BOARD INDEPENDENCE AND LONG-TERM FIRM PERFORMANCE

Sanjai Bhagat and Bernard Black[1]

February 2000

(earlier drafts were titled: *Do Independent Directors Matter?*)

Abstract

The boards of directors of American public companies are dominated by independent directors. Moreover, many commentators and institutional investors believe that independent directors should be even more numerically dominant on public company boards than they are today. We conduct the first large sample, long-horizon study of whether board independence (proxied by proportion of independent directors minus proportion of inside directors) correlates with the long-term performance of large American firms. We find evidence that firms suffering from low profitability respond by increasing the independence of their board of directors, but no evidence that this strategy works that firms with more independent boards achieve improved profitability. Our results do not support the conventional wisdom that greater board independence improves firm performance.

Comments welcome. Please address correspondence to either author:

Professor Sanjai Bhagat
Graduate School of Business
Univ. of Colorado - Boulder
Boulder CO 80309-0419
tel: (303) 492-7821

Professor Bernard Black
Stanford Law School
Stanford CA 94305

tel: (650) 725-9845

[1] Professor of Finance, Graduate School of Business, University of Colorado at Boulder, and Professor of Law, Stanford Law School. Research support was provided by the Q Group and the Institutional Investor Project at Columbia Law School. We thank Institutional Shareholder Services for making its director database available to us. We also thank George Benston, James Brickley, Gerald Davis, John Donohue, Jeff Gordon, Milton Handler, David Ikenberry, Ehud Kamar, Stacey Kole, April Klein, Sherry Jarrell, Stacey Kole, Bevis Longstreth, Anil Shivdasani, Randall Thomas, David Yermack, Marc Zenner, anonymous referees, participants in workshops at the Atlanta Finance Forum, American Finance Association, Columbia Law School, Georgetown Law School, NYU Center for Law and Business, Rice University, University of Rochester (Simon School of Business), and Stanford Law School, for comments and Renee Johnson, Robert King, Ann Le, Karen Lutz, Michelle Ontiveros, Michael Reyes, Mark Rysman, Sapna Sanagavarapu, Yan Yang, and Helen Yu for research assistance.

fax: (303) 492-5962 fax: (650) 725-0684
sanjai.bhagat@colorado.edu bblack@stanford.edu

Most large American public companies have boards with a majority of independent directors; almost all have a majority of outside directors. This pattern reflects the common view that the board's principal task is to monitor management, and only independent directors can be vigorous monitors. In contrast, an insider-dominated board is seen as a device for management entrenchment (e.g., Eisenberg, 1976; Millstein, 1993; American Law Institute, 1994). The proposition that large-company boards should consist mostly of independent directors has become conventional wisdom. For example, guidelines adopted by the Council of Institutional Investors (1998) call for at least 2/3 of a company's directors to be independent; guidelines adopted by the California Public Employees Retirement System (1998) and by the National Association of Corporate Directors (1996) call for boards to have a "substantial majority" of independent directors. This conventional wisdom has only an occasional dissenting voice (e.g., Longstreth, 1994; Tobin, 1994).

Does greater board independence produce better corporate performance, as conventional wisdom predicts? Conversely, does board composition respond to firm performance? The quantitative research on these questions has been inconclusive.

We report here evidence from the first large-scale, long-time-horizon study of the relationship between board independence and the long-term performance of large firms. We study measures of financial performance and growth from 1985-1995 for 934 of the largest United States firms, using data on these firms' boards of directors in early 1991 and data for a random subsample of 205 firms from early 1988. We follow the common practice of dividing directors into *inside directors* (persons who are currently officers of the company), *affiliated* directors (relatives of officers; persons who are likely to have business

relationships with the company, such as investment bankers and lawyers; or persons who were officers in the recent past) and *independent directors* (outside directors without such affiliations) (see the definitions provided by Institutional Shareholder Services, 1998, p. 3.11; Council of Institutional Investors, 1991).[2]

We indicate the proportions of independent and inside directors as f_{indep} and f_{inside}, respectively. Prior studies have generally used f_{indep} as the board composition variable of interest. This effectively treats inside and affiliated directors as equally (non)independent, when in fact, affiliated directors may often be substantially independent. We instead measure board independence as $INDEP = f_{indep} - f_{inside}$. This effectively treats independent, affiliated, and inside directors as having independence weights of +1, 0, and -1, respectively.

Our principal result: low-profitability firms respond by increasing board independence. But this strategy doesn't work. Firms with more independent boards don't achieve improved profitability. This suggests that the conventional wisdom stressing the importance of board independence lacks empirical support, and could detract from other, perhaps more effective strategies for addressing poor firm performance.

These results persist: (i) after controlling for board size, firm size, industry effects, CEO stock ownership, stock ownership by outside directors, and number and size of outside 5% blockholders; (ii) in both an ordinary least squares and a simultaneous equations framework; (iii) when we run Koenker-Bassett (1978) robust regressions, which give less weight to outlying observations; and (iv) for regressions using

[2] Our categories of "independent director," "affiliated director," and "inside director" correspond fairly closely to the "outside director," "grey director," and "inside director" categories used by Baysinger and Butler (1985), MacAvoy,

dummy variables for different ranges of *INDEP* as independent variables.

This paper is organized as follows. The next section reviews briefly the literature on the relationship between board composition and firm performance. Section 2 describes our research design and sample characteristics. Section 3 discusses the correlation and direction of apparent causation among firm profitability, board independence, and CEO share ownership. Section 4 explores the relationship between firm growth rates and board independence. Section 5 develops possible explanations for our results.

Cantor, Dana & Peck (1983), and Weisbach (1988).

1. Prior research on board composition

1.1 Does board composition affect firm performance?

Bhagat & Black (1999) recently surveyed the literature on how board composition affects firm performance or vice versa, so the survey here is brief. Prior studies of the effect of board composition on firm performance generally adopt one of two approaches. The first approach involves studying how board composition affects the board's behavior on discrete tasks, such as replacing the CEO, awarding golden parachutes, or making or defending against a takeover bid. This approach can involve tractable data, which makes it easier for researchers to find statistically significant results. But it doesn't tell us how board composition affects overall firm performance. For example, there is evidence that firms with majority-independent boards perform better on particular tasks, such as replacing the CEO (Weisbach, 1988) and making takeover bids (Byrd & Hickman, 1992). But these firms could perform worse on other tasks that cannot readily be studied using this approach (such as appointing a new CEO or choosing a new strategic direction for the firm), leading to no net advantage in overall performance.

This paper adopts the second approach of examining directly the correlation between board composition and firm performance. This approach allows us to examine the "bottom line" of firm performance (unlike the first approach), but involves much less tractable data. Firm performance must be measured over a long period, which means that performance measures are noisy and perhaps misspecified; see Kothari and Warner (1997) and Barber and Lyon (1996, 1997).

Prior research does not establish a clear correlation between board independence and firm performance. Early work by Vance (1964) reports a positive correlation between proportion of *inside*

directors and a number of performance measures. Baysinger and Butler (1985), Hermalin and Weisbach (1991), and MacAvoy, Cantor, Dana and Peck (1983) all report no significant same-year correlation between board composition and various measures of corporate performance. Baysinger and Butler report that the proportion of independent directors in 1970 correlates with *1980* industry-adjusted return on equity. However, their 10-year lag period is very long for any effects of board composition on performance to persist.

