"A Lapse of Concentration: Omitted Variables, Board Structure and Firm Performance"

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Abstract

Previous analyses of the relationship between board structure and firm performance have not considered how that relationship is affected by external ownership concentration. This paper illustrates how, as a result of this omission, estimates of the impact of staggered boards on firm performance have been biased downward. Including external ownership concentration also allows for the first time an examination of the interactions of that variable and board structure, permitting more informative empirical tests of whether, and in what circumstances, effective staggered boards (ESBs) benefit shareholders. Evidence from those tests is consistent with the hypothesis that ESBs represent credible commitments on the part of shareholders not to act opportunistically, and so enhance firm performance.

I. Introduction

The rash of high-profile corporate scandals in recent years has placed corporate governance prominently on the research agenda of economists and other social scientists. [See Hermalin and Weisbach (2003) for a recent review of the corporate governance literature.] Poor corporate governance can have enormous economic impacts through dramatic and well-publicized collapses like those of Enron and Global Crossing, and through the persistent, if less visible, misallocation of resources due to waste, fraud or neglect. Theoretical and empirical investigations of the responsibilities of firm managers, the incentives of managers to carry out their responsibilities, and the effectiveness of monitoring mechanisms in evaluating managers' performances are needed to develop a better understanding of how, and how well, various corporate structures translate the intentions of shareholders and other firm participants into action and performance. While there is likely not a single corporate institutional arrangement that is best for all firms, a wide-ranging research program on corporate governance can be informative on the circumstances in which particular governance mechanisms are more or less apt to contribute to better firm performance.

One type of event to which corporate governance researchers long have devoted much attention is the hostile takeover. [See Knoeber (1986), Shleifer and Vishny (1986), Shleifer and Summers (1988) and Shivdasani (1992).] Hostile takeovers are attractive for study because they are discrete events in which shareholder interests directly conflict with the interests of firm managers. Shareholders generally receive a substantial "takeover premium" for their shares if a takeover occurs, but the CEO, directors, and other firm officers frequently lose control over the firm and in many cases their jobs as

well. The governance mechanisms in place at the time a hostile takeover bid is made can determine to a large extent how the conflict in interests between shareholders and firm managers will be resolved and who will benefit from the outcome.

Within the study of hostile takeovers, a literature has emerged in the past few years of one such governance mechanism, namely staggered boards.[1] Most notably, an entire edition of the *Stanford Law Review* and several subsequent articles were devoted to staggered boards and their impact on takeover outcomes. [*Stanford Law Review* (2002), Volume 55, Number 3. See also Field and Karpoff (2002), Bebchuk (2003), Bebchuk and Cohen (2003), Kahan and Rock (2003), Klausner (2003) and Stout (2003).] The more widely held view is that staggered boards are harmful to shareholder interests because they allow firm managers to add a high degree of delay and uncertainty to hostile takeover attempts. [See Daines and Klausner (2001), Bebchuk, Coates and Subramanian (2002a and 2002b) and Bebchuk and Cohen (2003).] This insulates managers from the competitive forces of the market for corporate control and so gives them greater leeway to pursue their private interests at the expense of shareholders.

There is, however, a contrary view that staggered boards can serve as credible commitment devices, tying the hands of shareholders by making it more difficult for them to extract rents from firm managers and other stakeholders by accepting a hostile takeover bid. [See Field and Karpoff (2002) and Stout (2002 and 2003).] With such a commitment in place, firm participants are encouraged to make more firm-specific investments in human capital, more confident that they, and not opportunistic shareholders, will enjoy the rewards from those investments. This improves firm

[1] As discussed more fully in Section II, a staggered board is one in which only a fraction (usually one-third) of a board's directors are elected each year, extending the time required for control of a majority of a board to change hands.

performance, benefiting shareholders. Although there is a theoretical basis for this view, most of the empirical evidence reported to date supports the majority view that staggered boards reduce firm performance.[2]

The papers referred to above all share a conceptual shortcoming, namely that they fail to take into account external ownership concentration and how it interacts with board structure to affect firm performance.[3] Any discussion of hostile takeovers and staggered boards essentially concerns the ability of shareholders to act collectively to remove directors who oppose a takeover offer that shareholders want to accept. The degree of concentration of firm ownership in the hands of external owners is critical to understanding the ease or difficulty of collective shareholder action against firm managers. As firm ownership becomes concentrated in the hands of a few large owners, those owners become better situated to overcome the coordination costs and free-rider problems associated with collective action. All other things being equal, greater external ownership concentration results in a greater likelihood that shareholders will turn over board control. Both of the views described above hold that a staggered board hinders the ability of shareholders to act collectively to remove directors; by ignoring external ownership concentration, previous analyses have been unable to address how that effect interacts with another significant influence on collective shareholder action and how the interactions influence firm performance.

Failing to include external ownership concentration introduces a potential problem to empirical analyses of board structure and firm performance, as well as a

[2] See Section II.
[3] In this context, "external" refers to a person, company or institution that is not related to any firm officers or a firm's founding family, and that does not have significant business dealings with the firm beyond the share ownership.

missed opportunity. The problem arises because external ownership concentration is strongly correlated with firm performance, so regressions of firm performance on board structure that leave out external ownership concentration suffer an omitted variable bias. The lost opportunity arises because different board structures might have different impacts depending on the degree of external ownership concentration present. Such interactions of concentration and board structure may provide a deeper understanding of the impact of staggered boards than is possible by analyzing board structure alone.

This paper is the first to closely examine the inclusion of external ownership concentration into the analysis of board structure and performance, a contribution to both the framing of the discussion of staggered boards and the empirical research on their effects. I show that omitting external ownership concentration introduces a downward bias on estimates of the impact of staggered boards on firm performance. This suggests that a previous finding [Bebchuk and Cohen (2003)] that staggered boards reduce firm performance (derived from regressions that do not include external ownership concentration) is driven at least partially by an omitted variable bias. By including external ownership concentration and examining its interactions with different types of board structures, I find evidence that having a particularly strong type of staggered board positively affects firm performance where firm voting stock is concentrated in the hands of large external owners. This is consistent with the credible commitment view of staggered boards, and contradicts the more widely held view that staggered boards reduce firm performance.

The remainder of this paper is organized as follows. Section II defines three types of board structure to be examined and provides a review of the literature concerning the

impact of board structure on shareholder interests. Section III provides a further discussion of why external ownership concentration should be included in research on board structure and its impact on firm performance. Section IV describes the data used in my empirical analysis. Section V provides evidence of the correlation between board structure and external ownership concentration. Section VI presents evidence of the downward omitted variable bias described above, and Section VII presents findings regarding how the interactions of board structure and external ownership concentration affect performance. Section VIII provides a variety of robustness checks. Section IX and X discuss implications and conclusions, respectively.

II. Background and Empirical Findings on Board Structure

Board structure refers to the timing of director elections, the length of director terms, and possible restrictions on shareholders' abilities to determine who serves on a firm's board. Under an annually elected board, all directors are elected for one-year terms, and all stand for election at every annual meeting. Under a staggered board (also called a classified board), directors are divided into multiple (usually three) classes, and at every annual meeting one class of directors stands for election to a multiyear term. Assuming a target firm has three classes of directors, a bidding firm attempting to take over the target firm's board through proxy contests would require two elections, taking at least a full year, to gain control over a majority of seats on the board. The prospect of waiting a year or more to complete a takeover, and completing it after that time only if

the bidding firm is able to successfully get its candidates elected in two elections a year apart, is a substantial deterrent to potential bidding firms.

The manner in which a staggered board is implemented and the ease with which shareholders can alter a board's structure and composition make a large difference in whether a target firm's shareholders are able to allow a takeover to occur if directors resist. For that reason the distinction between an effective staggered board (ESB) and a "non-effective" staggered board (NESB) is valuable. As described in Bebchuk, Coates, and Subramanian (hereafter BC&S) (2002a), a firm has an ESB if: (1) it has a staggered board installed in the firm charter (as opposed to its bylaws, which could be changed by a vote of shareholders even without board approval), (2) directors can only be removed for cause, and (3) shareholders cannot, without board approval, elect to increase the number of directors and fill the vacancies created ("pack the board"). These conditions together force shareholders who want to turn over board control to win proxy contests in two successive annual meetings. As a result, an ESB, particularly when accompanied by a poison pill, represents a powerful defense against takeovers that are opposed by a majority of directors, even if the bids are favored by shareholders.[4] NESBs, under which shareholders retain at least one avenue for turning over board control, can make hostile takeovers more difficult to accomplish, but ESBs make them impossible without a high degree of delay and uncertainty.[5] BC&S (2002a) report that they can find no evidence

[4] Poison pills allow a target firm's shareholders, in the event of a merger with a bidding firm that owns a predetermined amount (typically around 15%) of the target firm's stock, to buy large amounts of stock in the merged firm at a substantial discount, diluting the ownership of the merged firm so much that pursuing a tender offer becomes prohibitively expensive to a bidding firm. Poison pills can usually be rescinded by a majority vote of directors so that a friendly takeover or merger can occur. This leads bidding firms to engage in proxy fights to install friendly directors who will rescind poison pills.

