEOs more. Specifically, they find that CEO pay rises with the number of outsiders appointed during the CEO's tenure, and about whose appointments the CEO therefore had a say. CEO pay also rises with variables likely to indicate a *lack* of board involvement: board size, the number of directors over age sixty-nine, and the number of "busy" directors, where busy is defined in terms of the number of *additional* directorships held by a director.

However, Hermalin and Weisbach's (1998) model predicts that a successful CEO—one who has improved his bargaining position by proving he is a rare commodity—can successfully bargain both for less board scrutiny *and* greater compensation. That is, the empirical link between an inattentive board and CEO compensation, which, in a Berle and Means view, is seen as causal, may in fact be spurious: both may be the consequence of a successful CEO exercising his bargaining position (or, correspondingly, an unsuccessful CEO incurring the cost of a reduced bargaining position). Exhibit 1 illustrates this issue (here the other factor is the CEO's previous performance, which allows him to bargain both for less board scrutiny—the board characteristic—and greater compensation—the "other" firm attribute).

In addition, both Core et al. (1999) and Hallock (1997) find that CEO pay at a given company increases when the given company's board contains directors who are CEOs of firms on whose boards the CEO of the given company sits (that is, when boards are "interlocking"). One interpretation is that there is a quid pro quo between such directors and the CEO, which leads to greater compensation. Again, one cannot dismiss the interpretation, in line with Hermalin and Weisbach's (1998) model, that the CEO of the given company is very successful and thus has sufficient bargaining power to get both higher compensation and a very friendly board of directors ("friendly")

because of the leverage over them that the CEO enjoys by sitting on their boards).

Finally, Yermack (1996) finds that the pay-performance relationship for CEOs decreases with board size, suggesting that small boards give CEOs larger incentives and force them to bear more risk than do large boards.

Summary

In this section, we have examined empirical studies that look more directly at what boards do. More precisely, we have reviewed studies that look at the statistical relationship between what boards do and their observable characteristics (studies that estimate some operationalization of equation 1 above). In contrast to performance studies (those that estimate some version of equation 4 above), these studies of board actions have generally found significant results. In particular, these studies appear to indicate that board characteristics are important. Both board composition and size appear to affect the quality of decisions on CEO replacement, responses to a hostile takeover, adoption of a poison pill, and the design of CEO compensation schemes. As we noted, however, the plausible possibility of spurious correlation makes accepting the obvious causal interpretation questionable for some of these studies.

Why have those who have estimated some variation of equation 1 found statistically significant results when those estimating equation 4 have generally found none? One potential answer has to do with the varying roles played by the board. In particular, board independence might not matter enough on a day-to-day basis for one to find significant relationships between measures of director independence and firm performance when estimating equation 4. Board independence does, however, matter for certain board actions, particularly those that occur infrequently or only in a crisis situation. In contrast, board *activity*—especially free-riding among directors, which board size might capture—could be important both for specific actions *and* overall firm performance.

Factors That Affect the Board's Makeup

The final set of studies we review focuses on the factors affecting the composition of the board—that is, equation 3 from the system described above. Knowing the factors that affect board composition is clearly an important step in understanding boards and their role in corporate governance.

Perhaps the most natural way to examine board composition is to look cross-sectionally at the firm-level factors associated with different kinds of boards. However, cross-sectional analysis of boards is limited because of endogeneity issues; any variable associated cross-sectionally with board composition is likely to be jointly determined with board composition. Despite this issue, cross-sectional correlations appear to be robust across samples and have been reported by a number of papers, including Weisbach (1988), Hermalin and Weisbach (1988), and Denis and Sarin (1999). It appears that tightly held firms—in which the founders are still active and the CEO has a large ownership position—tend to have insider-dominated boards. In contrast, larger and older firms are more likely to have professional management with small ownership stakes and outsider-dominated boards.¹¹

Board Dynamics

Because of the potential for joint-endogeneity problems, work on the determinants of board composition has focused on the dynamics of composition. That is, the impact of *changes* in a firm's characteristics or performance on subsequent *changes* in board composition is examined. Looking at changes in this fashion minimizes the potential for joint-endogeneity problems because of timing considerations; all that is required to avoid simultaneous-equations bias is for firm-level variables to not be affected by *subsequent* changes to the board.