Three recent studies offer hints that firms with a high percentage of independent directors may perform *worse*. Yermack (1996) reports a significant negative correlation between proportion of independent directors and contemporaneous Tobin's *q*, but no significant correlation for several other performance variables (sales/assets; operating income/assets; operating income/sales); Agrawal and Knoeber (1996) report a negative correlation between proportion of outside directors and Tobin's *q*. Klein (1998) reports a significant negative correlation between a measure of change in market value of equity and proportion of independent directors, but insignificant results for return on assets and raw stock market returns.

Event studies. Rosenstein and Wyatt (1990) find that stock prices increase by about 0.2%, on average, when companies appoint additional outside directors. This increase, while statistically significant, is economically small and could reflect signalling effects. Appointing an additional independent director could signal that a company plans to address its business problems, even if board composition doesn't affect the company's ability to address these problems. Rosenstein and Wyatt (1997) find that stock prices neither increase or decrease on average when an *insider* is added to the board.

Composition of board committees. Klein (1998) finds that *inside* director representation on a board's investment committee correlates with improved firm performance. She finds little evidence that "monitoring" committees that are usually dominated by independent directors -- the audit, compensation, and nominating committees -- affect performance, regardless of how they are staffed.

1.2 Does firm performance affect board composition?

Several researchers have examined whether board composition is endogenously related to firm performance, with inconsistent results. Hermalin and Weisbach (1988) and Weisbach (1988, p. 454) report that the proportion of independent directors on large firm boards increase slightly when a company has performed poorly: firms in the bottom performance decile in year X increase their proportion of independent directors by around 1% in year X+1, relative to other firms, during 1972-1983. In contrast, Klein (1998) finds no tendency for firms in the bottom quintile for 1991 stock price returns to add more independent directors in 1992 and 1993 than firms in the top quintile. Denis and Sarin (1999) report that firms that substantially increase their proportion of independent directors had *above-average* stock price returns in the previous year. They also report that average board composition for a group of firms changes slowly over time and that board composition tends to regress to the mean, with firms with a high (low) proportion of independent directors reducing (increasing) this percentage over time.

2. Research design and sample characteristics

2.1 Data collection procedure

This study seeks to directly measure the correlation between board independence and firm performance, while (i) correcting weaknesses (especially limited sample size, short measurement period, and limited control variables) in prior studies that may have led to failure to find significant results; and (ii) using a simultaneous equations approach to attempt to determine if board composition affects firm performance, firm performance affects board composition, or both. We use data on board composition in early 1991 from a database compiled by Institutional Shareholder Services of 957 large U.S. public corporations, including virtually all of the largest American firms. ISS classifies each director, at each firm, as inside, independent, or affiliated. We exclude from this database 23 firms without stock price data available on the CRSP tapes, to produce a "1991 sample" of 934 firms. We also use proxy statements obtained from LEXIS/NEXIS to collect data on board composition in early 1988 for a randomly chosen subsample of 205 firms.

We supplement this board data with data from Compustat on the sample firms' accounting performance between 1985 and 1995 (available for 928 firms for at least some variables and some years); data from CRSP on the sample firms' stock price performance during this period; and data on share ownership obtained from proxy statements (available for 780 firms). We collect the following information on holdings of voting shares (to the nearest 0.1%):[3]

[3] Any share ownership study faces difficulty handling stock options and firms with two or more classes of voting stock. Our decision rules were as follows: SEC rules require ownership disclosure for options that are exercisable currently or within 60 days. We include these options in computing share ownership. When two classes of voting stock have identical or nearly identical *economic* interests but different voting rights (typically two classes of common stock), we compute share ownership as percentage of total outstanding shares of both classes. This percentage *economic interest* will generally differ from the shareholder's percentage *voting interest*. If two classes have different economic interests (most commonly when a firm has voting convertible preferred stock), we use voting power as a proxy for economic interest, and compute ownership interest based on the percentage of total votes for shares of both classes. Where a firm has nonstandard titles, or separates the titles of CEO and Chairman, it can be difficult to determine who is the real chief executive officer. If a firm has a "CEO" and a "Chairman of the Board" who are different people, we treat

the named "CEO" as the chief executive officer if the named "chairman" is an outsider with another primary job, and treat the named "Chairman" as the chief executive officer if he appears to be an executive of the company without another primary job. It can frustrating and sometimes impossible to determine from proxy statements a family group's total share ownership when the family's shares are held by multiple trusts with overlapping trustees. We treated such family groups as a single shareholder, doing our best to compute total ownership. We treated the family group as an outside shareholder if no person with that family name was a company officer.

· the CEO's percentage ownership
· percentage ownership by all directors and officers
· percentage ownership by all outside directors (for 1988, by all independent directors)
(these two measures are highly correlated)
· number of outside shareholders or shareholder groups that own 5% or more of the company's voting shares
· total percentage ownership by all outside 5% shareholders

Below, when we use early 1991 board composition and stock ownership data, we report regression results for performance measures for the "retrospective" period from 1988-1990 and for the "prospective" period from 1991-1993. We also compute but do not report results for the earlier retrospective period of 1985-1987 and the later prospective period of 1994-1995; these results are similar to those for the closer-in-time periods that we report. When using early 1988 board composition and stock ownership data, we use 1985-1987 as the retrospective period and 1988-1990 as the prospective period.

2.2 Tests for entry and exit bias

This study, like any study of long-term performance, faces a potential problem with entry into and exit from the sample over time. For the retrospective period, firms that were included in our sample in early 1991, but not in earlier years, may have a different relationship between board independence and performance than firms that appear in the sample for the entire period. Similarly, firms that drop out of the sample during the prospective period may have a different relationship between board independence and performance than firms that survive for this period of time.

Entry and exit bias does not appear to be a significant concern for our sample. With regard to exit during the prospective period, we find no significant correlation between board composition or board size and the probability that a firm exits the sample between 1991 and 1995:

Spearman Correlation Coefficients
(two-tailed significance levels in parentheses; sample size = 815)

	Proportion of Inside Directors	Proportion of Independent Directors	Board Size
Probability that Firm, Included in Sample in 1991, Survives through 1995	-.008 (.817)	.034 (.303)	.025 (.464)

Second, for the 1985-1987, 1988-1990, and 1991-1993 periods, we measure the correlation between firm performance and board composition computed at two different times, early 1988 and early 1991, with similar results. This suggests that entry bias is not significant because the full 1991 sample includes, while the 1988 subsample excludes, firms that enter the full sample between 1988 and 1991.

2.3 Performance variables

There is no single ideal measure of long-term firm performance. We collect data on four measures of firm performance, each with support in the accounting and finance literature:

Description	Variable Name
Tobin's q[4]	Q
Return on assets (ratio of operating income to assets)	OPI/AST
Market adjusted stock price returns [5]	MAR

[4] Tobin's q for year *xx* is computed as q = (market value of common stock + book value of preferred stock + book value of long-term debt)/(book value of total assets), with all values measured at yearend. Other measures of Tobin's q are possible, but Chung and Pruitt (1994) report very high correlation between relatively careful and relatively crude measures.

[5] We use a simple measure of stock returns, *market-adjusted return (MAR)*, measured by cumulating over the measurement period daily returns minus the return on the S&P 500 index , *without* an adjustment for beta. For the multi-

Ratio of sales to assets	SAL/AST

Stock price returns must be used with caution as a performance measure because they are susceptible to investor anticipation. If investors fully anticipate the effects of board composition on performance, long-term stock returns will be insignificant, even if a significant correlation between performance and board independence exists in fact. For this reason, we rely mostly on Tobin's q, ratio of operating income to assets, and ratio of sales to assets as our performance measures. In the appendix we present some of the analysis using market adjusted stock returns as the performance measure.

