Economic Determinants of Audit Committee Independence

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ABSTRACT: This paper provides empirical evidence that audit committee independence is associated with economic factors. I find that audit committee independence increases with board size and board independence and decreases with the firm’s growth opportunities and for firms that report consecutive losses. In contrast, no relation is found between audit committee independence and creditors’ demand for accounting information. Although the analyses are based on data from 1991 to 1993, these results have implications for NYSE and NASDAQ listing requirements for audit committees adopted in December 1999. Specifically, the new requirements give firms the option of including non-outside directors on their audit committees if it is in the best interests of the firm to do so.

Keywords: audit committee; outside directors; corporate governance; board of directors.

Data Availability: Data used for this study are derived from a proprietary database.

Just as “one size doesn’t fit all” when it comes to board governance, “one size can’t fit all” audit committees. Within broad parameters, each audit committee should evolve and develop its own guidelines suited to itself and its corporation.

—New York Stock Exchange and National Association of Securities Dealers (1999)

I. INTRODUCTION

In December 1999, in response to the SEC’s call for improving the effectiveness of corporate audit committees in overseeing the financial-reporting process (Levitt 1998), the NYSE and NASDAQ modified their listing requirements for large U.S. companies. Under the new standards, firms must maintain audit committees with at least three directors, “all of whom have no relationship to the company that may interfere with the exercise of their independence from management and the company” (NYSE Listed Company Manual 1999).

Financial support is provided by a summer grant from the Stern School of Business. I thank Ashiq Ali, Eli Bartov, Stephen Bryan, Eric Koh, Baruch Lev, James Ohlson, Jeffrey Simonoff, the editor (Michael Bamber), two anonymous referees, and the NYU Accounting and Statistics Departments for their constructive comments.

Submitted April 2000
Accepted November 2001
§303.01(B)(2)[a]). Although this statement implies that firms must maintain audit committees with outside members only, listing requirements provide for the appointment of certain affiliated directors if the board determines it is in the best interests of the corporation for these individuals to serve on its audit committee (see NYSE Rule §303.01[B][3][b] and NASDAQ Rule 4310[c][26][B][ii]). Thus, firms have some flexibility in determining audit committee composition.

Because enforcement standards are constantly evolving, one question of interest is to what degree the SEC and the exchanges should allow firms to exercise this option. I provide insights into this question by examining economic determinants behind differences in audit committee independence for a sample of more than 400 large U.S. firms that were publicly traded during most of 1991–1993. During this time, exchange rules allowed more flexibility with respect to audit committee independence and many firms opted for audit committees with less than 100 percent outside directors (Vicknair et al. 1993; Verschoor 1993; Klein 1998, 2001; Parker 2000).

I develop predictions and test determinants of audit committee independence. I expect and find that the percentage of outside directors on the audit committee is limited by board size and overall board independence. Firms incur costs in expanding the board to include more outside directors (e.g., Yermack 1996) and in enlisting outside directors instead of inside directors who have firm-specific knowledge (e.g., Fama and Jensen 1983; Klein 1998). Thus, audit committee independence is costly to the firm.

I expect the demands for audit committee independence to emanate from management, shareholders, and creditors. Consistent with my expectation that managers' demand for directors with inside expertise increases in proportion to the complexities and uncertainties associated with growth opportunities (Williamson 1975), I find that audit committee independence decreases with the firm's growth opportunities. Consistent with the hypothesis that shareholders' demand for accurate, unbiased financial accounting data depends on the published financial accounting data's potential informativeness for equity valuation, I find that firms that have experienced two or more consecutive losses (which typically are less value-relevant than positive profits) have less independent audit committees. However, I find no evidence that audit committee independence is associated with the degree of debt in the firm's capital structure. This result is inconsistent with the expectation that creditors' demand for unbiased accounting data for use in debt covenants increases with debt.1

One implication of these findings is that firms tailor audit committee composition to suit their specific economic environments. This suggests that the SEC and the stock exchanges may wish to continue to allow firms some flexibility to include non-outside directors on their audit committees.

II. THE AUDIT COMMITTEE

The Audit Committee's Role as Monitor of the Firm's Financial-Reporting Process

By state law, boards of directors may conduct their work through the full board or delegate their authority to standing committees responsible to the board—for example, Delaware General Corporate Law §141(c) allows boards to set up committees. One such committee is the audit committee.

The audit committee provides, on behalf of the board of directors, oversight responsibility for the firm's financial-reporting process. According to the Blue Ribbon Committee

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1 Creditors also use accounting numbers to assess firm value in liquidation (as in the abandonment option). See, for example, Barth et al. (1998).
Report, the audit committee is the “the ultimate monitor” of the financial accounting reporting system (NYSE and NASD 1999, 7). The audit committee selects the outside auditor and meets separately with senior financial management and with the external auditor. The committee also questions management, internal auditors, and external auditors to determine whether they are acting in the firm’s best interests.

Consistent with the Blue Ribbon Committee Report and with prior studies (e.g., Carcello and Neal 2000), I assume that audit committee members who are independent of management are better monitors of the firm’s financial accounting process. Benefits of effective monitoring include transparent financial statements, active trading markets, and the ability to use unbiased financial accounting numbers as inputs into contracts among shareholders, senior claimants, and management.

NYSE and NASDAQ Audit Committee Requirements

Before December 1999, stock exchanges’ and NASDAQ’s rules for audit committee composition were vague at best. They required or encouraged large, U.S.-listed companies to maintain audit committees with all or a majority of their members independent of management. However, the listing requirements did not define “independence.”