[5] Turning over board control will be more difficult under a NESB than an annually elected board if (a) the number of votes needed to change firm bylaws, remove directors without cause, or pack the board is higher than that needed to elect directors, or (b) shareholders are more reluctant to take these steps (which might

since 1996 (the start of their data sample) that any firm with an ESB has been taken over as a result of management losing two proxy elections, and having an ESB makes the target of a hostile bid significantly less likely to be acquired.

The prevalent view of takeover defenses in general and ESBs in particular is that they harm shareholder interests. ESBs and other defenses entrench firm managers by making a hostile takeover more difficult and therefore insulate managers from the discipline of the market for corporate control. Under this view, which is grounded in principal-agent theory, takeover defenses give firm managers greater leeway to enjoy the private benefits of control rather than adhere strictly to shareholder interests. The stronger the defenses, the lower the likelihood of a successful hostile takeover, and the more firm managers can deviate away from behavior that would maximize shareholder value and toward behavior maximizing their own private utilities.

Several researchers have put forward explanations for the widespread existence of ESBs and other takeover defenses despite the harm to shareholders described by the entrenchment view. They could be necessary to induce the original firm owners to disperse their shareholdings, could stem from agency problems or information asymmetries between managers and either shareholders, firm lawyers or private equity sources, or they even could be efficient if the private benefits to entrenched managers are greater than the total costs to shareholders. [See Coates (2001), Bebchuk (2003) and Klausner (2003).] Daines and Klausner (2001) find that takeover defenses (including staggered boards) do not appear to introduce efficiencies by increasing the bargaining power of target firms in industries without competitive takeover markets, correcting for

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be considered extraordinary measures) than to elect new directors as part of a normal annual meeting. This paper takes no position on whether (a) or (b) reflects reality, but merely points out this possibility as justification for treating NESBs and annually elected boards as separate categories.

market myopia in industries in which the risk of information asymmetries is highest, or protecting firm managers with high private benefits of control. From these results, they conclude that they can find no evidence that such defenses are socially efficient. BC&S (2002a and 2002b) present an array of evidence from a sample of hostile takeover bids in the late 1990s to show that the presence of an ESB does not provide shareholders with greater returns in the event of a takeover bid. In the paper most closely related to this one, Bebchuk and Cohen (2003) find evidence that ESBs are negatively related to firm value as measured by Tobin's Q, and find no significant relationship between Tobin's Q and NESBs.[6]

While the dominant view holds that ESBs harm shareholders, an alternative view is that ESBs and other takeover defenses serve to restrain shareholders from harming the interests of other firm participants, and in so doing benefit shareholders. Holmstrom (1982) shows that, in team production systems in which observing inputs is prohibitively costly, eliminating free rider problems requires a passive budget-breaker who can penalize team members but can also credibly commit not to act opportunistically to expropriate for themselves the surpluses created by team members. Without that commitment, team members will withhold inputs from the team production process.

Accepting a takeover bid can be seen as one form of shareholder opportunism. Shleifer and Summers (1988) argue that the typical increase in market value of a firm targeted for a takeover does not necessarily reflect expected efficiency gains. It can also represent the redistribution of value to shareholders from other stakeholders (including CEOs, directors, employees, suppliers) who have devoted firm-specific assets to the firm

[6] Bebchuk and Cohen (2003) used proxies for ESBs and NESBs, namely staggered boards established by firm charters and staggered boards established by firm bylaws, respectively.

on the basis of long-term, often implicit agreements for increased future remuneration. [See also Knoeber (1986), Falaschetti (2002), and Stout (2002 and 2003).] Takeover defenses under the credible commitment view are the mechanisms by which shareholders tie their own hands and make it much more difficult to expropriate stakeholder rents by turning over control of the firm against the desires of firm managers.

Stout (2002 and 2003) argues that the ex ante benefits of ESBs and other defenses can counterbalance ex post costs to shareholders of the sort described by BC&S (2002a and 2002b), but she provides little empirical evidence to support this claim. Field and Karpoff (2002) examine a sample of firms that went public during 1988-1992 and found that following their initial public offerings firms that had takeover defenses, including staggered boards, in their charters outperformed those that did not in terms of return on assets for the first few years, after which their performances were not significantly different. This result can be interpreted as supportive of the credible commitment view, although other interpretations are also plausible.[7]

On balance, the current empirical evidence concerning ESBs and firm performance is more supportive of the entrenchment view that ESBs are harmful to shareholder interests than the credible commitment view that ESBs are beneficial, but the literature has not reached a definitive conclusion. Field and Karpoff (2002) do report a positive effect of takeover defenses on return on assets, but do not report separate results for different types of defenses, and so cannot speak toward the specific impact of staggered boards. The two BC&S papers (2002a and 2002b) make a strong case that once a takeover bid occurs the target firm's shareholders are made worse off by the presence of an ESB, but as Stout (2002) points out, their analyses make no effort to

[7] See Stout (2003), footnote 100.

account for the possible ex ante benefits of ESBs. Bebchuk and Cohen (2003) go further by examining the overall relationship between board structure and Tobin's Q, which encompasses the ex ante effects of board structure, any change on the likelihood of a takeover as a result of board structure, and shareholder effects in the event of a takeover bid. They conclude that ESBs harm shareholder interests by reducing firm value, but even this analysis, like those of the other researchers, fail to consider external ownership concentration. Consequentially, these empirical results are beset by two potentially important weaknesses, omitted variable bias and an overlooking of interactions between external ownership concentration and board structure, as explored in the following section.

III. The Importance of External Ownership Concentration

An analysis of board structure and firm performance that does not include external ownership concentration will exhibit a significant problem with omitted variable bias. In addition, it will forfeit the opportunity to consider how board structure and external ownership concentration interact to affect firm performance. The theoretical basis for the omitted variable bias problem and the usefulness of examining interactive effects of board structure and concentration are laid out below, with empirical evidence presented in Sections V through VII.

III.1. Omitted Variable Bias

In a regression of firm performance that includes board structure among its regressors but excludes external ownership concentration, the coefficients on board structure variables will suffer an omitted variable bias if external ownership concentration (a) has a significant impact on firm performance, and (b) is correlated with board structure. There are sufficient a priori reasons to think that such correlations are present to warrant including external ownership concentration in the analysis of board structure and firm performance, and those reasons all involve the fact that external ownership concentration reflects the relative ease or difficulty of collective shareholder action.[8]

III.1.a. External ownership concentration and firm performance

Researchers have put forward theories as to why greater external ownership concentration might lead to either better or worse firm performance. The case for better performance rests on the idea that as an owner's fraction of shares increases, his or her residual claim gets larger. As a result, that owner will have both greater incentive to monitor the actions of firm managers and greater ability to do so due to the authority that accompanies a greater voting stake. Agency problems are therefore reduced, improving performance. [See Smith (1904), Berle and Means (1991), Jensen and Meckling (1976) and Fama and Jensen (1983).] Shleifer and Vishny (1986) and Butz (1994) present models in which large minority shareholders reduce free-rider problems in monitoring associated with dispersed ownership and discipline managers with the threat of takeovers.

[8] There is a literature on institutional investor ownership and firm performance, but it tends to focus on the total institutional ownership of a firm and not on the concentration of that ownership, and so does not address the issues raised by this paper. For examples of this literature, see Wahal and McConnell (1997) and Duggal and Millar (1999).

These models suggest a positive relationship between external ownership concentration and firm performance.

There are also several theories that suggest a negative relationship. One is that the additional authority that comes with a large ownership share may allow certain owners to influence firm managers to divert resources toward other companies with whom the large owners are associated when those resources might be more profitably used elsewhere. Another theory argues that if small and large investors have different time horizons and firm managers feel more pressure to satisfy large shareholders because large shareholders face lower collective action costs and so have a greater ability to punish managers, then firm performance may suffer as managers cater more toward large shareholders' preferences. Bebchuk and Stole (1993) demonstrate how information asymmetries can induce managers to either under- or over-invest in long-term projects, depending on the type of asymmetry. The credible commitment view discussed in the previous section suggests that greater external ownership concentration increases the likelihood of expropriation by shareholders, reducing firm-specific investment and so reducing performance. Burkart *et al.* (1997) illustrate this formally.

Empirically, the evidence is more supportive of a negative relationship between external ownership concentration and firm performance, but that evidence is not conclusive. McConnell and Servaes (1990) report no significant relationship, but Demsetz and Villalonga (2001) find a significant negative relationship between external ownership concentration and Tobin's Q using OLS and a negative but statistically insignificant relationship using 2SLS.

III.1.b External ownership concentration and board structure

Because this is the first paper to examine the role of external ownership concentration in an analysis of board structure, there is no previous literature, theoretical or empirical, suggesting a priori that concentration should be correlated with different board structures. Such correlations are a reasonable supposition, however, when it is recognized that both external ownership concentration and board structure in essence speak to the ability of shareholders to take collective action against firm managers. Greater external ownership concentration reduces coordination costs and free-rider problems associated with organizing and executing collective action, making a successful campaign to elect new directors or pass other shareholder proposals affecting board composition more likely. An annually elected board, as opposed to an ESB, reduces the constraints on shareholder action and allows for a much timelier resolution of a board turnover desired by shareholders.