2.4 Control Variables

Our regression results control for a number of possible factors that could influence firm performance, in addition to board composition. These control variables are:

· board size
· CEO ownership (percent)
· outside director ownership (percent)
· firm size, proxied by log(sales). For performance variables with sales in the numerator (SAL/AST and, when we study firm growth we use log(assets) instead of log(sales) to control for firm size. We also run regressions (not reported) using log(assets) as the size control for all performance and growth variables; results are similar to the regressions with log(sales). For regressions using 1991 (1988) board and stock ownership data, we measure firm size in 1990 (1987).
· number of outside 5% blockholders. We also run regressions (not reported) using percentage holdings of all outside 5% blockholders as an additional control variable. This variable is generally insignificant. Coefficients for number of outside 5% blockholders decline because number of outside 5% blockholders and percentage holdings of all outside

---

year periods over which we cumulate returns, Kothari and Warner (1997) report that MAR is better specified than abnormal return measures that include a beta adjustment. In separate regressions (not shown), we confirm for our sample that MAR is better specified than measures based on cumulative abnormal returns or standardized abnormal returns.

5% blockholders are highly correlated (Spearman correlation coefficient = .909). Coefficients for other variables are virtually unchanged.

· industry control. We classify firms into 302 industry groups based on 4-digit SIC codes, omitting industries for which Compustat has data on only one or two firms in that 4-digit industry. We also run regressions using 2-digit SIC code industry groups and using four "1-digit" broad industry groups: utility (SIC codes 4800-4999), financial (SIC codes 6000-6999), transportation (SIC codes 3700-3799, 4000-4581, 4700-4799), and industrial (all other SIC codes). Results with 2-digit industries are similar to those that we report; results with 1-digit groups are similar except as noted below. The control variable for each regression is the mean value for the industry of the performance variable that is used in that regression.

· an intercept term (not shown in the regressions)

2.5 Endogeneity

Board composition could affect firm performance, but firm performance could also affect the firm's future board composition. The factors that determine board composition are not well understood, but board composition is known to be related to industry (Agrawal & Knoeber, 1999) and to a firm's ownership structure (firms with high inside ownership have less independent boards; see Section 2.6). If board composition is endogenous, ordinary least squares (OLS) coefficient estimates can be biased. Simultaneous equations methods can address endogeneity, but are often more sensitive than OLS to model misspecification; see Barnhart & Rosenstein (1998).

We address the combination of endogeneity and uncertainty about which econometric model to use partly by using an extensive set of control variables and robustness checks, and also by running both OLS and three-stage least squares (3SLS) regressions. Our OLS and 3SLS coefficient estimates and *t*-statistics for the effect of board independence on firm performance are very similar, which suggests that endogeneity and model misspecification are not seriously skewing our results.[7]

[7] We also rerun selected tables using Koenker-Bassett (1978) robust regressions, which give less weight to outlying

2.6 Sample characteristics

Table 1 provides summary statistics for the composition of the boards of directors of our sample firms. The median firm has an 11 member board, with 7 independent directors, 3 inside directors, 1 affiliated director, and 3 insiders, and *INDEP* = .40. d*INDEP* is the difference in *INDEP* between 1991 and 1988.

Table 1
Sample Characteristics: Board of Directors

Summary statistics for board composition for 934 large U.S. public companies included in the Institutional Shareholder Services director database for 1991. Standard deviation is shown in parentheses.

				Percentiles				
Category	**Median**	**Mean (std. dev.)**	**Min.**	**10**	**20**	**80**	**90**	**Max.**
Inside Directors	3	2.84 (1.64)	0	1	2	4	5	14
Affiliated Directors	1	1.59 (1.52)	0	0	0	3	3	9
Independent Directors	7	7.03 (3.48)	0	3	4	9	11	22
Entire Board	11	11.45 (3.74)	4	7	8	14	16	30
Fraction: Inside Directors	.23	.26 (.14)	0	.10	.14	.38	.46	.83
Fraction: Affiliated Directors	.12	.14 (.13)	0	0	0	.25	.31	.75
Fraction: Independent Directors	.64	.60 (.19)	0	.18	.43	.75	.82	1.00
$INDEP = f_{indep} - f_{inside}$	.40	.33 (.31)	-1.00	-.11	.09	.58	.67	1.00
$\delta INDEP$	.00	-.02 (.22)	- .80	-.28	-.17	.16	.22	.67

observations rerun for both dependent and independent variables. These regressions (not reported) show only minor changes in coefficients and *t*-statistics. Thus, our results are not significantly affected by outlying observations.

As Table 1 shows, most large companies have a high proportion of independent directors. The sample median (mean) of 64% (60%) independent directors can be compared with earlier studies, which generally show a smaller fraction of independent directors.[8] These studies are snapshots taken at different times during a longstanding trend, dating at least to 1970, toward greater board independence. This trend has continued since 1991, with the median number of inside directors at Standard & Poors 500 firms dropping from 3 to 2 (SpencerStuart, 1998).

About 70% of the firms in our sample have majority-independent boards; about 85% have more independent than inside directors (*INDEP* > 0). Only 54 firms (5.8% of the sample) have majority-inside boards. Firms with majority-inside boards tend to be smaller and to have higher inside ownership than the other sample firms.[9]

Table 2 reports summary statistics for our performance variables:

Table 2
Sample Characteristics: Performance Variables

Performance variables for 928 large U.S. public companies for 1985, 1990, and 1995. The variables *Q*, *OPI/AST* and *SAL/AST* are defined in the text. *Q* 85 means Tobin's *q* for 1985, and similarly for other variables.

Variable	Median	Mean	Minimum	Maximum	Std. Deviation	Sample Size
Q 85	0.93	1.28	0.06	12.2	1.21	790
Q 90	0.88	1.18	0.03	8.4	1.1	898
Q 95	1.05	1.31	0.05	11.6	1.1	795
OPI/AST 85	.23	.25	-.17	.98	.13	651
OPI/AST 90	.21	.23	-.22	1.15	.11	764
OPI/AST 95	.20	.22	-.06	.99	.10	654
SAL/AST 85	.98	1.06	.01	6.28	.80	825

[8] Our board composition results are similar to those of Klein (1998), who studies 485 large companies based on proxy statements between July 1, 1991 and June 30, 1992, and finds a mean board size of 12.3, with 23% insiders, 19% affiliated outsiders, and 58% independent directors. She finds a higher percentage of affiliated outsiders than we do because she considers interlocking directorships (Company *A*'s CEO sits on Company *B*'s board, and vice-versa) to indicate affiliation, while we do not.

[9] The 54 firms with majority-inside boards had mean (median) total assets of $3,981 million ($917 million) in 1993, compared to $9,002 million ($2,178 million) for the full sample, and mean (median) inside ownership of 21.1% (10.9%), compared to 9.0% (3.0%) for the full sample.

SAL/AST 90	.93	1.00	.07	5.62	.75	901
SAL/AST 95	.92	.97	.02	4.75	.69	797

Table 3 shows summary share ownership data for our sample. Board composition is related to insider share ownership. In our sample, the Spearman correlation coefficient between percentage of shares held by company officers and f_{inside} (f_{indep}) is .32 (-.41). Also, independent directors who own substantial blocks of stock may monitor more intensely than directors who own little stock. Similarly, monitoring by large outside blockholders could complement or substitute for monitoring by the board of directors. This makes it important to control for stock ownership in assessing the relationship between board composition and firm performance.