In December 1999, the NYSE and NASDAQ modified their audit committee requirements, based on their Report and Recommendations of the Blue Ribbon Committee on Improving the Effectiveness of Corporate Audit Committees, which they had issued in the previous February. Simultaneously, the SEC adopted new rules to improve disclosures related to audit committees (see SEC Release No. 34-42266, Adopting Rules Regarding Disclosure by Audit Committees, Including Discussions with Auditors Regarding Financial Statements). All large, U.S.-listed companies must now maintain audit committees with at least three independent directors. Both exchanges disallow directors from serving on the audit committee if they are current employees, have been employees within the last three years, have cross-compensation committee links, or are immediate family members of an executive officer. In addition, the NASDAQ bars from the audit committee directors who accept more than $60,000 in non-director compensation from the firm, or whose employers received at least $200,000 from the firm in any of the three past years.

However, both the NYSE and NASDAQ allow the firm to appoint to the audit committee directors who have business relationships with the firm if the board determines that the individual’s membership on the committee is in the corporation’s best interests. NASDAQ Rule 4310(c)(26)(B)(ii) allows the board under “limited circumstances” to appoint one former employee or family member to the audit committee if the board determines this is in the best interest of the corporation and its shareholders. NYSE §303.01(B)(3)(b) gives the board greater discretion. If the board determines that the business relationship does not

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2 For example, see Audit Committee Effectiveness—What Works Best, a guide for audit committees written by PricewaterhouseCoopers (2000), under the aegis of the Institute of Internal Auditors Research Foundation.
3 Fama and Jensen (1983) and Fama (1980) also argue that outside directors have incentives to effectively monitor top management.
4 Advocacy of independent audit committees has a long tradition. In 1940, the SEC first recommended that firms establish audit committees with only nonofficer board members (Accounting Series Release No. 19). In October 1987, the Treadway Commission advocated that audit committees include only independent directors (National Commission on Fraudulent Financial Reporting 1987).
compromise the individual’s independence, then that director may serve on the board’s audit committee. Thus, despite recent changes in exchange requirements, audit committee independence is still an open issue.

III. DETERMINANTS OF AUDIT COMMITTEE INDEPENDENCE

Board Size and Board Independence

I develop hypotheses relating audit committee independence to the supply of available outside directors. Because the audit committee is a subset of the full board, its composition depends on the board’s overall structure.

Lipton and Lorsch (1992), Jensen (1993), and Yermack (1996) argue that the board’s decision-making quality decreases with board size because the more people in the group, the lower the group’s coordination and processing skills (see Steiner 1972; Hackman 1990). Yermack (1996) finds evidence consistent with this argument. Specifically, Tobin’s Qs, several accounting profitability ratios, and CEO turnover rates are negatively related to board size.

If the firm limits board size, then the number of directors available to serve on the audit committee also will be limited. The typical board has between three and six board committees to staff, with each committee having at least two members (Klein 1998). Two committees, the executive compensation committee and the nominating committee, require independent directors to ensure monitoring. Thus, a smaller board may have to choose one or more nonindependent directors to serve on the audit committee to meet overall committee staffing needs.

Stated in the alternative form:

H1: Audit committee independence is positively related to the number of directors sitting on the entire board.

The larger the pool of outside directors on the board, the easier it is for the board to have an independent audit committee. However, boards require both outside and non-outside directors to fulfill their duties. Outside directors serve as monitors and help alleviate agency conflicts between shareholders and upper management. Inside and affiliated directors have the specialized expertise about the firm’s activities to evaluate and ratify its future strategic plans (Williamson 1975; Fama and Jensen 1983). Consistent with this argument, Klein (1998) finds that the percentage of inside directors on board investment or finance committees is positively associated with firm value. Thus, board independence reflects the trade-off between director independence and director expertise, which, in turn, reflects the balancing of the firm’s monitoring needs and its requirements for specialized information.

If board independence varies across firms, then, in the alternative form:

H2: Audit committee independence is positively related to board independence.

The Demands for Audit Committee Independence

Growth Opportunities

Williamson (1975) and Fama and Jensen (1983) argue that a firm structures its board in response to its needs to obtain unbiased, expert information. Both papers assert that a board’s demand for knowledgeable directors increases with the firms’ complexity and uncertainties. Inside directors have direct knowledge about their firm’s operations and investment horizons. Affiliated directors or their companies have ties with the firm and often provide expertise to the firm about suppliers, customers, financial opportunities, or legal
issues. Because of the complexities and uncertainties associated with growth opportunities, I expect high-growth opportunity firms’ managers and shareholders to demand less independent boards, resulting in less independent audit committees.

In the alternative form:

**H3:** Audit committee independence is negatively related to the firm’s expected growth in earnings or cash flows.

**Consecutive Losses**

Hayn (1995), Lipe et al. (1998), Amir et al. (1999), and Collins et al. (1999) show that the cross-sectional returns (or price) earnings relation is much weaker for firms reporting losses than for firms reporting profits. In addition, Hayn (1995) reports negative coefficients on the regression of returns on earnings, with \( R^2 \) values near 0.0 percent, for her sample of firms posting losses over two or more consecutive years. These studies suggest that financial statements on the whole are less value-relevant for firms suffering repeated losses than for profitable firms. Thus, I expect shareholders of firms with past consecutive losses to demand less scrutiny of the financial-reporting system and, consequently, to have a lower demand for audit committee independence.