Hermalin and Weisbach (1988) take this approach and estimate the factors that lead to changes in corporate boards. They find that three kinds of factors are statistically related to changes in the board. First, poor firm performance increases the likelihood that inside directors will leave the board and outside directors will join. Second, the CEO succession process appears to be intertwined with the board-selection process. When a CEO nears retirement, firms tend to add inside directors, who are potential candidates to be the next CEO. Just after a CEO change, inside directors tend to leave the board, consistent with the hypothesis that these directors are losing candidates to be CEO. Finally, Hermalin and Weisbach document that after a firm leaves a product market, inside directors tend to depart the board and outside directors tend to join.

Denis and Sarin (1999) confirm these findings on a much larger sample of firms from a nonoverlapping time period. They find that large changes in board composition tend to occur after abnormally poor performance and around the time of a CEO change. They also find that the dynamics of ownership structure and board structure appear to be related in an important way: the “derivative” of the proportion of outsiders on the board with respect to CEO stock ownership is

negative. One potential explanation is that as the CEO changes his ownership stake, his voting power vis-à-vis that of the other shareholders changes, which affects the power he has over board composition. Another possible explanation is that because changes in his ownership alter the alignment of the CEO's incentives with those of other shareholders, the importance of outside monitoring changes as the CEO's shareholdings change.¹²

Gilson (1990) examines the effect of bankruptcy on corporate boards. He finds that following a bankruptcy or private restructuring, banks take an active role in the firm's governance, including appointing a number of directors. Kaplan and Minton (1994) and Morck and Nakamura (1999) perform related studies of Japanese companies and the role of banks in their governance. These papers find that following poor performance, banks take a more active role in the firms' governance, including appointing a number of directors to the board. These studies are consistent with the view that creditors play a role in governance, which increases when firm performance lags and debtholders' claims become more uncertain.

Board Composition and the Power Struggle between the Board and the CEO

Probably the most important factor determining a board's effectiveness is its independence from the CEO. Independence from the CEO's influence is the underlying factor in many discussions of boards and their relationship with management. However, this variable is fundamentally unobservable, and this unobservability is an important reason why empirical work on boards of directors is a challenging topic. A number of recent papers have addressed the power struggle between the board and CEO empirically in creative ways.

Hallock (1997, 1999) examines board interlocks, which occur when a firm's employee sits on another firm's board and that firm's employee sits on the first firm's board. These employees are generally the CEO or another person high in management in their respective firms. Given this type of relationship, the potential for collusive or quid pro quo behavior on the part of the "interlocked" directors is particularly high. Hallock documents that the prevalence of interlocking directorships is too high to be explained by random chance. In addition, he finds that CEOs with interlocking boards get paid more than otherwise similar CEOs. These findings are consistent with the view that interlocking directorships provide the CEO a degree of control

over his board or, at the very least, that the CEO has the bargaining power to obtain a friendly board.

Shivdasani and Yermack (1999) examine the extent to which the CEO is involved in the board-selection process. This is an interesting empirical exercise because case-study evidence suggests that CEOs play an important role in selecting new board members (Mace 1986 and Lorsch and MacIver 1989) and because theoretical work implies that the role of the CEO in choosing directors can have an impact on the board's effectiveness (Hermalin and Weisbach 1998). Shivdasani and Yermack construct a measure of CEO involvement in the selection process based on whether the board has a separate nominating committee, and conditional on such a committee existing, whether the CEO is on it. The authors find that this measure of CEO involvement decreases the firm's subsequent number of independent directors. Shivdasani and Yermack's results are consistent with the view that, at least in some firms, the CEO is able to use his control over the selection process to decrease the board's independence.