Table 3
Sample Characteristics: Firm Ownership Structure

Stock ownership data for early 1991 for 780 large U.S. public companies (to nearest 0.1%). Standard deviation is in parentheses.

				Percentiles					
Ownership Data	**Median**	**Mean (std. dev.)**	**Min.**	**10**	**20**	**80**	**90**	**Max.**	**Sample Size**
CEO ownership	0.5	3.8 (9.9)	0.0	0.0	0.1	3.0	9.7	84.2	779
Ownership by all directors and officers	3.0	9.0 (14.0)	0.0	0.3	0.8	4.5	27.2	85.1	780
Outside director ownership	1.0	2.8 (5.6)	0.0	0.1	0.2	3.2	6.5	71.1	768
No. of outside 5% blockholders (up to 5)	1.0	1.4 (1.3)	0	0	0	2	3	5	778
For firms with outside 5% blockholders:									
Ownership by all blockholders	17.8	21.9 (15.6)	5.0	6.4	8.3	31.7	43.2	96.9	520
Ownership of largest 5% blockholder	10.2	14.4 (11.9)	5.0	6.0	7.2	18.2	28.6	82.0	537
Ownership of 2d largest 5% blockholder	6.9	7.8 (3.3)	5.0	5.3	5.6	9.3	10.6	39.0	330
Ownership of 3d largest 5% blockholder	6.2	6.8 (1.9)	5.0	5.2	5.4	8.0	9.6	16.0	148
Ownership of 4th largest 5% blockholder	5.8	6.4 (1.9)	5.0	5.1	5.2	6.7	8.4	14.7	63
Ownership of 5th largest 5% blockholder	5.7	6.1 (1.3)	5.0	5.2	5.2	7.0	8.4	9.6	17

3. Full sample results (using 1991 board and stock ownership data)

When data is available for only some years in a multiyear measurement period, we compute the average for the period using the year(s) with available data. We use $p < .05$ (in a two-tailed test) as our

threshold for statistical significance; results with .05 < p < .10 are considered "marginally significant." Significant results are shown in **boldface**.

3.1 OLS results for board independence and firm performance

Table 4 presents our basic OLS results for the full 1991 sample. During the retrospective period, board independence, proxied by *INDEP*, correlates significantly and *negatively* with all four performance measures. During the prospective period, the correlation remains negative for all variables, but is significant only for *Q*. These results are consistent with poor performance prompting firms to adopt more independent boards, but suggests that firms do *not* achieve superior performance (and may possibly achieve even worse performance) as a result of this change in board composition.[10]

[10] We perform a variety of checks for robustness, in addition to those described below in the text:

1. Results are similar with 2-digit industry controls. With 1-digit industry controls, OPI/SAL 91-93 becomes significantly negative and OPI/AST 91-93 is negative and marginally significant.
2. We obtain similar results with a number of other performance variables, including sales per employee, operating margin (operating income/sales), and cash-flow based measures (cash flow/assets instead of operating income/assets). The coefficients on *INDEP* are negative and significant or marginally significant for 1988-1990, and generally negative but only sometimes significant for 1991-1993.
3. We obtain similar results in regressions where we replace *INDEP* with f_{inside} and f_{indep} (in direct or log form) as independent variables, except that the negative coefficient on *INDEP* is typically split between a negative coefficient on f_{indep} and a positive coefficient on f_{inside}. This is consistent with our judgment that *INDEP* is a superior measure of board independence than f_{indep} alone.
4. We obtain similar results with Koenker-Bassett (1978) robust regressions, which give less weight to outliers.

Table 4
OLS Regression: Performance Variables on Board Independence and Ownership Structure

Ordinary least squares regression results for various performance variables on board independence and stock ownership for 928 large U.S. public companies for 1988-1990 and 1991-1993. The performance variables *Q, OPI/AST,* and *SAL/AST* are defined in the text. *Q* 88-90 means average *Q* during 1988-1990 and similarly for other performance variables. Board and stock ownership variables are based on early 1991 data. Industry control for each regression is the mean of the dependent variable for that regression for each firm's industry group; 302 industry groups are constructed on the basis of 4-digit SIC codes from Compustat. Sample size varies from 552 to 684 because of missing data. *t*-statistics are in parentheses. Significant results ($p < .05$) are in **boldface** (not shown for firm size or industry control).

	Independent Variables							
Dependent Variables	***INDEP***	**Board size**	**CEO ownership**	**Outside director ownership**	**No. of Outside 5% Holders**	**Log (firm size)**	**Industry control**	**Adj. R^2**
Q 88-90	**-.44 (-4.98)**	-.001 (-.03)	.004 (1.59)	**.009 (2.13)**	**-.074 (-3.76)**	-.13 (-5.56)	.64 (14.79)	.376
Q 91-93	**-.22 (-2.09)**	-.018 (-1.81)	.003 (.79)	.007 (1.38)	**-.067 (-2.92)**	-.09 (-3.29)	.80 (18.92)	.429
OPI/AST 88-90	**-.07 (-4.87)**	**-.003 (-2.07)**	-.001 (-.91)	.001 (1.49)	-.003 (-.84)	.002 (.60)	.42 (9.49)	.187
OPI/AST 91-93	-.01 (-.88)	.001 (.06)	.001 (.68)	.001 (1.44)	-.005 (-1.61)	-.001 (-.34)	.71 (11.78)	.214
SAL/AST 88-90	**-.21 (-3.09)**	**-.020 (-2.64)**	**-.005 (-2.22)**	.005 (1.53)	.022 (1.42)	.08 (4.38)	.82 (26.5)	.588
SAL/AST 91-93	-.07 (-1.36)	**-.016 (-3.00)**	-.003 (-1.93)	.004 (1.64)	**.025 (2.18)**	.05 (3.55)	.89 (35.0)	.699

3.2 Simultaneous equations results for board independence and firm performance

We address the possible endogeneity of board independence and firm performance by adopting a three stage least squares approach (3SLS), as described in Theil (1971)[6]. This permits firm performance, board independence, and CEO ownership to be endogenously determined. For each endogenously determined variable, we need an instrumental variable - - a variable that is correlated with the variable of interest, but is assumed to be uncorrelated with the error term. The endogenous variables and corresponding instrumental variables we use are:

[6] 3SLS is a systems estimating procedure that estimates all the identified structural equations together as a set, instead of estimating the structural parameters of each equation separately as is the case with the two stage least squares procedure (2SLS). The 3SLS is a full information method because it utilizes knowledge of all the restrictions in the entire system when estimating the structural parameters. The 3SLS estimator is consistent and in general is

· *firm performance measure*: normalized earnings per share (earnings per share divided by share price at the beginning of the measurement period)
· *board independence*: f_{indep}
·*CEO ownership*: share ownership by all directors and officers

We estimate the following system of equations:

· *Equation 5.1: firm performance* = f_1 (*INDEP*, CEO ownership, board size, outside director ownership, no. of outside 5% holders, log(firm size), industry performance control)
· *Equation 5.2: INDEP* = f_2 (firm performance, CEO ownership, outside director ownership, no of outside 5% holders, log(firm size))
· *Equation 5.3: CEO Ownership* = f_3 (firm performance, outside director ownership, log(firm size))

Our 3SLS results are shown in Table 5, Panel *A*, with performance variables as dependent variables; these results are comparable to Table 4. The coefficients and *t*-statistics for board independence are virtually unchanged from Table 4, which increases our confidence in both sets of results.

asymptotically more efficient than the 2SLS estimator; see Mikhail (1975).