In the alternative form:

**H4:** Audit committee independence is lower for firms reporting a series of consecutive, past losses.

**Creditors**

Creditors write debt contracts that contain accounting-based covenants to monitor management and shareholders (Jensen and Meckling 1976; Smith and Warner 1979; Leftwich 1983; Watts and Zimmerman 1990). However, managers sometimes manipulate earnings to delay or avoid debt covenant violations. For example, DeFond and Jiambalvo (1994) conclude that managers overstate earnings in the year before debt covenant violations. Thus, creditors’ demand for audit committee independence should increase with the firm’s debt-to-assets ratio due to their increased demands for monitoring the integrity of the firms’ financial accounting reports.

In the alternative form:

**H5:** Audit committee independence is positively related to the firm’s debt-to-assets ratio.

**CEO on Compensation Committee**

Although exchange and NASDAQ regulations restrict the CEO from serving on the board’s audit committee, no regulations prohibit the CEO from sitting on the board’s executive compensation committee. I make no prediction, *ex ante*, about the sign of the relation between the CEO serving on the compensation committee and audit committee independence. On the one hand, a board that allows its CEO to sit on its executive compensation committee may be CEO-friendly, thus providing less monitoring of the firm’s financial accounting reporting process. For example, Klein (2001) finds that earnings management is higher in firms where the CEO serves on the board’s compensation committee. On the other hand, shareholders may want to curb the CEO’s ability to distort financial statements by demanding greater audit committee independence. Thus, Hypothesis 6 is nondirectional:
H6: Audit committee independence is different if the CEO sits on the board’s executive compensation committee than if the CEO does not.

**Substitute Monitoring Mechanisms**

Nonmanagement blockholders (or their representatives) sometimes serve on the audit committee, giving them the opportunity to monitor the firm’s financial-reporting process. Klein (1998, 2001) finds that firms with large, non-inside stockholders on audit committees are more productive and exhibit less earnings management. If large, nonmanagement blockholders on the audit committee actively monitor the financial-reporting process, then there is less need for outside directors on the audit committee.

In the alternative form:

H7: Audit committee independence is lower if a large, non-inside shareholder sits on the board’s audit committee.

Jensen and Meckling (1976) argue that directors’ shareholdings act as a monitoring device. If outside director shareholdings substitute for outsiders on the audit committee, then in the alternative form:

H8: Audit committee independence is negatively related to the percentage of shares held by outside directors.

**Firm Size**

I also control for firm size. Larger firms have stronger internal controls systems than smaller firms (O’Reilly et al. 1998). If the firms’ internal controls act as in-house monitoring mechanisms, then larger firms require less alternative monitoring of their reporting systems and therefore need lower levels of audit committee independence. Alternatively, if shareholders are more apt to sue larger firms for misstated or fraudulent financial statements, then larger firms may try to inoculate themselves against lawsuits by adopting stronger monitoring mechanisms, such as greater audit committee independence. Thus, the association between firm size and audit committee independence is indeterminate.

IV. RESEARCH DESIGN

Sample Selection

I hand-collected data about boards and board audit committees from SEC-filed proxy statements. Initially, I include all U.S. firms listed on the S&P 500 as of March 31, 1992 and 1993, with annual shareholder meetings between July 1, 1991, and June 30, 1993. I exclude 65 bank and financial institution firm-years and 38 insurance company firm-years. I also delete three firm-years with missing audit committee composition data, and 58 firm-years with missing Compustat or CRSP data. The final sample has 803 firm-year observations.

Schedule 14A (the proxy statement) requires firms to disclose each director’s name, current directorships; family relationships between each and any director, nominee or executive officer; significant current or proposed transactions with management; significant business relationships with the firm, current firm shareholdings, and business experience during the last five years. Schedule 14A (Item 7[e][1]) requires firms to state whether they

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6 Items 404(a) and 404(b) of Regulation S-K of the 1934 Securities and Exchange Act define significant business transactions. Item 404(a) specifies a threshold of $60,000 for a transaction to be considered significant. Item 404(b) defines “certain business relationships” to include significant payments to the firm in return for services or property, significant indebtedness by the firm, outside legal counseling, investment banking, consulting fees, and other joint ventures.
have standing audit, compensation, or nominating board committees. If such committees exist, then firms must disclose their functions and responsibilities, their members, and the number of times each committee met during the last fiscal year.

I define outside directors as having no affiliation with the firm other than serving as directors. Consistent with NYSE and NASD (1999) and with exchange definitions, affiliated directors include former employees, relatives of the CEO, those with significant transactions or business relationships with the firm as defined by Items 404(a) and (b) of Regulation S-K, and those on interlocking boards. Inside directors are current employees.

Regression Model

I measure the associations between audit committee independence and the explanatory variables by estimating the following regression:

\[
\%\text{Audout} = \alpha + \beta_1 \text{Board Size} + \beta_2 \%\text{Outsiders} + \beta_3 \text{Growth Opportunities} + \beta_4 \text{Losses} + \beta_5 \text{Debt-to-Assets} + \beta_6 \text{CEO on Compensation Committee} + \beta_7 \%\text{Blockholder on Audit Committee} + \beta_8 \%\text{Outside Director Holdings} + \beta_9 \text{Firm Size} + \mu.
\]