That both external ownership concentration and board structure can have such an influential impact on whether a hostile takeover attempt will be successful is by itself enough to suggest that concentration may be correlated with the different board structures, although the direction of a particular correlation would differ depending on how board structure affects firm performance and the degree to which external ownership concentration acts as a complement or substitute for an annually elected board in terms of

increasing the likelihood of collective shareholder action.[9] For example, if greater external ownership concentration acts as a substitute for an annually elected board and firms with ESBs do have lower performance, then large investors may perceive performance gains to be had simply by buying a sizable fraction of the stock of ESB firms and thereby exposing managers to punishment from collective shareholder action that the managers otherwise would not face. In this scenario we should observe a positive correlation between external ownership concentration and ESBs. On the other hand, if external ownership concentration works more like a complement to an annually elected board, then large investors may find that their influence over firm managers is greatest in firms where the potential for hostile takeover threats are greatest, that is in firms with annually elected boards. Here we would observe a negative correlation external ownership concentration and ESBs. This does not exhaust the possible interrelations of board structure and external ownership concentration, but it is sufficient to establish that correlations between the two variables are plausible enough to warrant a serious suspicion that estimates of the effect of board structure on firm performance found without taking external ownership concentration into account suffer from a significant omitted variable bias. The first evidence of the strength and direction of the correlations between external ownership concentration and each type of board structure is presented below.

III.2 Interactions of External Ownership Concentration and Board Structure

[9] Note that because the three types of board structure encompass all firms, a positive correlation between external ownership concentration and, say, ESBs implies that there must be a negative correlation between external ownership concentration and one or both of the other board structures.

The question of whether external ownership concentration acts as a complement or a substitute for one board structure or another leads directly to the need to examine the interactions of board structure and concentration to attain a deeper understanding of the impact of board structure on firm performance. Because board structure and external ownership concentration both concern collective shareholder action, it is entirely possible that a particular board structure has quite different effects depending on the degree of concentration of firm voting stock in external hands. Excluding external ownership concentration could then cause a misunderstanding of board structure's impact on performance. Suppose, for example, that ESBs do not have a significant impact on firm performance when external ownership concentration is low, but at high levels of external ownership concentration ESBs behave as the credible commitment view suggests and improves firm performance by encouraging firm-specific investment in spite of the high concentration. Suppose further that comparatively few firms have high levels of concentration. Then if we exclude external ownership concentration from our analysis of board structure and firm performance and so cannot examine how board structure and external ownership concentration interact, we would be apt to miss the effect of ESBs in the presence of high concentration and conclude that ESBs have no effect on performance. Including the interactions of board structure with external ownership concentration in analyses of board structure and firm performance allow for an investigation of these potentially overlooked relationships, and so deepen our understanding of board structure.

IV. Data

The database for this paper is the *Forbes 500* list of top firms in terms of sales revenue in fiscal year 1999. Of the firms on the *Forbes* list, 44 utilities firms (SIC codes 4900-4999) and 80 financial firms (SIC codes 6000-6999) were excluded because firms in those industries face extensive regulation which may cause their boards and related investor behavior to differ from other firms. Fifty firms were excluded because the Compustat database did not contain enough relevant data for them for 1999 and 11 were excluded because the EDGAR database did not contain the proxy statements or charters required. These deletions leave a sample of 315 firms.

The type of board structure in place in a firm is quite persistent over time. In the years in the mid-1980s, many firms did amend their charters and bylaws to alter their board structure to adjust to the dramatic change represented by the development of the poison pill. Since that time, and especially since the early 1990s when several state court cases established the legal limits of poison pill use, there has been very little variation of board structure within firms over time. The lack of variation makes econometric panel techniques of little use in analyzing board structure. This fact, combined with the time required to hand-collect the necessary external ownership concentration data, prompted the decision to use cross sectional analysis here.

Each firm's proxy statement lists the identity and percentage of outstanding stock owned by each person, company, or other organization that owns at least five percent of any class of the firm's outstanding stock. From this information, I construct two measures of external ownership concentration. *Ext5* is a dummy variable equaling one if there are one or more external owners of at least five percent of the firm's outstanding

voting stock and zero otherwise, and *Ext5Sum* indicates the total percentage of outstanding voting stock owned by all external owners who own at least five percent.[10] These and all other variable definitions are summarized in Table 1.

The dummy variables *ANN*, *NESB* and *ESB* equal one if the firm has an annually elected board, a NESB, or an ESB, respectively, and zero otherwise. Panel C of Table 1 displays the variables capturing the interaction of board structure and external ownership concentration. *ESB_Ext5* equals 1 if the firm has an ESB and at least one external five percent owner. *ESB_no_Ext5* equals 1 if the firm has an ESB but does not have an external five percent owner. Analogous dummy variables are defined for the interactions of *Ext5* with *NESB* and with *ANN*. *ESB_Ext5Sum* equals *Ext5Sum* if the firm has an ESB and equals zero otherwise. *NESB_Ext5Sum* and *ANN_Ext5Sum* are defined similarly.

Following McConnell and Servaes (1990) and Bebchuk and Cohen (2003), firm performance is measured with Tobin's Q.[11] Because analyses of board structure are often motivated by questions of board structure's impact on shareholder interests, market-based measures such as Tobin's Q are the variables most frequently used for firm performance. *Q2000* is the firm's industry-adjusted Q, that is, its Tobin's Q divided by the median Tobin's Q for all companies in the Compustat database for 2000 in the firm's industry (defined by two-digit SIC code). *Q1998* is defined similarly. *Avg5Q* is the firm's five-

[10] For firms with dual class voting structures, an external owner must own at least five percent of the total number of votes (as opposed to shares) to be regarded as a five percent owner. Some firms have classes of stock that do not entitle its owners to vote in shareholder elections. Non-voting stock was excluded in constructing the external ownership concentration variables.

[11] Tobin's Q here is calculated as in Gompers, Ishii, and Metrick (2003) and Bebchuk and Cohen (2003), as the market value of assets divided by the book value of assets (Compustat item 6), where the market value of assets is equal to the book value of assets (item 6) plus the market value of common stock (item 24 * item 25) minus the sum of the book value of common stock (item 60) and balance sheet deferred taxes (item 74). This and other relatively simple measures of Tobin's Q have been used regularly since Chung and Pruitt (1994) demonstrated the very high correlation between them and more sophisticated, complex measures.

year average relative Q covering 1994-1998, and *Avg3Q* is the firm's three-year average relative Q covering 1996-1998.

Other control variables used below are described in Panel E of Table 1. *Assets* is the value of total assets of the firm. *FirmAge* is the age of the firm measured from the year of incorporation. *Volatility* measures the volatility of the firm's stock price, calculated as the standard deviation over the 60 months prior to its fiscal year 1999. *Delaware* equals 1 if the firm is incorporated in Delaware and zero otherwise. (Delaware state law allows firm managers greater latitude than other states' laws to resist takeover bids supported by shareholders. Over one-half of the sample firms are incorporated in Delaware.) *BoardSize* provides the number of directors serving on the firm board for the majority of the firm's fiscal year 1999.

There is a concern that Tobin's Q does not appropriately capture firms' intangible assets. Major sources of intangible assets arise from research and development (R&D) investment. As a control for these intangible assets, *R&D/Sales* is included. This variable equals firm R&D expenditures scaled by firm sales revenue. Many firms in the sample did not report a figure for R&D expenditures. To avoid dropping these firms from the sample, I set *R&D/Sales* to zero for these firms, and also include the dummy variable *R&D?,* which equals 1 if R&D expenditure is available in Compustat for the firm and zero otherwise. Finally, all regressions also include dummy variables for the 47 two-digit SIC codes represented in the sample. Descriptive statistics of all variables save

the SIC dummies are shown in Table 2. All non-binary, non-interaction variables described above were converted to natural logs for the analyses that follow.[12]

V. Correlations between External Ownership Concentration and Staggered Boards

Tables 3 and 4 describe the pattern of external ownership concentration and board structure among sample firms. This pattern suggests why omitting external ownership concentration from regressions of firm performance on board structure biases the estimates of the impact of both types of staggered board. Roughly 60% of firms with annually elected boards also have at least one large external owner, compared to about 80% for firms with either NESBs or ESBs. This indicates a more positive correlation of measures of external ownership concentration with either *ESB* or *NESB* than with *ANN*, as confirmed by Table 5. Although the correlation coefficients are low in absolute value, a clear pattern is visible. External ownership concentration is positively correlated with ESBs and negatively correlated with annually elected boards. There are mixed results between concentration and NESBs, with a positive correlation between NESBs and the presence of external ownership concentration (indicated by *Ext5*), and a slightly negative correlation between NESBs and the degree of external ownership concentration (indicated by *Ext5Sum*).

[12] Although the full sample contains 315 firms, the regressions reported below are based on fewer observations. Compustat did not contain enough data to calculate Tobin's Q for between 36 and 52 firms, depending on the Q variable used. *Volatility* was not available for 27 firms.