Table 5: Simultaneous Equations (3SLS) Instrumental Variables Estimates

Simultaneous equations (three stage least squares) regression results for various performance variables on board independence and stock ownership for 928 large U.S. public companies for 1988-1990 and 1991-1993. The instrumental variables, system of equations, and performance variables *Q, OPI/AST,* and *SAL/AST* are defined in the text. *Q* 88-90 means average *Q* during 1988-1990 and similarly for other performance variables. Board and stock ownership variables are based on early 1991 data. Industry control for each regression in Panel A is the mean of the dependent variable for that regression for each firm's industry group; 302 industry groups are constructed on the basis of 4-digit SIC codes from Compustat. Sample size varies from 552 to 684 because of missing data. *t*-statistics are in parentheses. Significant results ($p < .05$) are in **boldface** (not shown for firm size or industry control).

Panel A: Equation 5.1 (Firm Performance as Dependent Variable)

Dependent Variable: Firm Performance	Independent Variables							Adj. R^2
	INDEP	Board Size	CEO Ownership	Outside Director Ownership	No. of Outside 5% Holders	Log (firm size)	Industry Control	
Q 88-90	**-.49 (-4.86)**	-.001 (-.06)	.005 (1.46)	**.009 (2.05)**	**-.07 (-3.51)**	-.12 (-5.29)	.65 (14.8)	.3777
Q 91-93	**-.28 (-2.29)**	-.02 (-1.72)	.002 (.54)	.007 (1.36)	**-.06 (-2.85)**	-.08 (-3.28)	.80 (18.8)	.4289
OPI/AST 88-90	**-.08 (-5.23)**	-.003 (-1.90)	-.001 (-.59)	.001 (1.32)	-.002 (-.86)	.002 (.53)	.45 (9.61)	.1978
OPI/AST 91-93	-.01 (-.74)	.001 (.12)	.001 (.77)	.001 (1.46)	-.005 (-1.57)	-.001 (-.29)	.71 (11.8)	.2165
SAL/AST 88-90	**-.21 (-2.66)**	**-.02 (-2.29)**	-.001 (-.34)	.005 (1.44)	.02 (1.56)	.08 (4.48)	.81 (26.1)	.5806
SAL/AST 91-93	-.09 (-1.46)	**-.01 (-2.77)**	-.001 (-.52)	.004 (1.57)	**.03 (2.36)**	.05 (3.72)	.89 (34.7)	.6975

Panel B: Equation 5.2 (Board Independence as Dependent Variable)

Dependent Variable	Independent Variables						Adj. R^2
	Firm Performance Measure	Firm Performance	CEO Ownership	Outside Director Ownership	No. of Outside 5% Holders	Log (firm size)	
INDEP	Q 88-90	**-.21 (-6.81)**	**-.01 (-6.80)**	-.0001 (-.03)	.009 (.90)	-.004 (-.40)	.203
	Q 91-93	**-.11 (-5.57)**	**-.01 (-7.91)**	-.001 (-.49)	.016 (1.80)	.001 (.10)	.179
	OPI/AST 88-90	**-2.42 (-8.70)**	**-.01 (-5.31)**	.002 (.69)	.015 (1.30)	.02 (1.48)	.198
	OPI/AST 91-93	**-.90 (-3.38)**	**-.01 (-6.88)**	-.001 (-.42)	.02 (1.97)	.02 (2.40)	.149
	SAL/AST 88-90	**-.13 (-6.23)**	**-.01 (-7.99)**	-.001 (-.16)	**.04 (4.64)**	.04 (4.39)	.198
	SAL/AST 91-93	**-.12 (-6.64)**	**-.01 (-8.41)**	-.001 (-.17)	**.04 (4.54)**	.03 (3.77)	.193

Panel C: Equation 5.3 (CEO Ownership)

Dependent Variable	Independent Variables				Adj. R^2
	Firm Performance Measure	Firm Performance	Outside Director Ownership	Log (firm size)	
CEO Ownership	Q 88-90	**4.13 (4.34)**	.04 (.63)	-.73 (-2.13)	.062
	Q 91-93	**2.44 (3.95)**	.03 (.46)	-.95 (-3.21)	.056
	OPI/AST 88-90	**28.3 (3.62)**	-.05 (-.62)	-1.40 (-4.43)	.056
	OPI/AST 91-93	**31.9 (3.83)**	-.08 (-.99)	-1.33 (-4.30)	.057
	SAL/AST 88-90	**1.41 (1.99)**	.04 (.61)	-1.50 (-5.09)	.0419
	SAL/AST 91-93	1.16 (1.93)	.03 (.51)	-1.39 (-5.15)	.0394

Panel *B* confirms the suggestion from the 1988-1990 data in Table 4 and in Panel *A* of a likely causal

connection running from poor firm performance to a firm decision to increase board independence. The coefficients on all three performance variables for 1988-1990 are negative and strongly significant.

In Table 5, Panel *A* we include regressions using performance variables for 1998-1990, and in Panel *B*, we include regressions using performance variables for 1991-1993 - for parallelism with Table 4, but omit these regressions in subsequent tables because they have no obvious causal interpretation in a simultaneous equations framework.

3.3 Is board composition affected by growth or growth opportunities?

We check the robustness of the results in Tables 4 and 5 in various ways. First, we test for a possibility that the correlation between firm or industry growth rate or growth prospects and *both* firm profitability and board composition may be driving our results. To do so, we add the following additional control variables to equation 5.2:

- GrSAL 88-90 = fractional *firm* sales growth from 1987 to 1990 (as a measure of current firm growth)
- fractional *industry* sales growth from 1987 to 1990 (as a measure of the current growth opportunities available in the industry, even if not seized by this particular firm)
- GrSAL 91-93 = fractional *firm* sales growth from 1990 to 1993 (as a measure of the future growth opportunities available to the firm, because realized future firm growth is a proxy for current growth opportunities).
- fractional *industry* sales growth from 1990 to 1993 (as a measure of the future growth opportunities available in the industry, even if not seized by this particular firm)

Thus, our system of equations is:

- *Equations 6.1 and 6.3:* same as equations 5.1 and 5.3
- *Equation 6.2:* $INDEP = f_2$ (firm performance, CEO ownership, outside director ownership, no. of outside 5% holders, log(firm size), GrSAL 88-90, industry sales growth from 1987 to 1990, GrSAL 91-93, industry sales growth from 1990 to 1993)

Our results are shown in Table 6-*SAL*. We show results only for Panel *B* (Equation 6.2). The coefficients

for Panels *A* and *C* of Table 6 are very close to those in Table 5, except that the negative coefficient on *INDEP* for *Q* for the prospective period in Table 5, Panel *A* loses significance in Table 6-*SAL*.

Table 6 -SAL
Simultaneous Equations Estimates With Controls for
Firm and Industry Sales Growth and Growth Opportunities

Simultaneous equations (three stage least squares) regression results for various performance variables on board independence and stock ownership for 928 large U.S. public companies for 1988-1990 and 1991-1993, with controls for firm and industry sales growth and growth opportunities. The instrumental variables, system of equations, and performance variables *Q, OPI/AST,* and *SAL/AST* are defined in the text. *Q* 88-90 means average *Q* during 1988-1990 and similarly for other performance variables. GrSAL 88-90 means fractional growth in firm sales from 1987 to 1990 and similarly for GrSAL 91-93. Board and stock ownership variables are based on early 1991 data. 302 industry groups are constructed on the basis of 4-digit SIC codes from Compustat. Sample size varies from 552 to 684 because of missing data. *t*-statistics are in parentheses. Significant results ($p < .05$) are in **boldface**.