\%\text{Audout} is the logistical transformation of the percentage of outsiders on the audit committee.\(^7\) Board Size is the natural log of the number of board members (Yermack 1996) and \%\text{Outsiders} is the logistical transformation of the percent of outside directors on the board.\(^8\) I obtain data for these three variables from the shareholders’ meeting proxy statement. Following Smith and Watts (1992), I define Growth Opportunities as the three-year market value of equity plus the book value of liabilities divided by the three-year book value of assets, all ending on the fiscal year prior to the shareholders’ meeting.\(^9\) This metric captures the proportion of firm value represented by growth opportunities relative to assets in place. Losses equals 1 if the firm reported losses for each of the two years prior to the firm’s shareholders’ meeting (Compustat item 18 is negative for fiscal years t and t-1), and 0 otherwise. Losses captures the diminished value-relevance of financial reporting for firms experiencing extended periods of losses. Debt-to-Assets is the three-year long-term debt-to-assets ratio at the end of the fiscal year prior to the shareholders’ meeting (three-year Compustat item 9 divided by three-year item 6). CEO on Compensation Committee is a dichotomous variable set to 1 if the CEO sits on the board’s compensation committee, and 0 otherwise. 5\% Blockholder on Audit Committee is a dichotomous variable set to 1 if a nonmanagement director holding at least 5 percent of the firm’s shares sits on the board’s audit committee, and 0 otherwise.\(^10\) \%Outside Director Holdings is the percentage of shares held by outside directors. The latter two items are in the firm’s proxy statement. Firm Size is the natural log of the firm’s assets (Compustat item 6) at the end of the fiscal year prior to the shareholders’ meeting.

\(^7\) The logistical transformation is \(\ln(\%\text{Audout}/(1-\%\text{Audout}) + 1).\) I use this transformation because the values of \%\text{Audout} are confined to the interval from 0 to 1, whereas the logistically transformed values extend from \(-\infty\) to \(+\infty\). Thus, an intrinsically non-normal distribution is transformed into a more normal distribution.

\(^8\) I use the latter transformation to be internally consistent with the transformed \%\text{Audout} variable. Results based on untransformed values as well as the natural log of \%\text{Outsiders} are qualitatively the same as those reported in the text and are not shown separately.

\(^9\) The numerator is Compustat items \((6 - 60 + (24 \times 25))\) summed over fiscal years t, t - 1, and t - 2. The denominator is Compustat item 6 summed over fiscal years t, t - 1, and t - 2.

\(^10\) I would like to thank Lee-Seok Hwang for these data.
V. EMPIRICAL RESULTS

Descriptive Statistics

Table 1 reports data on board and audit committee composition. Consistent with other board composition studies or surveys, 58.4 percent of the board is outsiders, less than one quarter (22.5 percent) is insiders, and the rest (19.1 percent) are affiliated directors.\textsuperscript{11} In contrast, the audit committee includes a preponderance of outsiders (79.6 percent) and few insiders (1.4 percent), but about the same percentage of affiliated directors (19.0 percent). Because of these affiliated directors, 43.4 percent of firms have audit committees with outside directors only, and 86.7 percent have a majority of independent directors.

Table 2 presents the mean, median, and 1st and 3rd quartiles of the untransformed variables used in the regression analysis. The interquartile range for board size is 10–14 members. The interquartile range for \(\%\text{Outsiders}\) is 50.0 percent to 70.6 percent, consistent with Fama and Jensen's (1983) argument that boards should include some insiders and affiliated directors for their expertise.

Growth Opportunities and the Debt-to-Assets ratio have means of 1.40 and 0.27, respectively. 4.6 percent of firms report losses in two or more consecutive years; 9.1 percent of firms allow the CEO to sit on the executive compensation committee; and 5.7 percent


| TABLE 1 |

Composition of Overall Boards of Directors and Audit Committees\textsuperscript{a}

<table>
<thead>
<tr>
<th>Percentage of Directors Who Are:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insiders</td>
</tr>
<tr>
<td>Outsiders</td>
</tr>
<tr>
<td>Affiliates</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Percentage of Firms that Have at Least One Member Who Is:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inside Director</td>
</tr>
<tr>
<td>CEO</td>
</tr>
<tr>
<td>Outside Director</td>
</tr>
<tr>
<td>Affiliated Director</td>
</tr>
<tr>
<td>Relative of CEO</td>
</tr>
<tr>
<td>Former Employee of Firm</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Percentage of Firms that Have at Least 51% Outside Directors</th>
</tr>
</thead>
<tbody>
<tr>
<td>73.8</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Percentage of Firms that Have 100% Outside Directors</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
</tr>
</tbody>
</table>

\textsuperscript{a} Sample is for 803 U.S. firm-years with audit committees listed on the S&P 500 as of March 31, 1992 and 1993 with annual shareholder meetings between July 1, 1991 and June 30, 1993. Banks, financial institutions, insurance companies, and firms with missing Compustat or CRSP data are excluded.
TABLE 2
Descriptive Statistics for Untransformed Variables Used in the Analysis of Audit Committee Independence for a Pooled Sample of 803 Firm-Years 1991–1993

<table>
<thead>
<tr>
<th>Variable</th>
<th>Hypothesis Number</th>
<th>Mean</th>
<th>Median</th>
<th>1st Quartile</th>
<th>3rd Quartile</th>
</tr>
</thead>
<tbody>
<tr>
<td>%Audout</td>
<td></td>
<td>79.7%</td>
<td>80.0%</td>
<td>66.7%</td>
<td>99.0%</td>
</tr>
<tr>
<td>Board Size</td>
<td>1</td>
<td>12.0</td>
<td>12.0</td>
<td>10.0</td>
<td>14.0</td>
</tr>
<tr>
<td>%Outsiders</td>
<td>2</td>
<td>58.4%</td>
<td>60.0%</td>
<td>50.0%</td>
<td>70.6%</td>
</tr>
<tr>
<td>Growth Opportunities</td>
<td>3</td>
<td>1.40</td>
<td>1.29</td>
<td>1.11</td>
<td>1.61</td>
</tr>
<tr>
<td>%Losses</td>
<td>4</td>
<td>4.6%</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Debt-to-Assets</td>
<td>5</td>
<td>0.27</td>
<td>0.27</td>
<td>0.16</td>
<td>0.36</td>
</tr>
<tr>
<td>CEO on Compensation Committee</td>
<td>6</td>
<td>9.1%</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>5% Blockholder on Audit Committee</td>
<td>7</td>
<td>5.7%</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>%Outside Director Holdings</td>
<td>8</td>
<td>1.58%</td>
<td>0.47%</td>
<td>0.15%</td>
<td>1.82%</td>
</tr>
<tr>
<td>Assets ($ million)</td>
<td></td>
<td>8,526</td>
<td>3,190</td>
<td>1,330</td>
<td>8,554</td>
</tr>
</tbody>
</table>