Because external ownership concentration has different correlations with different types of board structure, the omitted variable problem described above will bias the estimated impacts of each type of board structure differently. Suppose that external ownership concentration has a pronounced negative relationship with firm performance. When external ownership concentration is omitted from a regression of firm performance, that negative relationship is likely to emerge as biases in the estimated coefficients of regressors that are correlated with external ownership concentration. If *ESB* is positively related to external ownership concentration, then the negative but omitted negative relationship between concentration and performance will emerge as a downward bias in the estimated coefficient on *ESB*. More precisely, the estimated coefficient of *ESB* will conflate the effect of an ESB on performance and that portion of the negative influence of external ownership concentration on performance that is correlated with *ESB*. The result is a downward biased estimate of the impact of ESBs on firm performance. Evidence for exactly this scenario is presented in the next section.

To get a more complete picture of the relationship between external ownership concentration and board structure, Table 6 presents the results of multivariate regressions of *Ext5Sum* on board structure and several control variables.[13] By definition *Ext5Sum* is left-censored at *Ext5Sum* = 5%, making a tobit model appropriate. The results show positive relationships between external ownership concentration and the presence of either type of staggered board, and these results are robust to different specifications of both performance and concentration.[14] Starting from the median *Ext5Sum* value of 11.1%, a shift from an *ANN* to an *ESB*, all else constant, is associated with a rise in

[13] This and subsequent tables of regression results omit coefficient estimates and standard errors for industry dummies and constant terms.
[14] Similar results were found in unreported logit regressions with *Ext5* as the dependent variable.

Ext5Sum to 15.4%-16.1%, depending on which column's results are used. A shift from an *ANN* to a *NESB* is associated with a rise in *Ext5Sum* to 13.9%-14.8%. Table 6 establishes the positive relationship between external ownership concentration and both types of staggered boards, suggesting that in multivariate regressions of firm performance in which *ESB* and *NESB*, but not a measure of external ownership concentration, are included among the regressors, the coefficient estimates on both *ESB* and *NESB* are likely to suffer omitted variable biases.

The results in Table 6 also indicate a strong negative relationship between external ownership concentration and firm performance as measured by Tobin's Q, consistent with a finding of Demsetz and Villalonga (2001).[15] As described above, this negative relationship is the driver of a downward bias of estimates of the impact of staggered boards on firm performance. Table 6 shows that external ownership concentration is positively related to ESBs and NESBs, and negatively related to firm performance, implying a downward bias for coefficient estimates on *ESB* and *NESB* if external ownership concentration is left out of the analysis of board structure and firm performance. More direct evidence for the downward bias is presented in the next section.

VI. Assessing Omitted Variable Bias

To assess the omitted variable bias empirically, I begin with the regression shown in Column 1 of Table 7, with *Q2000* as the dependent variable, *NESB* and *ESB* among the regressors, and no measure of external ownership concentration included. The

[15] See Section III.

coefficients on *NESB* and *ESB* are both positive but statistically insignificant (p-values of 0.44 and 0.66, respectively).

(It is worth noting that while these coefficients on *NESB* and *ESB* are positive, in a similarly specified model Bebchuk and Cohen (2003) find negative coefficients on their proxies for NESBs and ESBs (see footnote 4), with the coefficient for their ESB proxy being statistically significant. This difference may be attributable to the different sizes of firms in our samples. My firms are *Forbes 500* firms, while the majority of their sample is composed of smaller firms. In an unreported regression, when I ran the regression from Column 1 on the lower half of my firms in terms of assets, the coefficients on *NESB* and *ESB* drop precipitously (to -0.026 and 0.016, respectively), supporting the hypothesis firm size is a driver of our differing results. This suggests that caution is warranted in applying my results to smaller firms, and more interestingly that board structure may have different impacts on firm performance depending on firm size. This is a subject for future study, and beyond the scope of this paper.)

Columns 2 and 3 of Table 7 display the results of regressions that add measures of external ownership concentration to the regression from Column 1. *Ext5* is added in Column 2, *Ext5Sum* and its square in Column 3. In both cases, the inclusion of external ownership concentration results in markedly higher coefficient estimates for *NESB* and *ESB*.[16] Although the estimates still do not attain conventional levels of statistical significance, their p-values do decline to roughly one-third their previous values – the p-values for the coefficient estimates of *NESB* and *ESB* respectively are 0.11 and 0.22 for Column 2 and 0.17 and 0.20 for Column 3. Whereas in Column 1 having an ESB is

[16] Similar results were also found using ln(*Ext5Sum*) rather than *Ext5Sum* and its square to capture nonlinearities. However, in subsequent regressions (see Table 10), ln(*Ext5Sum*) was not able to capture significant non-monotonic relationships, and so *Ext5Sum* and its square are used throughout.

associated with a 4.5% increase in firm market value, Columns 2 and 3 place the increase in market value associated with an ESB at 12.2%. The median firm market value for my sample is $11.38 billion, so a 12.2% rise translates to an increase in market value of nearly $1.4 billion, a non-trivial amount to say the least. For having a NESB, the changes in market value rise from 7.8% in Column 1 to 16.5% and 13.9% in Columns 2 and 3, respectively.

Through seemingly unrelated estimation, a simultaneous covariance matrix for pairs of regressions can be generated allowing for cross-specification hypothesis testing.[17] In this way, I can test whether the coefficient estimates on *NESB* and *ESB* found in Column 1 are significantly different from those found in Column 2 or Column 3. The hypothesis that the coefficient estimate for *ESB* is the same in Column 1 as in Column 2 can be rejected at the 0.05 level, and the same is true comparing *ESB* coefficients across Columns 1 and 3. For the *NESB* coefficient estimates, the hypothesis that they are the same across Columns 1 and 2 can be rejected at the 0.01 level, and the hypothesis that they are the same across Columns 1 and 3 can be rejected at the 0.05 level. This is strong evidence that excluding ownership concentration from regressions of firm performance on board structure biases the coefficient estimates for *ESB* and *NESB* downward.

A recent innovation by Altonji, Elder and Taber (hereafter AE&T) allows me to evaluate for each regression in Table 7 the likelihood that the estimated impact on firm performance of *ESB* or *NESB* is completely attributable to omitted variable bias. (See the Appendix for details of the AE&T (2002) methodology.) Table 8 shows the results from

[17] The "suest" command in Stata generates a covariance matrix that is appropriate even though the regressions use the same data. See StataCorp (2003).

applying the AE&T (2002) methodology to the estimates for *ESB* and *NESB* from the Table 7 regressions. (Columns 1-3 of Table 8 correspond to the regressions reported in Columns 1-3 of Table 7.) The value -2.706 in the first row of Column 1 indicates that based on the regression results from Table 7, Column 1, the selection on omitted variables would need to be 2.706 times as strong as the selection on the other included variables to explain away the entire estimated impact of *ESB* on firm performance (the negative sign here reflects a downward omitted variable bias). Looking at the results for *ESB* in Columns 2 and 3, based on regressions in which external ownership concentration is included, the likelihood that the coefficient estimates for *ESB* are the product of omitted variable bias decline precipitously. The ratio of selection on omitted variables to selection on included variables would need to be twice as high in the regressions from Columns 2 and 3 (5.524 or 5.779, in absolute value) as in the regression from Column 1 (2.706) for omitted variable bias to explain away the coefficient estimate for *ESB*. The fact that including external ownership concentration dramatically reduces the likelihood of omitted variable bias driving the coefficient estimate for *ESB* strongly suggests that excluding external ownership concentration is a source of omitted variable bias.

Turning to the second row of Table 8, there is little change in the calculated statistic for the coefficient estimate of *NESB* when *Ext5* is added to the analysis (-6.090 in Column 1 compared to -6.876 from Column 2). When *Ext5Sum* and its square are added to the regression in Column 3, however, the statistic more than triples its value from Column 1. This indicates a much lower likelihood that omitted variable bias is the driver of the coefficient estimate for *NESB* in the Column 3 regression as opposed to the Column 1 regression. Although there is currently no standard for ascribing a statistical

significance level to a difference in results based on the AE&T (2002) methodology, it does seem a reasonable conclusion that the coefficient estimates for *ESB* and *NESB* are considerably more likely to suffer a downward omitted variable bias when external ownership concentration is not included in the analysis of board structure and firm performance. This finding is particularly compelling for specifications of external ownership concentration capable of capturing non-monotonic relationships with firm performance. The evidence from the direct examination of the coefficient estimates presented earlier in this section, combined with these results from the AE&T (2002) methodology, provides strong evidence that external ownership concentration is critical to an accurate investigation of the impact of ESBs and NESBs on firm performance, and that the impacts estimated in analyses that omit external ownership concentration likely suffer downward biases.