Baker and Gompers (2000) examine the board-selection process in a large sample of initial public offerings. They test whether factors that are plausibly related to CEO bargaining power influence the selection of board members. In particular, they argue that CEO tenure and CEO voting stake, as measured by its Shapley value, are likely to be positively related to CEO bargaining power.¹³ In contrast, the presence of a venture capital investor, especially one with a strong reputation, is likely to decrease the CEO's bargaining power relative to the board. Empirically, Baker and Gompers find that, consistent with the bargaining framework, CEO tenure and CEO Shapley value are positively related to the number of insiders on the board, while the number of insiders decreases with the reputation of the venture capitalist financing the firm.

Overall, the literature has documented a number of facts about board dynamics. These facts can be explained reasonably well by a bargaining framework such as Hermalin and Weisbach (1998). Interested parties' control of the board appears to be a function of their bargaining power. When banks' financial claims become more uncertain and their legal rights in bankruptcy courts therefore become stronger, their representation on boards increases (Gilson 1990; Kaplan and Minton 1994; Morck and Nakamura 1999). After a period of good performance, when a CEO's perceived value relative to a potential replacement is likely to be high, he is able to add more insiders to the board (Hermalin and Weisbach 1988 and Denis and Sarin 1999). Finally, direct measures of a CEO's bargaining position—such as his voting stake, the use of interlocks, his representation on the nominating committee,

and his dealings with venture capitalists—appear to affect board composition in ways consistent with the bargaining framework (Hallock 1997, 1999; Shivdasani and Yermack 1999; Baker and Gompers 2000).

Studies of Boards Focusing on Particular Industries

Most of the literature on boards of directors has relied on samples of public industrial companies. This focus is natural given the visibility and importance of such companies. However, the diversity of firms in such studies adds heterogeneity and potential noise to the issues being addressed. A number of studies have avoided this problem by focusing on one particular industry or organizational form. This subsection surveys this work and its implications for governance more broadly.

The Money Management Industry

Two recent papers have examined boards of directors in the money management industry. Tufano and Sevick (1997) consider a sample of open-end mutual funds while Dann et al. (2000) examine the role of the board in closed-end investment companies. Open-end and closed-end funds differ organizationally, but both types of organizations seek to maximize their funds' returns. Clearly, maximizing returns implies negotiating as good a deal as possible with the portfolio managers. Both Tufano and Sevick and Dann et al. use this logic to focus on the relationship between boards and expense ratios. Both papers find that when boards are made up of independent directors, fees tend to be lower. Both papers also find that expenses are increasing with board size. These results are consistent with the literature on industrial corporations, suggesting that board size and composition are correlated with board effectiveness.

Organizations with Prohibitions on Takeovers

Two studies have used organizational restrictions on takeovers as a way of examining whether boards substitute for an external control market. Brickley and James (1987) construct a sample of banks, some of which are allowed by state law to be taken over and some of which are from states that prohibit acquisitions of banks. Mayers et al. (1997) compare stock and mutual

insurance companies for the same reason, since stock companies can be acquired but mutuals cannot. Each of the papers measures the impact of these regulatory requirements on board composition; the idea is to test whether internal and external control mechanisms are substitutes. The two papers arrive at conflicting results: Brickley and James find that banks from states with takeover restrictions have fewer outside directors than banks from other states (contrary to the substitution hypothesis), while Mayers et al. find that mutual insurance companies employ more outside directors than do stock insurance companies (consistent with the substitution hypothesis).

Hospitals

An important difference between for-profit firms and other organizations exists in the organization's objective function. For-profit firms attempt to maximize the present value of economic profits; in contrast, a nonprofit's objective function is an endogenous choice not clearly specified by economic theory. This difference has implications for governance: while the governance of a for-profit aids in the goal of profit maximization, governance of a nonprofit must both choose the objective function and decide how best to maximize it.

Understanding these issues in nonprofit governance in general seems like an important topic for both economic theorists and empiricists. Two papers—Brickley and Van Horn (2000) and Eldenburg et al. (2000)—have taken a first step in this direction, using samples of hospitals. Hospitals are a useful setting for studying the relationship between organizational form and governance because they exist simultaneously as different types of organizations but perform the same basic services.