**Control Variable**

| Assets ($ million)         |                   | 8,526   | 3,190   | 1,330        | 8,554        |

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**Variable definitions:**
- %Audout = the percent of outside directors on the audit committee;
- Board Size = the number of board members;
- %Outsiders = the percent of outside directors on the board;
- Growth Opportunities = the three-year market value of the total firm (Compustat items (6 - 60 + (24 X 25)) divided by three-year assets-in-place (Compustat item 6) ending on the fiscal year prior to the shareholders’ meeting;
- %Losses = the percent of firms that reported losses (Compustat item 18) in each of the two years prior to the shareholders’ meeting;
- Debt-to-Assets = the three-year ratio of the book value of debt (Compustat item 9) divided by the book value of assets (Compustat item 6) ending on the fiscal year prior to the shareholders’ meeting;
- CEO on Compensation Committee = 1 if the CEO sits on the board’s compensation committee, and 0 otherwise;
- 5% Blockholder on Audit Committee = 1 if a non-inside director with at least 5 percent of the firm’s shares sits on the audit committee, and 0 otherwise;
- %Outside Director Holdings = the percentage of shares owned by all outside directors; and
- Assets = the firm’s book value of assets (Compustat item 6).

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**Correlations**

Table 3 presents Pearson correlations between the transformed dependent and independent variables. Spearman correlations yield similar results. The following correlations support several hypotheses: %Audout is significantly positively correlated with Board Size.
### TABLE 3
Pearson Correlations (and p-values) among the Dependent and Explanatory Variables\(^a\)

<table>
<thead>
<tr>
<th></th>
<th>%Audout</th>
<th>Board Size</th>
<th>%Outsiders</th>
<th>Growth Opportunities</th>
<th>Losses</th>
<th>Debt-to-Assets</th>
<th>CEO on Compensation Committee</th>
<th>5% Blockholder on Audit Committee</th>
<th>%Outside Director Holdings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Board Size</td>
<td>0.06</td>
<td>0.09</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(%10)</td>
<td></td>
<td>(0.01)</td>
<td>(0.01)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>%Outsiders</td>
<td>0.50</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(%01)</td>
<td></td>
<td>(0.01)</td>
<td>(0.01)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Growth Opportunities</td>
<td>-0.12</td>
<td>-0.16</td>
<td>-0.21</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(%01)</td>
<td></td>
<td>(0.01)</td>
<td>(0.01)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Losses</td>
<td>-0.03</td>
<td>-0.01</td>
<td>0.02</td>
<td></td>
<td>-0.11</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(%44)</td>
<td></td>
<td>(0.81)</td>
<td>(0.51)</td>
<td></td>
<td>(0.01)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Debt-to-Assets</td>
<td>0.04</td>
<td>0.19</td>
<td>0.13</td>
<td></td>
<td>-0.30</td>
<td>0.08</td>
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<tr>
<td>(0.24)</td>
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<td>(0.01)</td>
<td>(0.01)</td>
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<td>(0.01)</td>
<td>(0.03)</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>CEO on Compensation Committee</td>
<td>-0.17</td>
<td>-0.15</td>
<td>-0.25</td>
<td>0.20</td>
<td>-0.03</td>
<td>-0.15</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>(%01)</td>
<td></td>
<td>(0.01)</td>
<td>(0.01)</td>
<td>(0.01)</td>
<td>(0.42)</td>
<td>(0.01)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5% Blockholder on Audit Committee</td>
<td>-0.16</td>
<td>-0.01</td>
<td>-0.06</td>
<td>0.07</td>
<td>-0.03</td>
<td>-0.09</td>
<td>0.03</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(%01)</td>
<td></td>
<td>(0.84)</td>
<td>(0.08)</td>
<td>(0.06)</td>
<td>(0.42)</td>
<td>(0.02)</td>
<td>(0.34)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>%Outside Director Holdings</td>
<td>0.05</td>
<td>-0.01</td>
<td>0.09</td>
<td>0.06</td>
<td>0.03</td>
<td>0.02</td>
<td>-0.02</td>
<td>0.36</td>
<td></td>
</tr>
<tr>
<td>(%20)</td>
<td></td>
<td>(0.69)</td>
<td>(0.01)</td>
<td>(0.08)</td>
<td>(0.33)</td>
<td>(0.56)</td>
<td>(0.55)</td>
<td>(0.01)</td>
<td></td>
</tr>
<tr>
<td>Firm Size</td>
<td>0.03</td>
<td>0.54</td>
<td>0.12</td>
<td>-0.25</td>
<td>-0.05</td>
<td>0.31</td>
<td>-0.17</td>
<td>-0.08</td>
<td>-0.09</td>
</tr>
<tr>
<td>(%47)</td>
<td></td>
<td>(0.01)</td>
<td>(0.01)</td>
<td>(0.01)</td>
<td>(0.14)</td>
<td>(0.01)</td>
<td>(0.01)</td>
<td>(0.03)</td>
<td>(0.02)</td>
</tr>
</tbody>
</table>

\(^a\) Variable definitions:
%Audout = \(\ln(\%\text{Audout}/(1 - \%\text{Audout}) + 1)\);
Board Size = the natural log of the number of board members; and
%Outsiders = \(\ln(\%\text{Outsiders}/(1 - \%\text{Outsiders}) + 1)\).
See Table 2 for other variable definitions.
(H1) and %Outsiders (H2). %Audout is significantly negatively correlated with Growth Opportunities (H3), CEO on Compensation Committee (H6), and 5%Blockholder on Audit Committee (H7). In contrast, the correlations between audit committee independence and Losses (H4), Debt-to-Assets (H5), %Outside Director Holdings (H8), and Firm Size are insignificantly different from zero.