VII. Interactive Effects of Board Structure and External Ownership Concentration on Firm Performance

The inclusion of external ownership concentration in this analysis allows for the first time an empirical investigation of how firms with each type of board structure perform under different degrees of external ownership concentration. Table 9 displays the results of interacting the board structure variables with *Ext5*.[18] (For a reminder of the

[18] The regression in Table 9 includes neither *Ext5* nor any of the three board structure variables other than in their interacted forms. As a result, the estimated coefficient for, say, *ANN_Ext5* combines the effect of *ANN*, the effect of *Ext5*, and the effect of the interaction of the two. Including *Ext5*, *NESB* and *ESB* would require dropping some interactive terms due to collinearity (*ANN_Ext5* + *NESB_Ext5* + *ESB_Ext5* = *Ext5*, *ESB_Ext5* + *ESB_no_Ext5* = *ESB*, etc.), causing the coefficient estimates of *Ext5*, *NESB* and *ESB* to combine the effects of those variables as well as the dropped interactive terms. Using this specification

definition of each interactive variable, see Panel C of Table 1.) The dropped category is firms with annually elected boards and no external owner of at least 5% of the voting stock (*ANN_no_Ext5*). The most noticeable result is the strong negative impact of external ownership concentration on firm performance. For each type of board structure, firms that have at least one external 5% owners perform significantly worse than firms that do not. We can reject the hypothesis that the coefficient estimates of *ESB_Ext5* and *ESB_no_Ext5* at the 0.10 level, and analogous hypotheses for *NESB* and *ANN* firms can be rejected at the 0.01 level. If a firm that has an ESB changes from having no external 5% owner to having at least one (a switch from *ESB_no_Ext5* to *ESB_Ext5*), the associated change in market value is -23.4%, or $2.7 billion for a firm with the sample median market value. The switch from *ANN_no_Ext5* to *ANN_Ext5* is associated with a 32.2% decrease in market value, and the switch from *NESB_no_Ext5* to *NESB_Ext5* is associated with a whopping 51.9% market value decrease.

Looking across board structure types, among firms that do not have an external 5% owner, having an NESB firm is associated with much better performance than having either an ANN or an ESB. While there is essentially no difference in performance between an *ANN_no_Ext5* firm and an *ESB_no_Ext5* firm, *NESB_no_Ext5* firms have market values at least 50% higher than either, differences which are significant at around a 0.10 level.

The differences across board structure types among the three-fourths of sample firms that do have at least one external 5% owner are not as dramatic. Such firms with ESBs have market values 6.2% higher than firms with NESBs, which in turn have market

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rather than the one in Table 9 yields mathematically interchangeable results, but the interpretation of the coefficient estimates is less intuitive.

values 8.0% higher than firms with ANNs, but these performance differences are not significant at conventional levels. This evidence is weakly supportive of the credible commitment view of ESBs described in Section II. Among firms with more concentrated external ownership, and so with a greater likelihood of shareholders turning over control of their boards through a hostile takeover, those firms with ESBs in place outperform those with board structures that are weaker in terms of takeover defenses. This is consistent with the credible commitment view that an ESB encourages firm-specific investment by firm participants by constraining shareholders from acting opportunistically, but contradicts the entrenchment view that ESB firms should perform worse due to firm managers' insulation from the market for corporate control.

Stronger evidence consistent with the credible commitment view is displayed in Table 10, which reports results from regressions in which the board structure variables are interacted with *Ext5Sum* and its square.[19] In both regressions, the hypothesis that *ESB_Ext5Sum* and *NESB_Ext5Sum* are equal can be rejected at the 0.05 level, and the same is true for their squares. In the Column 2 regression, the hypothesis that *ANN_Ext5Sum* and *NESB_Ext5Sum* are equal can be rejected at the 0.10 level and the hypothesis that their squares are equal can be rejected at the 0.05 level, but in the Column 1 regression only the square terms are significantly different. Neither *ESB_Ext5Sum* and *ANN_Ext5Sum* nor their squares are statistically different at conventional levels in either regression, although in the Column 1 regression the differences between *ESB_Ext5Sum* and *ANN_Ext5Sum* and between their squares are significant at the 0.16 and 0.24 levels,

[19] As in Table 9, in Column 1 of Table 10 only the interaction terms of the board structure variables and the *Ext5Sum* variables are included. The explanation for this is similar to that given in footnote 17, although here *NESB* and *ESB* can be included without needing to drop any interaction terms, so they are included in Column 2. Including *Ext5Sum* or $Ext5Sum^2$ would require dropping some interaction terms and would complicate interpretation as described in footnote 17, so they remain excluded.

respectively. For each type of board structure and in both regressions, the joint hypothesis that the interaction term with *Ext5Sum* and the interaction term with its square are simultaneously equal to zero can be rejected at the 0.01 level.

The strong negative relationship between external ownership concentration and firm performance is evident in both columns, although this relationship is the not the same across all types of board structure. For ESB firms, the combined impact of *Ext5Sum* and its square on firm performance is negative for all values of *Ext5Sum* from 0% to 100%, and essentially the same can be said about ANN firms (the total impact of external ownership concentration becomes positive when *Ext5Sum* reaches around 95%). For NESB firms, however, the total impact of external ownership concentration is negative only until *Ext5Sum* reaches about 35% in Column 1 and about 40% in Column 2, after which the total impact becomes increasingly positive.[20] Some caution is in order against reading too much into this result because there are very few sample firms with both a NESB and a high level of *Ext5Sum*.[21] In addition, the dynamics among board structure (of any type), external ownership concentration and firm performance could change once large external owners approach a controlling share of a firm and collective shareholder action becomes less pivotal.

Comparing across board structures, results from both columns indicate that firms with ESBs outperform firms with ANNs for levels of *Ext5Sum* up to 59% (although due to the specification in the Column 1 regression, there is no estimated difference in performance across board structure types when *Ext5Sum* = 0%). Therefore, over a range

[20] This non-monotonic relationship may explain why in Table 8 the degree of potential omitted variable bias in the coefficient estimate for *NESB* did not change much between regressions (1) and (2), but did change quite a bit between regressions (1) and (3).

[21] Only two of the 315 sample firms have a NESB and *Ext5Sum* > 35%, and none have a NESB and *Ext5Sum* > 40% (see Table 3).

of external ownership concentration that contains a great majority of sample firms, having an ESB is associated with better firm performance than having an ANN.[22] Like the results from Table 9, this result is consistent with the credible commitment view that ESBs enhance firm performance and contradicts the entrenchment view that ESBs are detrimental to firm performance.

ESB firms also outperform firms with NESBs over substantial, albeit narrower, ranges of *Ext5Sum*. The estimated coefficients in Column 1 indicate that ESB firms have higher market values than NESB firms for levels of *Ext5Sum* up to 25% (again, there is no estimated difference in performance across board structure types when *Ext5Sum* = 0% in Column 1).[23] In Column 2, NESB firms outperform ESB firms at low levels of *Ext5Sum* (recall the significantly positive coefficient on *NESB_no_Ext5* in Table 9) and high levels, while ESB firms outperform NESB firms when *Ext5Sum* is within a range of 6%-26%.[24] The finding that NESB firms perform exceptionally well under very high and very low degrees of external ownership concentration does not fit cleanly into either the entrenchment view or the credible commitment view, and it is noted here primarily to emphasize that NESBs warrant further investigation as a unique category of board structure in their own right.[25]

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[22] 311 of the 315 sample firms (98.7%) have *Ext5Sum* < 59%, and 227 (72.1%) have 0% < *Ext5Sum* < 59% (see Table 3).

[23] 263 of the 315 sample firms (83.5%) have *Ext5Sum* < 25%, and 179 (56.8%) have 0% < *Ext5Sum* < 25% (see Table 3).

[24] 107 out of 315 (34.0%) of sample firms have 0% < *Ext5Sum* < 6%, 151 (47.9%) have 6% < *Ext5Sum* < 26%, and 57 (18.1%) have *Ext5Sum* > 26% (see Table 3).

[25] As noted above, the small number of NESB firms with *Ext5Sum* > 30% requires that caution be used in assigning too much weight to estimated results for higher levels of external ownership concentration. A possible explanation for the strong performance of NESB firms at low levels of concentration found in Table 9 and Column 2 of Table 10 is that where there is little external ownership concentration and so the risk of shareholder opportunism is low, a NESB might serve as a "credible-enough commitment," especially if stakeholders would like to leave open the possibility of takeovers that are in the interests of both shareholders and stakeholders but resisted by firm managers. While consistent with this paper's results, this explanation is merely speculative.

Table 11 provides estimates of the changes in firm market value associated with switches from one type of board structure to another at various levels of *Ext5Sum* below 50%. In both panels, the row labeled "From ANN to ESB" shows a pattern quite consistent with the credible commitment hypothesis. Having an ESB is associated with better firm performance than having an ANN for the entire range of *Ext5Sum* values considered. This matches the prediction of the credible commitment view and contradicts that of the entrenchment view. More importantly, the difference in market value between ESB firms and ANN firms becomes larger as external ownership concentration increases, that is, as the threat of shareholder opportunism grows. This holds until *Ext5Sum* equals around 30%, after which the benefit of having an ESB rather than an ESB begins to decline, consistent with the idea that as large external shareholders approach a controlling share of firm voting stock and so collective shareholder action becomes less critical, the need for protection against shareholder opportunism becomes less pressing.

Focusing on the rows of Table 11 concerning NESBs, as noted above the behavior of NESB firms at very low and very high levels of external ownership concentration is difficult to explain neatly in terms of either the entrenchment view or the credible commitment view. Within an intermediate range of *Ext5Sum* that includes a sizable portion of sample firms, NESB firms do behave in Panel 2 as one might expect, as something of an intermediate category between ANN firms and ESB firms, with ESB firms outperforming NESB firms as the credible commitment view predicts. The behavior of NESB firms at more extreme levels of external ownership concentration, however, remains a puzzle.