Panel B: Equation 6.2 (Board Independence as Dependent Variable)

	Independent Variables (also includes CEO ownership, Outside director ownership, No. of outside 5% holders, Log (firm size), but coefficients not noted here)						**Adj. R^2**
Dependent Variable	**Firm performance measure**	**Firm performance**	**GrSAL 88-90**	**Industry sales growth 88-90**	**GrSAL 91-93**	**Industry sales growth 91-93**	
	Q 88-90	**-.20 (-6.05)**	-.001 (-.35)	-.16 (-.29)	**.001 (2.34)**	-.77 (-1.67)	.176
	OPI/AST 88-90	**-2.03 (-8.19)**	-.001 (-1.20)	-.46 (-.80)	.001 (.21)	**-1.58 (-3.05)**	.190
INDEP	SAL/AST 88-90	**-.14 (-6.35)**	**-.001 (-2.27)**	-.56 (-1.10)	.001 (1.21)	-.75 (-1.69)	.180

The growth controls in Table 6-*SAL* do not change the central implication from Table 5: Poorly performing firms adopt more independent boards, but do not thereafter improve their performance. There is no consistent evidence that either current (1988-1990) firm or industry growth or future firm growth prospects (proxied by growth in 1991-1993) affect board composition in early 1991. Prior firm performance is the dominant driver of greater board independence. We also find a negative relation between future industry growth and board independence; we have no good explanation for this correlation.

We also rerun Table 6 using growth in operating income instead of growth in sales as the measure of growth. Table 6-OPI shows Panel *B* of this revised table. Panels *A* and *C* are omitted; they are similar to the corresponding (omitted) panels in Table 6-*SAL*.

Table 6-OPI

Simultaneous Equations Estimates With Controls for Firm and Industry Operating Income Growth and Growth Opportunities

Simultaneous equations (three stage least squares) regression results for various performance variables on board independence and stock ownership for 928 large U.S. public companies for 1988-1990 and 1991-1993, with controls for firm and industry operating income growth and growth opportunities. The instrumental variables, system of equations, and performance variables *Q*, *OPI/AST*, and *SAL/AST* are defined in the text. *Q* 88-90 means average *Q* during 1988-1990 and similarly for other performance variables. GrOPI 88-90 means fractional growth in firm operating income from 1987 to 1990 and similarly for GrOPI 91-93. Board and stock ownership variables are based on early 1991 data. 302 industry groups are constructed on the basis of 4-digit SIC codes from Compustat. Sample size varies from 552 to 684 because of missing data. *t*-statistics are in parentheses. Significant results ($p < .05$) are in **boldface**.

Panel B: Board Independence as Dependent Variable

Dependent Variable	Independent Variables (also includes CEO ownership, Outside director ownership, No. of outside 5% holders, Log (firm size), but coefficients not noted here)						Adj. R^2
	Firm performance measure	Firm performance	GrOPI 88-90	Industry oper. Income growth 88-90	GrOPI 91-93	Industry oper. Income growth 91-93	
	Q 88-90	**-.22 (-5.68)**	.001 (-.78)	-.55 (-.78)	-.67 (-.19)	**-.20 (-2.03)**	.154
	OPI/AST 88-90	**-2.03 (-8.19)**	-.001 (-.80)	-.46 (-.80)	.0001 (.21)	**-.16 (-3.01)**	.190
INDEP	SAL/AST 88-90	**-.17 (-5.59)**	-.0001 -.58)	-.39 (-.58)	.0002 (.74)	-.17 (-1.84)	.162

Once again, the growth controls do not affect the negative correlation between firm performance in 1988-1990 and board independence in early 1991. There is some evidence in Table 6-*OPI* of a negative correlation between industry growth prospects (proxied by industry growth in 1991-1993) and board independence. The coefficient on industry operating income growth in 1991-1993 is significantly negative for Q and OPI/AST, and marginally significant for SAL/AST. As before, we have no good explanation for this correlation.

3.4 Robustness check using 1988 board and share ownership data

As a further check on our results, we collect board composition and share ownership data in early 1988 for a randomly chosen subsample of 205 firms. Simultaneous equations results are shown in Table

5-1988 below.[11] In Panel *B*, recent past performance (during 1985-1987) correlates significantly and negatively with board independence in early 1988 for *Q* and *OPI/AST*, and negatively but not significantly for *SAL/AST*. Moreover, for the full sample, 1985-1987 performance correlates significantly and negatively with 1991 board independence for all three performance variables (regression results are not shown). We see this as corroboration of the evidence reported above that poorly performing firms increase board independence.

As we did with 1991 board data, we get hints that greater board independence not only doesn't improve performance, it may lead to worse performance. The coefficients on board independence with all three prospective performance specifications are negative in Panel A, and the coefficient with the OPI/AST specification is statistically significant.

[11] OLS regressions with firm performance as the dependent variable produce coefficient estimates similar to Panel *A* of Table 5-1988.

Table 5-1988: Simultaneous Equations Instrumental Variables Estimates

Simultaneous equations (three stage least squares) regression results for various performance variables on board independence and stock ownership for 205 large U.S. public companies for 1985-1987 and 1988-1990. The instrumental variables and system of equations are the same as for Table 5, except that *INDEP88* replaces *INDEP* in all equations The performance variables *Q, OPI/AST,* and *SAL/AST* are defined in the text. *Q* 88-90 means average *Q* during 1988-1990 and similarly for other performance variables. Board and stock ownership variables are based on early **1988** data. Industry control for each regression in Panel A is the mean of the dependent variable for that regression for each firm's industry group; 302 industry groups are constructed on the basis of 4-digit SIC codes from Compustat. Sample size varies from 195 to 201 because of missing data. *t*-statistics are in parentheses. Significant results ($p < .05$) are in **boldface**.

Panel A: Firm Performance as Dependent Variable

Dependent Variable: Firm Performance	**Independent Variables (other independent variables same as in Table 5, Panel A but not shown)**	
	Board Independence in Early 1988 (*INDEP*88)	**Adj. R^2**
Q 88-90	-.27 (-1.53)	.447
OPI/AST 88-90	**-.06 (-2.24)**	.139
SAL/AST 88-90	-.18 (-1.31)	.492

Panel B: Board Independence as Dependent Variable

Dependent Variable	**Independent Variables (other independent variables same as in Table 5, Panel B but not shown)**		**Adj. R^2**
	Firm Performance Measure	**Firm Performance**	
	Q 85-87	**-.32 (-2.49)**	.113
	OPI/AST 85-87	**-2.59 (-2.59)**	.185
INDEP88	SAL/AST 85-87	–.06 (-1.40)	.168

Panel C: CEO Ownership

Dependent Variable	**Independent Variables (other independent variables same as in Table 5, Panel C but not shown)**		
	Firm Performance Measure	**Firm Performance**	**Adj. R^2**
	Q 85-87	-3.03 (-1.12)	.070
	OPI/AST 85-87	3.26 (.21)	.084
CEO Ownership	SAL/AST 85-87	2.55 (1.84)	..086

3.5 Robustness check using *changes* in board composition from 1988-1991

The tables above are based on absolute levels of board independence. A related question is whether firms measurably change their level of board independence in response to poor performance.

Here the evidence is more equivocal. We address this question first in an ordinary least squares framework, and then in a simultaneous equations framework.

Using the subsample of 205 firms for which we have board composition data for both 1988 and 1991, we construct a measure of *change* in board independence from 1988 to 1991: d*INDEP = INDEP - INDEP88*. In Table 7, *dINDEP* is the dependent variable, and different measures of recent past (1985-1987) and contemporaneous (1988-1990) performance and growth are the principal independent variables. If recent past or contemporaneous poor performance (slow growth) is a strong driver of board independence, the coefficients in Table 7 should be negative.