Table 3 also reveals that many explanatory variables are significantly correlated with each other. The formal hypothesis tests are based on multiple regression analysis.

Multiple Regression Results
The data encompass two consecutive years, with many firms represented in both years. OLS error terms will suffer from serial correlation, resulting in unbiased coefficients but understated standard errors. I use Froot's (1989) procedure to adjust the variance-covariance matrix for dependence among observations from the same firm.

Table 4 presents the empirical results. %Audout is significantly positively associated with Board Size (p < 0.01) and with %Outsiders (p < 0.01). These findings are consistent with H1 and H2, supporting the view that audit committee independence increases with the supply of available, outside directors.

%Audout is significantly negatively associated with Growth Opportunities (p < 0.10), Losses (p < 0.05), 5%Blockholder on Audit Committee (p < 0.01), and Firm Size (p < 0.05). These findings are consistent with H3, H4, and H7, with Firm Size serving as a control variable. The negative coefficient on Growth Opportunities supports the view that managers of growth firms require more board members with specific expertise about their firms. The negative coefficient on Losses is consistent with shareholders demanding lower audit committee independence when financial statements are less value relevant. The negative coefficients on 5%Blockholder on Audit Committee and on Firm Size suggest that large nonmanagement blockholders and strong internal controls substitute for audit committee independence. The coefficients on the debt-to-assets ratio (H5), CEO on Compensation Committee (H6), and Outside Director Holdings (H8) are insignificantly different from zero.

In summary, audit committee independence increases with the supply of available, independent directors and with the demand for monitoring, and decreases with the availability of substitute monitoring mechanisms. %Outsiders plays the biggest role in explaining audit committee independence. A simple regression of %Audout on %Outsiders yields an $R^2$ of 0.22, compared with the $R^2$ of 0.25 from the full multiple regression. Nonetheless, the other factors collectively play a significant incremental role in explaining the percentage of outsiders on the audit committee variation in audit committee independence; testing for the differential in $R^2$s yields an F-statistic of 5.07, significant at the 0.01 level.

Additional Tests
Are Growth Opportunities Primarily Capturing Hi-Tech Firms?
The variable, Growth Opportunities, may capture disproportionate numbers of firms in high-tech industries or with high research and development expenditures.¹² Reingold (1999) reports that according to Korn/Ferry and Spencer Stuart, high-tech companies such as Internet firms have fewer outsiders on their boards and smaller board sizes than do other types of companies.

¹² Contrary to this conjecture, Smith and Watts (1992) test and find that R&D expenditures cannot substitute for this measure of growth opportunities in their analyses. Lev and Zarowin (1999) also find no relation between R&D expenditures and future growth.
TABLE 4
Explanators of Audit Committee Independence Based on Time-Series Adjusted Regressions* for a Pooled Sample of 803 Firm-Years 1991-1993

\[
\text{%Audout} = \alpha + \beta_1 \text{Board Size} + \beta_2 \%\text{Outsiders} + \beta_3 \text{Growth Opportunities} \\
+ \beta_4 \text{Losses} + \beta_5 \text{Debt-to-Assets} + \beta_6 \text{CEO on Compensation Committee} \\
+ \beta_7 \%\text{Blockholder on Audit Committee} + \beta_8 \%\text{Outside Director Holdings} \\
+ \beta_9 \%\text{Firm Size}^b
\]

<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>Predicted</th>
<th>Hypothesis</th>
<th>Coefficients and (t-statistics)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>+</td>
<td>1</td>
<td>0.39 (0.56)</td>
</tr>
<tr>
<td>Board Size</td>
<td>+</td>
<td>2</td>
<td>0.78 (2.62)**</td>
</tr>
<tr>
<td>%Outsiders</td>
<td>+</td>
<td>3</td>
<td>1.89 (13.50)*****</td>
</tr>
<tr>
<td>Growth Opportunities</td>
<td>-</td>
<td>4</td>
<td>-0.06 (-1.86)*</td>
</tr>
<tr>
<td>Losses</td>
<td>-</td>
<td>5</td>
<td>-0.55 (-2.32)**</td>
</tr>
<tr>
<td>Debt-to-Assets</td>
<td>+</td>
<td>6</td>
<td>-0.26 (-0.59)</td>
</tr>
<tr>
<td>CEO on Compensation Committee</td>
<td>+/-</td>
<td>7</td>
<td>-0.25 (-1.39)</td>
</tr>
<tr>
<td>%Blockholder on Audit Committee</td>
<td>-</td>
<td>8</td>
<td>-0.97 (-3.80)*****</td>
</tr>
<tr>
<td>%Outside Director Holdings</td>
<td>-</td>
<td>Control</td>
<td>0.62 (1.06)</td>
</tr>
<tr>
<td>Firm Size</td>
<td>+/-</td>
<td>Variable</td>
<td>-0.15 (-2.22)**</td>
</tr>
<tr>
<td>Adjusted R(^2)</td>
<td></td>
<td></td>
<td>0.24</td>
</tr>
</tbody>
</table>

***, **, * Significant at the 0.01, 0.05, and 0.10 levels, respectively.

* t-statistics are after using the Froot (1989) procedure to adjust the variance-covariance matrix for dependence among observations from the same firm.