VIII. Robustness Checks

The previous three sections provide evidence that (a) excluding external ownership concentration causes a downward bias in the estimated impact of ESBs and NESBs on firm performance, (b) when external ownership concentration is included in the analysis of board structure and firm performance, having an ESB has a positive impact on firm performance, or more accurately that ESBs mitigate the negative effect on performance of external ownership concentration. This section considers the robustness of these results.

VIII.1 Different Definitions of External Ownership Concentration

To make sure the results found above are not an artifact of the particular specification of external ownership concentration used, I ran the same analysis replacing *Ext5Sum* with two different specifications. First, rather than use the total percent of firm voting stock owned by all external owners of at least 5% of the voting stock, I constructed a variable indicating the percent of voting stock owned by the single largest external owner of at least 5% (*Ext5Big*). Second, I constructed a measure based on the Herfindahl-Hirschman index:

$$Ext5HHI = \Sigma\, x_i^2 \text{ for all } i$$

where x_i is the percent of voting stock owned by the i^{th} external owner of at least 5% of firm voting stock. I also ran all of the regressions again after dropping the square term of the external ownership concentration measure being tested.

With all of these specifications, the patterns of the coefficient estimates and results of significance test are similar, with only a few exceptions. Significance levels using *Ext5Big* generally are lower (just beyond conventional levels of significance, in the 0.10-0.20 range) for the results in regressions similar to those in Table 7 and Table 10, Column 1. This is perhaps not so surprising, given that by definition there is less variation in *Ext5Big* than in *Ext5Sum*. Also not surprising (given the non-monotonic relationship between external ownership concentration and firm performance found for NESB firms in Table 10) is that when the square term of any external ownership concentration measure is dropped, the results from the analysis of Tables 7 and 8 do not indicate any significant change across regressions in the coefficient estimates for *NESB*. The coefficient estimates for *ESB* do still exhibit statistically significant change, even in those specifications. Finally, specifications using *Ext5Sum* without its square yield statistically insignificant results in regressions similar to those in Table 10, although the same is not true for *Ext5Big* and *Ext5HHI*. Overall the results are robust to different measurements of external ownership concentration, and in most of the instances in which the significance of the results does not hold, the drop in significance is actually consistent with findings from previous sections.

VIII.2 Performance Measures from Different Years

The results displayed in Tables 7-10 are based on regressions that use fiscal year 1999 data for all independent variables and firm performance from fiscal year 2000 as the dependent variable. Although the time required for hand-collecting board structure and external ownership concentration data made gathering those data for additional years

infeasible, I did collect performance data for years before and after 2000. I repeated this paper's analyses using industry-adjusted Tobin's Q data for each year from 1998 to 2002, and for averages over the years 1996-1998, 1994-1998, and 2000-2002. The results for regressions similar to those in Tables 7 and 9 are remarkably consistent over the years examined. In regressions similar to those in Table 10, replacing *Q2000* with performance measures from years prior to 2000 yields results that keep the same pattern as those shown in Table 10, although there is a weakening of the significance levels (several results that are significant at the 0.05 level in Table 10 are significant at the 0.10 level using earlier performance data). Significance levels tend to fall sharply when performance data from 2001 and (to a lesser degree) 2002 are used, suggesting perhaps that the relationships described in Table 10 may become more tenuous during economic downturns.

VIII.2 Changes in Control Variables

Spending on R&D was unavailable in Compustat for just over one-third of the sample firms. As described in Section V, to avoid dropping a large portion of my sample I set *R&D/Sales* to zero for those firms and created a dummy variable *R&D?* that equals 1 if firm R&D data was available. To ensure that this handling of R&D data does not drive my results, I also performed the regressions on only those firms for which R&D data was available. The only major change to the results is that in Table 6 the significance of coefficient estimates for *NESB* collapses (the significance of the *ESB* estimates is unaffected). Other results are similar to those reported in the subsequent tables, although the reduction in sample size does increase the standard errors of coefficient estimates.

R&D is not the only type of spending that can be used to control for firm intangible assets. Spending on advertising and capital expenditures may also reflect the effects of intangible assets not directly captured by Tobin's Q. I created variables analogous to *R&D/Sales* and *R&D?* with advertising and capital expenditures data and ran regressions using these variables in addition to and in lieu of the R&D variables. No permutation of these variables yielded results that are substantially different from those reported in the tables.

To check against possible overidentification, the performance regressions were run multiple times with ln(*Assets*), ln(*FirmAge*), *Delaware*, and ln(*BoardSize*) each dropped in turn. In none of these regressions did the results substantially differ from the results displayed in the tables.

The robustness of the previous sections' results to a variety of definitions of key variables and many different regressions strongly suggests that the results are not artifacts of particular specifications. The evidence presented therefore supports the hypothesis that omitting external ownership concentration from analyses of board structure and firm performance does cause a downward bias on the estimated impact of ESBs and NESBs on firm performance. Further, the interactive effects of board structure and external ownership concentration on firm performance indicate that having an ESB is associated with better firm performance over a range of external ownership concentration that encompasses most sample firms. This is consistent with the credible commitment view of ESBs, and contradicts the entrenchment view.

IX. Implications

Corporate organization exhibits characteristics of both the team production and principal-agent theories, in which the credible commitment view and entrenchment view are respectively rooted. Different aspects of firm behavior may be more influenced by one framework than the other but neither is completely absent, and a proper role for researchers of corporate organization and behavior is to attempt to determine which framework is more relevant to which decisions. The consistency of the results found here with the credible commitment view suggests that a team production story appears more relevant to ESBs and potentially other takeover defenses, which inherently involve the collective actions of dispersed decision makers determining the distribution of rents very much along the lines that Holmstrom (1982) described.

In addition to the debate over ESBs, my findings also contribute to the broader debate over whether legal rules surrounding corporate control and takeovers should reflect "shareholder primacy," in which shareholders possess final authority to decide whether a takeover bid should be accepted, or "director primacy," in which directors have the authority to block a takeover even over the expressed objection of a majority of shareholders. Delaware case law gives directors of a firm with a staggered board an almost unlimited right to refuse a takeover even after shareholders vote in support of the bidder in a proxy election. [See BC&S (2002a).] Advocates of shareholder primacy hold that this violates the rights of shareholders as the ultimate owners of the firm. Director primacy advocates argue that it accurately reflects that the purpose of a board is to govern the activities of the firm and the disposal of its resources and so such decisions should remain in the directors' hands until they are voted out by shareholders in whatever

manner the firm charter and bylaws provide. The evidence provided above suggests that removing the avenues by which shareholders can remove directors quickly can actually serve shareholders' interests, and so lends credence to the director primacy view.

X. Conclusions

The findings presented here demonstrate a positive relationship between external ownership concentration and the presence of an ESB, and show that ignoring external ownership concentration in analyses of board structure and firm performance leads to downwardly biased estimates of the effects staggered boards have on performance. This is the first paper to examine how the interactions between board structure and external ownership concentration affect firm performance. The results here are consistent with the credible commitment view that an ESB assures other firm participants that shareholders will not act opportunistically when external ownership is more concentrated and the costs of shareholder collective action are reduced, and so firm performance improves as participants devote more resources to the team production process. Unusual results regarding the effect of the interaction of NESBs and external ownership concentration on firm performance are also found, warranting further study.

Appendix – Assessing Omitted Variable Bias Using the AE&T Methodology

Altonji, Elder and Taber (2002) provide the theoretical justification for the following methodology for evaluating the degree of omitted variable bias in a regression coefficient estimate. Consider a regression of the form:

A1. $Y = \alpha Z + X'\gamma + W'\varphi + \varepsilon = \alpha Z + X'\gamma + u$

where Z is a dummy variable whose coefficient estimate α is believed to suffer an omitted variable bias, X is a vector of observables, W is a vector of unobservables, ε is an error term, and u is a residual capturing both the error term and the influence of the unobservables ($u = W'\varphi + \varepsilon$).