Table 7
Regression: Change in Board Independence on Performance and Growth

Change in board independence for 205 large U.S. public companies between early 1988 and early 1991. The performance and growth variables are defined in the text. Board composition data is from early 1988 and early 1991. Industry control for each regression is the mean of that variable for each firm's industry group; 302 industry groups are constructed on the basis of 4-digit SIC codes from Compustat. Sample size varies from 195 to 201 because of missing data. *t*-statistics are shown in parentheses. Significant results ($p < .05$) are in **boldface**.

	Independent Variables (industry control and log(1987 sales) are included in the regressions but are not shown)				
Dependent Variable	**Performance or Growth Variable**	**Recent Past Performance or Growth (Same Variable over 1985-1987)**	**Contemporaneous Performance or Growth (Same Variable over 1988-1990)**	**Board Size**	**Adj. R^2**
? *INDEP = INDEP - INDEP* 88	*Performance Variables*				
	Q	-.02 (-.70)	-.01 (-.20)	-.001 (-.24)	-.021
	OPI/AST	.10 (.31)	-.18 (-.52)	.004 (.54)	-.032
	SAL/AST	-.09 (-1.14)	.17 (1.93)	.002 (.40)	.005
	Growth Variables				
	GrAST	-.001 (-.24)	-.001 (-.12)	.002 (.28)	-.028
	GrSAL	-.001 (-.33)	-.001 (-1.00)	.004 (.73)	-.022
	GrOPI	-.001 (-.23)	.001 (.31)	.003 (.53)	-.031
	GrEMP	-.001 (-.17)	-.001 (-.01)	.004 (.51)	-.032

There is no evidence in Table 7 of a correlation between change in board composition and recent past or contemporaneous performance or growth. The signs on the coefficients vary and most *t*-statistics are small. This nonresult is consistent with the mixed results found by other researchers, reviewed earlier.

The story changes when we move to a simultaneous equations framework. Table 8 uses the same equations and instrumental variables as Table 5, except that we replace *INDEP* with d*INDEP*. Panel *C* on CEO ownership is omitted. In Table 8, Panel *A*, there is no significant relationship between change in board independence from 1988 to 1991, and subsequent firm performance in 1991-1993. In Panel *B*, there is a significant negative correlation between contemporaneous performance (during 1988-1991) and change in board independence over the same period for *Q* and *OPI/AST*, but not for *SAL/AST*.

Table 8: Simultaneous Equations Estimates for Changes in Board Independence

Simultaneous equations (three stage least squares) regression results for various performance variables on change in board independence from 1988 to 1991 (d*INDEP*) and stock ownership for 205 large U.S. public companies for 1988-1990 and 1991-1993. The instrumental variables and system of equations are the same as for Table 5, except that d*INDEP* replaces *INDEP* in all equations. The performance variables *Q, OPI/AST,* and *SAL/AST* are defined in the text. *Q* 88-90 means average *Q* during 1988-1990 and similarly for other performance variables. Board composition is based on data from early 1988 and early 1991; stock ownership is are based on early 1991 data. Industry control for each regression is the mean of the dependent variable in Panel A for that regression for each firm's industry group; 302 industry groups are constructed on the basis of 4-digit SIC codes from Compustat. Sample size varies from 195 to 201 because of missing data. *t*-statistics are in parentheses. Significant results ($p < .05$) are in **boldface**.

Panel A: Firm Performance as Dependent Variable

Dependent Variable: Firm Performance	**Independent Variables (other independent variables same as in Table 5, Panel A but not shown)**	**Adj. R^2**
	d**INDEP**	
Q 88-90	**-.92 (-2.12)**	.372
Q91-93	-.50 (-1.07)	.403
OPI/AST 88-90	**-.15 (-2.20)**	.122
OPI/AST 91-93	.14 (1.36)	.063
SAL/AST 88-90	.33 (1.12)	.508
SAL/AST 91-93	.36 (1.35)	.612

Panel B: Change in Board Independence as Dependent Variable

Dependent Variable	**Independent Variables (other independent variables same as in Table 5, Panel B but not shown)**		**Adj. R^2**
	Firm Performance Measure	**Firm Performance**	
dINDEP	Q 88-90	**-.12 (-2.75)**	.033
	OPI/AST 88-90	**-2.00 (-3.36)**	.043
	SAL/AST 88-90	.01 (.30)	-.007

Table 8, Panel *B* provides support for the evidence from earlier tables that poor firm performance predicts higher future board independence. A puzzle, given the strong *t*-statistics in Table 5, Panel *B*, is why the negative correlation between 1988-1990 performance and 1988-1991 changes in board independence is not stronger. Perhaps the strategy of increasing board independence emerges over time in response to persistent poor performance. If so, the strategy will be reflected more clearly in absolute levels of board independence than in changes in board independence over a limited time period.

3.6 Robustness check: Nonlinear relationship between board independence and firm performance

The OLS and 3SLS regressions above provide evidence that poor firm performance leads firms to increase their board independence. There is no evidence that this strategy improves future performance, and hints that there might be a *negative* relationship between board independence and future firm independence. To see if those hints can be sharpened, we explore in this section a possible nonlinear relationship between board independence and future firm performance. For example, it could be valuable for firms to have a significant number of inside directors -- say 30% -- to achieve the benefits of these directors' firm-specific knowledge, but there after unimportant or even detrimental to further increase the proportion of inside directors. Similarly, it could be valuable to have more independent than inside directors, or to have a majority of independent directors (see theoretical work by Noe and Rebello, 1996 and empirical work by Byrd and Hickman, 1992), or a 60% supermajority of independent directors (see empirical work by Weisbach, 1988 and Cotter, Shivdasani and Zenner, 1997).

We test these hypotheses in Table 9 using dummy variables to divide boards into four independence ranges defined as follows:

Dummy1: equal to 1 if *INDEP* < 0 (more inside than independent directors); and 0 otherwise

Dummy2: equal to 1 if 0 < *INDEP* < 0.2 (a 50-50 to 60-40 split between independent and inside directors); and 0 otherwise

Dummy3: equal to 1 if 0.2 < *INDEP* < 0.4 (a 60-40 to 70-30 split between independent and inside directors); and 0 otherwise

Residual category: highly independent boards, with *INDEP* > 0.4

Other independent variables are the same as in Table 4, but are not shown in Table 9 because their coefficients and *t*-statistics are virtually identical to Table 4. About 15% of our sample has *Dummy1* = 1; 15% of the sample has *Dummy2* = 1; 20% of the sample has *Dummy 3* = 1; the remaining firms are in the residual category.

Table 9
OLS Regression: Firm Performance with Board Independence Dummy Variables

Regression results for various performance variables on dummy variables for board independence and on stock ownership variables for 928 large U.S. public companies for 1991-1993. The performance variables *Q, OPI/AST,* and *SAL/AST* are defined in the text. *Q* 91-93 means average *Q* during 1991-1993 and similarly for other performance variables. Board and stock ownership variables are based on early 1991 data. Industry control for each regression is the mean of the dependent variable for that regression for each firm's industry group; 302 industry groups are constructed on the basis of 4-digit SIC codes from Compustat. Sample size varies from 552 to 684 because of missing data. *t*-statistics are in parentheses. Significant results ($p < .05$) are in **boldface**.