Variable definitions:
- \%Audout = ln(\%Audout/(1 - \%Audout) + 1);
- Board Size = the natural log of the number of board members; and
- \%Outsiders = ln(\%Outsiders/(1 - \%Outsiders) + 1).

See Table 2 for other variable definitions.

I therefore re-estimate the regression in Table 4, substituting R&D Expenditures and a proxy, Hi-tech, for my growth opportunity measure. I define R&D Expenditures as research and development expenditures divided by total assets. Hi-tech is a dummy variable equal to 1 if the firm is in a high-tech industry, and 0 otherwise.\(^{13}\) Growth Opportunities is insignificantly positively correlated with R&D Expenditures (\(\rho = 0.18\)) and Hi-tech (\(\rho = 0.13\)).

\(^{13}\) Following Field and Hanka (2000), Hi-tech encompasses all firms with primary three-digit SIC codes in computer and office equipment (357), electronic components and accessories (367), miscellaneous electrical machinery, equipment, and supplies (369), laboratory apparatus and analytical, optical, measuring, and controlling instruments (382), surgical, medical, and dental instruments and supplies (384), and computer programming, data processing, and other computer-related services (737).
The coefficients on R&D Expenditures and Hi-tech are not significant in the multiple regression, suggesting that neither R&D Expenditures nor Hi-tech substitute for Growth Opportunities. I also re-estimate the regression in Table 4 after including Growth Opportunities along with R&D Expenditures and Hi-tech, respectively. The coefficients on Growth Opportunities exhibit virtually no change, and the coefficients on R&D Expenditures and Hi-tech remain insignificantly different from zero.

**Accounting Losses and Legal Liability for Poor Performance**

%Audout is lower for firms reporting losses in the previous two years. These results are consistent with the argument that investors in loss firms require less independent audit committees because financial information is less value-relevant for loss firms. A competing explanation for the negative association between losses and audit committee independence is that firms experiencing sustained losses have difficulty attracting outside directors to serve on their audit committees due to liability concerns. However, most large companies have director and officer insurance indemnifying non-inside directors from legal damages, and many states (especially Delaware and New York) severely limit lawsuits against non-inside directors.

Using the probability of bankruptcy as a proxy for legal liability, I substitute Altman’s Z-statistic for Losses and also use Altman’s Z-statistic as an additional regressor in the original multiple regression. In each regression, the coefficient on Altman’s Z-statistic is insignificant at the 0.10 level, suggesting no systematic association with audit committee independence.

**Alternative Definition of Audit Committee Independence**

Current SEC and exchange rules suggest all members must be outside directors for the audit committee to be considered independent. As Table 1 shows, only 43.4 percent of sample firms had 100 percent independent audit committees in 1991–1993. To assess whether full independence is associated with the same economic factors as %Audout, I estimate a probit model using full independence (rather than %Audout) as the dependent variable. The inferences from the probit model are identical to those in Table 4, except the coefficient on CEO on Compensation Committee is significantly negative at the 0.05 level for the probit model.

**Simultaneity**

Some variables that explain %Audout also likely explain Board Size and %Outsiders. To account for simultaneities, I use a two-stage least squares (2SLS) method, in which %Audout is regressed on the factors used in Table 4, and either %Outsiders or Board Size is regressed on a set of endogenous and exogenous factors. The 2SLS estimator of %Outsiders or Board Size can be described as an instrumental variables estimator because this method substitutes instruments for %Outsiders or Board Size based on predicted values obtained from regressions of each variable on its set of factors.

Table 5 presents the 2SLS coefficients for each set of equations. The first two columns present the results with %Outsiders as the instrumental variable. To determine the simultaneous factors, I estimate stepwise regressions explaining %Outsiders and explaining Board Size, respectively. The set of possible explanatory variables include those used for the regression explaining %Audout and other potential determinants of board independence and board size described in the literature. I keep all explanatory variables from the stepwise regressions with p-values less than 0.15.
<table>
<thead>
<tr>
<th>Variable</th>
<th>2SLS on %Audout and %Outsiders</th>
<th>2SLS on %Audout and Board Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>1.09 (1.50)</td>
<td>0.55 (0.92)</td>
</tr>
<tr>
<td>%Outsiders</td>
<td>1.38 (3.70)**</td>
<td>1.84 (14.85)**</td>
</tr>
<tr>
<td>Board Size</td>
<td>0.62 (2.35)**</td>
<td>0.67 (2.61)**</td>
</tr>
<tr>
<td>Growth Opportunities</td>
<td>-0.08 (-2.31)**</td>
<td>-0.05 (-1.88)*</td>
</tr>
<tr>
<td>Losses</td>
<td>-0.54 (-1.91)*</td>
<td>-0.53 (-1.90)*</td>
</tr>
<tr>
<td>Debt-to-Assets</td>
<td>-0.46 (-1.24)</td>
<td>-0.51 (-1.39)</td>
</tr>
<tr>
<td>CEO on Compensation Committee</td>
<td>-0.62 (-2.95)**</td>
<td>-0.52 (-2.68)**</td>
</tr>
<tr>
<td>5% Blockholder on Audit Committee</td>
<td>-1.24 (-4.82)**</td>
<td>-1.15 (-4.67)**</td>
</tr>
<tr>
<td>%Outside Director Holdings</td>
<td>1.13 (1.63)</td>
<td>0.83 (1.27)</td>
</tr>
<tr>
<td>Firm Size</td>
<td>-0.10 (-1.93)*</td>
<td>-0.12 (-2.17)**</td>
</tr>
<tr>
<td>%Inside Director Holdings</td>
<td>-1.58 (-6.22)**</td>
<td></td>
</tr>
<tr>
<td>CEO on Nominating Committee</td>
<td>-0.13 (-4.05)**</td>
<td></td>
</tr>
<tr>
<td>CEO Tenure</td>
<td>-0.04 (-1.97)**</td>
<td>0.02 (2.14)**</td>
</tr>
<tr>
<td>R&amp;D Expenditures</td>
<td>-0.88 (-2.03)**</td>
<td>-0.57 (-2.41)**</td>
</tr>
<tr>
<td>Beta</td>
<td>-0.13 (-3.18)**</td>
<td>-0.05 (-2.72)**</td>
</tr>
<tr>
<td>Institutional Ownership</td>
<td>0.41 (3.74)**</td>
<td></td>
</tr>
</tbody>
</table>