The AE&T (2002) methodology begins with the assumption that the observables in vector X are simply a randomly selected subset of all potentially observable variables, and the unselected variables compose the unobservable vector W. Given this assumption, both the observables and the unobservables should exhibit the same variation with respect to Z:

A2. $$\frac{E[X'\gamma \mid Z=1] - E[X'\gamma \mid Z=0]}{Var(X'\gamma)} = \frac{E[u \mid Z=1] - E[u \mid Z=0]}{Var(u)}$$

The assumption that the observables are a randomly selected subset of the set of possible variables is a conservative one. Under most circumstances, the econometrician will have some rationale, either from theory or experience, for choosing particular variables as regressors. Presumably, then, the normalized (by their variance) shift in observables associated with Z will usually be greater than the normalized shift in unobservables associated with Z. However, making this admittedly unrealistic

assumption allows for a conservative estimate of the shift in unobservables associated with Z:

A3. $$E[u \mid Z=1] - E[u \mid Z=0] = \frac{E[X'\gamma \mid Z=1] - E[X'\gamma \mid Z=0]}{Var(X'\gamma)} * Var(u)$$

In order to estimate the potential magnitude of omitted variable bias in α, the fraction of the variance of Z that is orthogonal to the omitted variables is required. This fraction can be estimated by regressing Z on the observables:

A4. $$Z = X'\gamma + \varepsilon_{Z|X}$$

The fraction of the variance of Z that is orthogonal to the observables can be calculated as $\text{Var}(\varepsilon_{Z|X})/\text{Var}(Z)$. Relying again on the conservative assumption that the variables in vector X are a randomly selected subset of all possible variables, we use the fraction of the variance of Z that is orthogonal to the observed variables as our estimate of the fraction of the variance of Z that is orthogonal to the omitted variables:

A5. $$\frac{Var(\varepsilon_{Z|W})}{Var(Z)} = \frac{Var(\varepsilon_{Z|X})}{Var(Z)}$$

Using the results from (A3) and (A5), we can estimate the potential magnitude of the omitted variable bias in α as:

A6. $$bias = \frac{E[u \mid Z=1] - E[u \mid Z=0]}{Var(\varepsilon_{Z|W})/Var(Z)} = \frac{E[X'\gamma \mid Z=1] - E[X'\gamma \mid Z=0]}{Var(X'\gamma)/Var(u)} * \frac{Var(Z)}{Var(\varepsilon_{Z|X})}$$

A negative value for *bias* indicates a downward omitted variable bias.

Comparing the estimated coefficient α to the calculated value of *bias* allows us to assess the degree of omitted variable bias in α. Specifically, the ratio $\alpha/bias$ represents the correlation between Z and omitted variables, relative to the correlation between Z and

the variables included in X, necessary for the coefficient estimate α to be entirely attributable to omitted variable bias. For example, a value of 3 (or -3) for *α/bias* implies that the normalized shift in the unobservables $\{E[u|Z=1]-E[u|Z=0]\}/Var(u)$ would need to be 3 times as large as the normalized shift in observables $\{E[X'\gamma|Z=1]-E[X'\gamma|Z=0]\}/Var(X'\gamma)$ to attribute the entire effect of Z on Y to omitted variable bias. The larger in absolute value the ratio *α/bias*, the less likely it is that omitted variable bias is solely responsible for α.

Table A1 shows the results of applying the AE&T (2002) methodology in order to assess and compare the omitted variables bias associated with the coefficient estimates for ESB across the regressions from Table 7. Table A2 does the same for the coefficient estimates of *NESB*.

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Table 1: Variable Definitions
All variables refer to FY1999 data, except where noted.

Variable	Description	Source
Panel A: External Ownership Concentration		
Ext5	Equals 1 if an external owner owns at least 5% of firm voting stock; otherwise 0	Proxy Statement
Ext5Sum	Total percent of firm voting stock owned by all external owners of at least 5%	Proxy Statement
Panel B: Board Structure		
ANN	Equals 1 if the firm has an annually elected board; otherwise 0	Charter
NESB	Equals 1 if the firm has a non-effective staggered board; otherwise 0	Charter
ESB	Equals 1 if the firm has an effective staggered board; otherwise 0	Charter
Panel C: Interaction Terms for External Ownership Concentration and Board Structure		
ANN_Ext5	Equals 1 if the firm has an *ANN* and at least one external 5% owner; otherwise 0	Charter and Proxy Statement
NESB_Ext5	Equals 1 if the firm has a *NESB* and at least one external 5% owner; otherwise 0	Charter and Proxy Statement
ESB_Ext5	Equals 1 if the firm has an *ESB* and at least one external 5% owner; otherwise 0	Charter and Proxy Statement
ANN_no_Ext5	Equals 1 if the firm has an *ANN* but no external 5% owner; otherwise 0	Charter and Proxy Statement
NESB_no_Ext5	Equals 1 if the firm has a *NESB* but no external 5% owner; otherwise 0	Charter and Proxy Statement
ESB_no_Ext5	Equals 1 if the firm has an *ESB* but no external 5% owner; otherwise 0	Charter and Proxy Statement
ANN_Ext5Sum	Equals *Ext5Sum* if the firm has an *ANN*; otherwise 0	Charter and Proxy Statement
NESB_Ext5Sum	Equals *Ext5Sum* if the firm has a *NESB*; otherwise 0	Charter and Proxy Statement
ESB_Ext5Sum	Equals *Ext5Sum* if the firm has an *ESB*; otherwise 0	Charter and Proxy Statement
Panel D: Firm Performance		
Q[year]	Firm's Tobin's Q divided by the median Tobin's Q in the firm's 2-digit industry, for the fiscal year indicated	Compustat
Avg5Q	Firm's Tobin's Q divided by the median Tobin's Q in the firm's 2-digit industry, averaged over 1994-1998	Compustat
Avg3Q	Firm's Tobin's Q divided by the median Tobin's Q in the firm's 2-digit industry, averaged over 1996-1998	Compustat

Variable	Description	Source
Panel E: Control Variables		
Assets	Total assets (in billions of dollars)	Compustat
FirmAge	Age of the firm measured from the year of incorporation	International Directory of Company Histories[26]
Volatility	Standard deviation stock price volatility calculated over 60 months	Compustat
Delaware	Equals 1 if the firm is incorporated in Delaware; otherwise 0	Compustat
BoardSize	Number of directors on the firm's board	Proxy Statement
R&D/Sales	R&D expenditures divided by Sales	Compustat
R&D?	Equals 1 if R&D expenditures for the firm is reported in Compustat; otherwise 0 (if no value is reported, *R&D/Sales* is set to 0)	Compustat
SIC	One dummy variable for each of the 47 two-digit SIC code represented in the sample	Compustat

[26] A few firm's years of incorporation are unavailable from the International Directory. Data for these firms were found through their charters and yahoo.investor.reuters.com.

Table 2: Descriptive Statistics

Variable	Obs	Median	Mean	St. Dev.	Minimum	Maximum
Panel A: External Ownership Concentration						
Ext5	315	1	0.733	0.443	0	1
Ext5Sum	315	11.100	14.221	14.058	0	93.310
Panel B: Board Structure						
ANN	315	0	0.400	0.491	0	1
NESB	315	0	0.298	0.458	0	1
ESB	315	0	0.302	0.460	0	1
Panel C: Interaction Terms for External Ownership Concentration and Board Structure						
ANN_Ext5	315	0	0.251	0.434	0	1
NESB_Ext5	315	0	0.244	0.430	0	1
ESB_Ext5	315	0	0.238	0.427	0	1
ANN_no_Ext5	315	0	0.149	0.357	0	1
NESB_no_Ext5	315	0	0.054	0.226	0	1
ESB_no_Ext5	315	0	0.063	0.244	0	1
ANN_Ext5Sum	315	0	5.347	12.249	0	93.310
NESB_Ext5Sum	315	0	4.220	8.529	0	38.970
ESB_Ext5Sum	315	0	4.655	10.461	0	62.260
Panel D: Firm Performance						
Q2000	274	1.134	1.588	1.307	0.251	9.811
Q1998	264	1.179	1.585	1.196	0.467	11.583
Avg5Q	280	1.092	1.353	0.793	0.497	7.437
Avg3Q	276	1.119	1.418	0.902	0.509	8.165
Panel E: Control Variables						
Assets	315	6.635	14.938	35.058	0.771	405.200
FirmAge	315	62	59.057	34.521	1	150
Volatility	288	0.318	0.343	0.118	0.153	1.052
Delaware	315	1	0.622	0.486	0	1
BoardSize	315	11	11.076	2.639	5	20
R&D/Sales	315	0	0.021	0.040	0	0.246
R&D?	315	1	0.638	0.481	0	1

Table 3: Number of Firms (and Percent of Sample) by *Ext5* and Board Structure

	ANN	*NESB*	*ESB*	All Firms
No large external owner (*Ext5* = 0)	47 (14.9%)	17 (5.4%)	20 (6.3%)	84 (26.7%)
At least one external 5% owner (*Ext5* = 1)	79 (25.1%)	77 (24.4%)	75 (23.8%)	231 (73.3%)
Total	126 (40.0%)	94 (29.8%)	95 (30.2%)	315 (100%)

Table 4: Number of Firms (and Percent of Sample) by *Ext5Sum* and Board Structure

	ANN	*NESB*	*ESB*	All Firms
Ext5Sum = 0	47 (14.9%)	17 (5.4%)	20 (6.3%)	84 (26.7%)
5% < *Ext5Sum* < 10%	20 (6.3%)	16 (5.1%)	23 (7.3%)	59 (18.7%)
10% < *Ext5Sum* < 20%	24 (7.6%)	33 (10.5%)	21 (6.7%)	78 (24.8%)
20% < *Ext5Sum* < 30%	21 (6.7%)	21 (6.7%)	17 (5.4%)	59 (18.7%)
30% < *Ext5Sum* < 40%	5 (1.6%)	7 (2.2%)	10 (3.2%)	22 (7.0%)
40% < *Ext5Sum* < 50%	6 (1.9%)	0 (0.0%)	2 (0.6%)	8 (2.5%)
50% < *Ext5Sum* < 100%	3 (1.0%)	0 (0.0%)	2 (0.6%)	5 (1.6%)
Total	126 (40.0%)	94 (29.8%)	95 (30.2%)	315 (100%)