Brickley and Van Horn estimate the relationship between CEO turnover and hospital performance and between CEO pay and hospital performance on samples of for-profit and nonprofit hospitals. They find that both relationships are similar for the for-profit and nonprofit hospitals. Consequently, they cannot reject the hypothesis that nonprofit and for-profit hospitals maximize different objective functions. Eldenburg et al. perform a similar experiment, looking at CEO and board turnover across a number of classes of hospitals, including for-profit, nonprofit, government, and religious. They find that both board turnover and CEO turnover increase with poor hospital performance, high administrative costs, and high levels of uncompensated care. The sensitivity of turnover to these factors varies across hospital types. These findings are consistent with the view that different types of hospitals maximize different objective functions.

Conclusions

Boards of directors are an integral part of the governance of large organizations, including all corporate and many noncorporate organizations. Therefore, they have attracted considerable attention from scholars in economics and finance. In this paper, we have surveyed this research and its implications for governance.

Boards of directors are an institution that has arisen *endogenously* in response to the agency problems inherent in governing any organization. Formal theory on boards of directors has been quite limited to this point. Instead, the literature has developed as a series of empirical studies generally aimed at answering one of three questions:

1. How are board characteristics such as composition or size related to profitability?
2. How do board characteristics affect the observable actions of the board?
3. What factors affect the makeup of boards and board evolution over time?

Several key findings have been derived from the empirical literature on boards. Notably, board composition is not related to corporate performance, while board size is negatively related to corporate performance. In addition, both board composition and size do appear to be related to the quality of the board's decisions on CEO replacement, acquisitions, poison pills, and executive compensation. Finally, boards appear to evolve over time as a function of the bargaining position of the CEO relative to that of the existing directors. Firm performance, CEO turnover, and changes in ownership structure appear to be important factors affecting changes to boards.

Most research on boards begins with the assumption that the directors' effectiveness is a function of the board's independence from management. The unobservability of the board's independence, together with endogeneity issues, conspires to make empirical work on boards a challenge. First, because of the econometric issues raised, and second, because of the resulting difficulties of interpretation. Two characteristics of boards—their size and composition—are conceivably correlated with a board's independence. A number of studies have found that these characteristics are associated with boards that take better actions from the shareholders' perspective. However, lacking an adequate interpretation of these results—are they equilibrium or out-of-equilibrium results? evidence of causation or spurious correlation?—we are reluctant to recommend policy changes on the basis of these studies.

All of this highlights the importance of better modeling of boards and their functions. This too is a difficult task, however. First, there is an important dynamic element to the board-CEO relationship that is missing from most principal-agent models. In this relationship, the “principal's” preferences change over time because changes in board membership mean the board becomes more or less favorably disposed to the CEO (among other possible changes in preferences). A second, and related, issue is that unlike standard agency models, the agent has some say over who his principal is. These aspects of the board-CEO relationship complicate the modeling problem in ways that have yet to be resolved.

Even if one were to resolve these modeling issues, one would still be open to the complaint that the board is being modeled as a monolithic entity. In reality, a board consists of individuals who are unlikely to share a common agenda on all matters. For instance, after a proxy fight, directors hostile to management are sometimes added to a board that is otherwise friendly with management. But less dramatic and more common examples also exist. Because each board member bears 100 percent of the cost of her effort to monitor the CEO while enjoying only a fraction of the benefit, we should expect a free-rider problem among the directors. In addition, a CEO can potentially act strategically by playing one faction or group of directors against another.

Addressing these issues requires modeling the board's inner workings. But once we treat the board as consisting of individuals, we face tremendous challenges in applying our standard game-theory modeling strategies to the problem. We are not even assured that these are the appropriate modeling strategies. Experimental and other evidence is increasingly casting doubt on the appropriateness of game theory to explain the behavior of small groups of individuals because individuals appear to be governed more by issues of emotion, fairness, and norm adherence than is consistent with standard economic models (see Hermalin [2001] for a partial survey of some of these issues). When these issues are addressed, we will have a more coherent model of the board and a better understanding of its role in governance.

Thus, while significant progress has been made in the past fifteen years, there is much more to be done. To this point, the literature has documented a number of facts and empirical relationships, most of which are for large, publicly traded companies. Formal theory has been limited, in large part because of the modeling issues involved. We expect that in the near future, research on boards will focus on three main areas:

1. Models of the inner workings of boards.
2. Tests of the implications of particular models, rather than the “Are Outside Directors Good or Bad?” studies that we have seen so much of to this point.