(Continued on next page)
TABLE 5 (Continued)

<table>
<thead>
<tr>
<th>2SLS on %Audout and %Outsiders</th>
<th>2SLS on %Audout and Board Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>%Audout</td>
<td>%Outsiders</td>
</tr>
<tr>
<td>5% Outside Blockholder</td>
<td>0.21 (2.00)*</td>
</tr>
<tr>
<td>Lagged Stock Returns</td>
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<tr>
<td>Hi-tech</td>
<td></td>
</tr>
<tr>
<td>Adjusted R²</td>
<td>0.10</td>
</tr>
</tbody>
</table>

***, **, * Significant at the 0.01, 0.05, and 0.10 levels, respectively.

* Variable definitions:
  - %Inside Director Holdings = the percentage of shares owned by all inside directors;
  - CEO on Nominating Committee = 1 if CEO sits on the board’s nomination committee, and 0 otherwise;
  - CEO Tenure = the natural log of the number of years the CEO has been on the board;
  - R&D Expenditures = research and development expenses divided by total assets;
  - Beta = the 120-day beta of the stock prior to the end of the last fiscal year;
  - Institutional Ownership = the percentage of stock owned by institutions;
  - 5% Outside Blockholder = 1 if an outside director owns 5% or more shares, and 0 otherwise;
  - Lagged Stock Returns = the one-year stock return prior to the shareholders' meeting; and
  - Hi-tech = 1 if firm is in a high-technology industry, and 0 otherwise.

See Tables 2 and 4 for other variable definitions.
The endogenous variables for %Audout and %Outsiders are Board Size, Growth Opportunities, and %Outside Director Holdings. The exogenous variables for %Outsiders are %Inside Director Holdings (Hermalin and Weisbach 1988), CEO on Nominating Committee (Klein 1998), CEO Tenure (Hermalin and Weisbach 1988), R&D Expenditures (Reingold 1999), Beta, Institutional Ownership, and 5% Outside Blockholder. The last two columns present the results using Board Size as the instrumental variable. The endogenous variables are Losses and CEO on Compensation Committee. The exogenous variables for Board Size are CEO Tenure (Yermack 1996), R&D Expenditures (Reingold 1999), Beta, 5% Outside Blockholder, Lagged Stock Returns, and Hi-tech (Reingold 1999).

The inferences from the 2SLS analyses are similar to those derived from the multiple regression reported in Table 4. The one exception is that the coefficients on CEO on Compensation Committee are significantly negative at the 0.01 level for the 2SLS analyses, but insignificantly negative for the multiple regression. Thus, simultaneity does not affect the primary inferences drawn from Table 4, suggesting that the empirical results are robust to both procedures.

VI. CONCLUSIONS

Beginning in December 1999, the SEC and stock exchanges require listed firms to maintain audit committees with at least three directors, "all of whom have no relationship to the company that may interfere with the exercise of their independence from management and the company" (NYSE Listed Company Manual §303.01[B][2][a]). Although this statement suggests that firms must maintain audit committees composed solely of outside directors, exchange regulations allow for non-outside directors if the board determines it is in the firm's best interests for these individuals to serve on its audit committee.

I examine if variations in audit committee independence are associated with economic factors for a sample of S&P 500 firms over 1991–1993, a time period when firms had greater latitude in placing affiliated directors on their audit committee. I find that audit committee independence increases with board size and the percentage of outsiders on the board, consistent with the hypothesis that audit committee independence depends on the supply of available outside directors on the board. In contrast, audit committee independence decreases with the firm's growth opportunities and when the firm reported net losses in each of the two preceding years, supporting the hypothesis that audit committee independence is related to management's and shareholders' demand for scrutiny of the firm's financial accounting process. I also find a negative association between audit committee independence and the presence of alternative monitoring mechanisms, that is, for larger firms or when a nonmanagement director owning at least 5 percent of the firms' shares sits on the audit committee. Overall, my findings are consistent with the Blue Ribbon Commission's observation that "one size doesn't fit all" when it comes to audit committees. Thus, the stock exchanges may wish to allow boards of directors flexibility in determining their audit committee composition.

Several possible avenues for future research arise from this study. First, does the lower level of audit committee independence for higher growth firms and for firms with sustained losses result in higher incidences of financial fraud? Second, the Blue Ribbon Commission suggests that all audit committee members should have expertise in financial accounting. To what extent do audit committees comply with this suggestion, and what factors, if any, are related to fulfilling this mandate? Third, examining the interdependence between audit committee independence and competing corporate governance structures could further our understanding as to how corporations make trade-offs among these alternative mechanisms.
REFERENCES