Table 5: Correlation Coefficients between External Ownership Concentration and Board Structure

	Ext5	*Ext5Sum*
ANN	-0.1964	-0.0497
NESB	0.1266	-0.0038
ESB	0.0834	0.0568

Table 6: Establishing the Positive Relationship between Staggered Boards and External Ownership Concentration

Tobit Regression Results – Dependent Variable = ln(*Ext5Sum*)

	(1)	**(2)**	**(3)**	**(4)**
NESB	0.290**	0.227*	0.262**	0.283**
	(.122)	(.123)	(.124)	(.128)
ESB	0.330***	0.332***	0.364***	0.370***
	(.125)	(.128)	(.127)	(.132)
ln*(Avg5Q)*		-0.889***		
		(.154)		
ln*(Avg3Q)*			-0.820***	
			(.142)	
ln*(Q1998)*				-0.716***
				(.121)
ln*(Volatility)*	0.770***	0.592***	0.515**	0.452**
	(.197)	(.201)	(.201)	(.209)
ln*(Assets)*	-0.151**	-0.164***	-0.140**	-0.132**
	(.060)	(.061)	(.062)	(.063)
ln*(FirmAge)*	0.089	0.022	0.028	0.014
	(.071)	(.074)	(.073)	(.076)
ln*(R&D/Sales)*	-0.139***	-0.066	-0.088*	-0.092*
	(.044)	(.049)	(.049)	(.051)
ln*(R&D?)*	0.246	0.146	0.280	0.282
	(.179)	(.180)	(.181)	(.189)
Industry dummies	Yes	Yes	Yes	Yes
Pseudo R-squared	0.1963	0.2564	0.2602	0.2584
N	288	260	256	245

*, **, *** denote significance at the 10%, 5%, and 1% levels, respectively.

Table 7: Impact of Board Structure on Performance with and without External Ownership Concentration
OLS Regression Results – Dependent Variable = ln(*Q2000*)

	(1)	**(2)**	**(3)**
NESB	0.075	0.153	0.130
	(.098)	(.095)	(.095)
ESB	0.044	0.115	0.115
	(.098)	(.093)	(.090)
Ext5		-0.437***	
		(.098)	
Ext5Sum			-0.028***
			(.006)
$(Ext5Sum)^2$			0.0003***
			(.0001)
ln(*Assets*)	-0.037	-0.059	-0.063
	(.050)	(.047)	(.047)
ln(*FirmAge*)	-0.019	-0.018	-0.026
	(.065)	(.062)	(.062)
Delaware	-0.083	-0.063	-0.079
	(.083)	(.081)	(.081)
ln*(BoardSize)*	0.344**	0.278*	0.253
	(.171)	(.164)	(.168)
ln*(R&D/Sales*)	0.149***	0.122***	0.109***
	(.040)	(.039)	(.038)
R&D?	-0.271**	-0.239*	-0.182
	(.143)	(.134)	(.134)
Industry dummies	Yes	Yes	Yes
Adjusted R-squared	.1054	.1955	.2028
N	274	274	274

White (1980) robust standard errors are in parentheses.
*, **, *** denote significance at the 10%, 5%, and 1% levels, respectively.

Table 8: Evaluation of Omitted Variables Bias in Coefficient Estimates of ESB and NESB
See Appendix for AE&T (2002) methodology and more detailed results

	Regression from Table 7:		
	(1)	(2)	(3)
Correlation between *ESB* and omitted variables, relative to the correlation between *ESB* and other included variables, necessary for the coefficient on *ESB* to be attributable to omitted variable bias (the value of *α/bias* as defined in the Appendix)	-2.706	-5.524	-5.779
Correlation between *NESB* and omitted variables, relative to the correlation between *NESB* and other included variables, necessary for the coefficient on *NESB* to be attributable to omitted variable bias (the value of *α/bias* as defined in the Appendix)	-6.090	-6.876	-19.029

Regression (1) – External ownership concentration is omitted.
Regression (2) – *Ext5* is included.
Regression (3) – *Ext5Sum* and its square are included.

Table 9: Interactions of Board Structure and External Ownership Concentration (*Ext5*)
OLS Regression Results – Dependent Variable = ln(*Q2000*)

	(1)
ANN_Ext5	-0.389***
	(.129)
NESB_Ext5	-0.312**
	(.129)
ESB_Ext5	-0.252*
	(.142)
NESB_no_Ext5	0.421*
	(.250)
ESB_no_Ext5	0.014
	(.165)
ln(*Assets*)	-0.056
	(.046)
ln(*FirmAge*)	-0.024
	(.061)
Delaware	-0.065
	(.080)
ln*(BoardSize)*	0.259
	(.162)
ln*(R&D/Sales*)	0.119***
	(.039)
R&D?	-0.208
	(.132)
Industry dummies	Yes
Adjusted R-squared	.2058
N	274

White (1980) robust standard errors are in parentheses.
*, **, *** denote significance at the 10%, 5%, and 1% levels, respectively.

Table 10: Interactions of Board Structure and External Ownership Concentration (*Ext5Sum*)
OLS Regression Results – Dependent Variable = ln(*Q2000*)

	(1)	**(2)**
NESB		0.290
		(.216)
ESB		0.061
		(.149)
ANN_Ext5Sum	-0.033***	-0.028***
	(.007)	(.008)
$(ANN\_Ext5Sum)^2$	0.0003***	0.0003***
	(.0001)	(.0001)
NESB_Ext5Sum	-0.046***	-0.069***
	(.013)	(.022)
$(NESB\_Ext5Sum)^2$	0.0011***	0.0017***
	(.0004)	(.0006)
ESB_Ext5Sum	-0.020**	-0.019*
	(.009)	(.010)
$(ESB\_Ext5Sum)^2$	0.0001	0.0001
	(.0002)	(.0002)
ln(*Assets*)	-0.071	-0.061
	(.048)	(.047)
ln(*FirmAge*)	-0.033	-0.033
	(.063)	(.062)
Delaware	-0.081	-0.080
	(.082)	(.081)
ln*(BoardSize)*	0.235	0.236
	(.176)	(.171)
ln*(R&D/Sales*)	0.106***	0.103***
	(.038)	(.039)
R&D?	-0.176	-0.157
	(.134)	(.133)
Industry dummies	Yes	Yes
Adjusted R-squared	.2046	.2114
N	274	274

White (1980) robust standard errors are in parentheses.
*, **, *** denote significance at the 10%, 5%, and 1% levels, respectively.

Table 11: Changes in Market Value Associated with Changes in Board Structure at Different Levels of External Ownership Concentration

Panel A: Based on Table 7, Column 1	External Ownership Concentration (*Ext5Sum*)					
Switch in board structure	0%	5%	10%	20%	30%	40%
From ANN to ESB	0%	6.07%	11.30%	18.65%	21.15%	18.49%
From NESB to ESB	0%	11.12%	17.38%	12.51%	-11.92%	-43.69%
From ANN to NESB	0%	-4.55%	-5.18%	5.45%	37.54%	110.42%

Panel B: Based on Table 7, Column 2	External Ownership Concentration (*Ext5Sum*)					
Switch in board structure	0%	5%	10%	20%	30%	40%
From ANN to ESB	6.32%	10.94%	14.73%	19.45%	19.97%	16.26%
From NESB to ESB	-20.41%	-1.41%	12.91%	16.98%	-11.48%	-51.07%
From ANN to NESB	33.58%	12.53%	1.62%	2.11%	35.53%	137.61%

Table A1: Evaluation of Omitted Variables Bias in Coefficient Estimates of *ESB* (*ESB* corresponds to *Z* in Appendix discussion)

All regressions are from Table 7

Regression:	(1)	(2)	(3)
Estimated coefficient on *ESB* (α)	0.044	0.115	0.115
E[u | ESB=1] - E[u | ESB=0] (from A3)	-0.170	-0.247	-0.238
$Var(\varepsilon_{ESB\|W})/Var(ESB)$ (from A5)	10.572	11.848	11.930
bias	-0.016	-0.021	-0.020
α/bias	**-2.706**	**-5.524**	**-5.779**

Regression (1) – External ownership concentration is omitted.
Regression (2) – *Ext5* is included.
Regression (3) – *Ext5Sum* and its square are included.

Table A2: Evaluation of Omitted Variables Bias in Coefficient Estimates of *NESB* (*NESB* corresponds to *Z* in Appendix discussion)

All regressions are from Table 7

Regression:	(1)	(2)	(3)
Estimated coefficient on *NESB* (α)	0.075	0.153	0.130
E[u | NESB=1] - E[u | NESB=0] (from A3)	-0.114	-0.222	-0.174
$Var(\varepsilon_{NESB\|W})/Var(NESB)$ (from A5)	9.225	9.955	25.424
bias	-0.012	-0.022	-0.007
α/bias	**-6.090**	**-6.876**	**-19.029**

Regression (1) – External ownership concentration is omitted.
Regression (2) – *Ext5* is included.
Regression (3) – *Ext5Sum* and its square are included.