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3. Studies of boards of organizations other than large publicly traded corporations. Of particular importance are small entrepreneurial firms and nonprofit organizations.

We note that a number of the recent papers surveyed above have followed one or more of these approaches. It is likely that subsequent work along these lines will add much to our understanding of boards and of governance in general.

Endnotes

1. For an innovative way to assess independence—or board activism—see MacAvoy and Millstein (1999), who use CalPERS' grading of board procedures as a measure.
2. Most directors can be classified as inside directors or outside directors. Inside directors are employees or former employees of the firm. They generally are not thought to be independent of the CEO, since the success of their careers is often tied to the CEO's success. Outside directors are not employees of the firm and usually do not have any business ties to the firm aside from their directorship. Outside directors are typically CEOs from other firms or prominent individuals in other fields. Finally, about 10 percent of directors do not fall into either category; often these are attorneys or businesspeople that have a long-standing relationship with the firm. These directors are usually referred to as "affiliated" or "gray" directors.
3. Here and throughout this paper, "firm performance" will be a convenient phrase meant to capture various possible measures of firm success (for example, return to investors, profitability, successful execution of firm strategy). In many of the empirical studies we review, firm performance has been operationalized in a precise way (for example, stock return or performance on some accounting measure). In the more limited theoretical literature, firm performance has typically meant economic profits in static models or firm value—the present discounted value of economic profits—in dynamic models.
4. As their holdings have grown, institutions have played a much more active role in monitoring management governance in recent years. See Karpoff (1998) or Carleton et al. (1998) for discussion of shareholder activism and recent evidence on large institutional shareholders' efforts to change corporate governance.
5. See Kaplan and Reishus (1990) and Farrell and Whidbee (forthcoming) for evidence on the reputation argument.
6. Some other models that concern boards of directors are Adams (1998), Almazan and Suarez (2000), Hirshleifer and Thakor (1994), Raheja (2001), and Warther (1998).
7. Most of this literature focuses on the monitoring of boards of directors. Of course, boards do other things as well inside of firms. For an interesting discussion of the political role played by some directors, see Agrawal and Knoeber (forthcoming).
8. One exception is Baysinger and Butler (1985), who find that the 1970 proportion of independent directors is positively related to 1980 return on equity. However, as Bhagat and Black (1999) emphasize, these authors use only a single performance measure, and ten years seems like an implausibly long time over which to observe performance improvements from a factor such as board composition.
9. Among them are Coughlan and Schmidt (1985), Warner, Watts, and Wruck (1988), Weisbach (1988), Jensen and Murphy (1990), Barro and Barro (1990), Blackwell et al. (1994), Kaplan (1994), Brickley and Van Horn (2000), Eldenburg et al. (2000), and Huson et al. (2000).
10. A third explanation is that board composition is a function of the quality of executives just below the CEO. When there are high-quality inside alternatives to the CEO, these executives will be more likely to be directors, leading to more inside directors on average. In addition, they will tend to replace the CEO for reasons that might not be related to publicly available measures of performance, and it will be more likely in these firms that the replacement CEO will be an insider, consistent with Borokhovich et al. (1996) and Huson et al. (2000).
11. One cross-sectional study not subject to the endogeneity critique is Kroszner and Strahan (forthcoming). They find that stable firms with collateralizable assets are more likely to have bankers on their boards, potentially allowing for better monitoring of bank lending activities.
12. However, because the CEO's shareholdings in his own company are generally a disproportionate part of his portfolio, his attitude toward company risk is likely to differ from that of more diversified shareholders. That is, although increased CEO shareholdings may better align his incentives with those of shareholders on some dimensions, they may misalign them with respect to attitudes toward risk.
13. From cooperative game theory, the Shapley value to a player is that player's payoff, which equals his or her expected marginal contribution to a random coalition of players. In the context of dividing a pie, the Shapley value concept can be seen as the extension of the Nash bargaining solution concept to games with more than two players. See Hart (1987) or Myerson (1991) for details.

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