	Independent Variables (other independent variables same as Table 4 but not shown)			
Dependent Variable	***Dummy1* = 1 if *INDEP* < 0; otherwise = 0**	***Dummy2* = 1 if 0 < *INDEP* < 0.2; otherwise = 0**	***Dummy3* = 1 if 0.2 < *INDEP* < 0.4; otherwise = 0**	**Adj. R^2**
Q 91-93	.16 (1.52)	.15 (1.68)	**.19 (2.56)**	.428
OPI/AST 91-93	-.002 (-.17)	.01 (.58)	.02 (1.58)	.214
SAL/AST 91-93	.09 (1.64)	-.004 (-.08)	-.035 (-.90)	.699

Table 9 does not provide strong evidence of breakpoints. We also address a possible nonlinear relationship between board independence and firm performance by rerunning Table 4 with $INDEP^2$ as an additional control variable. This variable's coefficient varies in sign and is insignificant for all performance variables.

3.7 Results for board size

Yermack (1996) reports a significant negative correlation between board size and *Q*, *SAL/AST*, *OPI/AST*, and *OPI/SAL* for large U.S. public firms. Eisenberg, Sundgren and Wells (1998) report a negative correlation between performance and firm size for small and midsize Finnish firms. In contrast, we find much weaker evidence of a correlation between board size and firm performance in Tables 4 and 5, and also in regressions (not shown) using *OPI/SAL* as a performance variable, which we run for comparability with Yermack. For example, in Table 5, board size takes a significant negative coefficient for 1991-1993 only for *SAL/AST*. For the other variables relied on by Yermack, the coefficients on board size are insignificant and, for *OPI/AST*, of opposite sign to that reported by Yermack.

These results, together with similar results for board size in our 1988 subsample, where board size is again significant and negative only for SAL/AST, cast doubt on the reliability of the findings by Yermack and by Eisenberg, Sundgren and Wells.

3.8 Results for share ownership

Board monitoring is one possible way to induce good firm performance. A potential substitute is to provide good incentives to management, most commonly through stock ownership. Table 5, Panel *C* provides evidence of a positive correlation between *past* performance and CEO ownership. This suggests that CEOs get rewarded for performing well (in the spirit of Kole, 1996). However, the suggestion that good performance predicts higher CEO share ownership is not confirmed in Table 5-1988, where we use 1985-1987 performance and 1988 board and share ownership data. Consistent with Kole (1996) and Himmelberg, Hubbard and Palia (1999), there is no evidence from Table 5, Panel *A*, that higher CEO share ownership translates into improved future performance.

There are hints in the OLS regressions in Table 4 and the 3SLS regressions in Table 5 that stock ownership by outside directors correlates with improved performance. Coefficients on outside director ownership are positive for all performance variables for 1991-1993, and are marginally significant for SAL/AST in Table 4. We return to this issue in Section 5.2.

There is no evidence in the OLS regressions in Table 4 or the 3SLS regressions in Table 5 that monitoring by outside 5% blockholders has a consistent effect on firm performance. The coefficients on number of outside 5% blockholders vary in sign, are significantly negative for *Q*, but are significantly positive for *SAL/AST*.

4. Correlation between board independence and firm growth

We investigate in this section the relationship between board independence and firm growth.

The growth measures we use are:

Variable	**Definition**
GrAST *xx yy*	percentage growth in assets from year *xx* - 1 to year yy; for example GrAST 85-87 is percentage growth in assets from 1984 (treated as the baseline year) to 1987
GrSAL *xx yy*	percentage growth in sales from year *xx* -1 to year yy
GrOPI *xx yy*	percentage growth in operating income from year *xx* -1 to year *yy* (we discard observations with negative initial OPI)

Since firm growth may both determine and be determined by board independence, we move directly to a simultaneous equations (3SLS) structure. We estimate the following system of equations:

· *Equation 10.1: firm growth measure* = f_1 (*INDEP*, CEO ownership, board size, outside director ownership, no. of outside 5% holders, log(firm size), industry growth control)
· *Equation 10.2: INDEP* = f_2 (firm growth measure, CEO ownership, outside director ownership, no. of outside 5% holders, log(firm size))
· *Equation 10.3: CEO ownership* = f_3 (firm growth measure, outside director ownership, log(firm size)

The instrumental variables we use are:

firm growth measure: for GrSAL and GrOPI, we use GrAST as an instrumental variable; for GrAST, we use GrSAL as an instrumental variable
board independence: f_{indep}
CEO ownership: share ownership by all directors and officers

Our results are presented in Table 10. There is evidence from Panel *B* that slow firm growth in sales and assets (but not operating income) leads to greater board independence, but no evidence from Panel *A* that greater board independence leads to faster growth.

Table 10
Simultaneous Equations Estimates: Growth Accounting Variables on Board Composition

Simultaneous equations (three stage least squares) regression results for various growth variables for 928 large U.S. public companies for 1988-1990 and 1991-1993. The instrumental variables, system of equations and growth variables GrAST, GrSAL, and GrOPI are defined in the text. GrAST 88-90 means percentage growth in assets during the period from 1984 to 1987, and similarly for other variables. Board and stock ownership variables are based on early 1991 data. Industry control for each regression is the mean of the dependent variable in Panel A for that regression for each firm's industry group; 302 industry groups are constructed on the basis of 4-digit SIC codes from Compustat. Sample size varies from 552 to 684 because of missing data. *t*-statistics are shown in parentheses. Significant results ($p < .05$) are in **boldface**.

Panel A: Equation 10.1 (Firm Growth as Dependent Variable)

Dependent Variable: Firm Growth	**Independent Variables (other independent variables same as in Table 5, Panel A but not shown)**	
	Board Independence (*INDEP*)	**Adj. R^2**
GrAST 91-93	5.67 (1.46)	.023
GrSAL 91-93	3.74 (.93)	.050
GrOPI 91-93	-1.42 (-.12)	.039

Panel B: Equation 10.2 (Board Independence as Dependent Variable)

Dependent Variable	Independent Variables (other independent variables same as in Table 5, Panel B but not shown)		Adj. R^2
	Growth Measure	Firm Growth	
	GrAST 88-90	**-.002 (-5.03)**	.152
	GrSAL 88-90	**-.002 (-4.29)**	.142
INDEP	GrOPI 88-90	.0001 (1.14)	.114

5. Conclusion

We find a reasonably strong correlation between poor performance and subsequent increase in board independence. The change in board independence seems to be driven by poor performance rather than by firm and industry growth opportunities. However, there is no evidence that greater board independence leads to improved firm performance; if anything, there are hints in the other direction. The conventional wisdom that supports a very high degree of board independence and may explain why poorly performing firms increase board independence, appears to rest on a shaky empirical foundation.

In this concluding section, we explore some possible reasons why increased board independence may not pay off in improved firm performance.

5.1 The case for inside directors

One reason why increasing board independence apparently doesn't pay off in improved performance is that having a reasonable number of inside directors could add value. Baysinger and Butler (1985) suggest that an optimal board contains a mix of inside, independent, and perhaps also affiliated directors, who bring different skills and knowledge to the board. Including insiders on the board may make it easier for other directors to evaluate them as potential future CEOs (Vancil, 1987; Weisbach, 1988). Insiders also may be better at strategic planning decisions, consistent with Klein's (1998) evidence that

inside director representation on investment committees of the board correlates with improved firm performance. This "mixed board" explanation is consistent with Klein's (1999) evidence that affiliated directors are more likely to be found on the boards of firms that need the affiliated director's expertise, although Klein finds no significant correlation between proportion of affiliated directors and firm performance.

To be sure, senior managers *could* be invited to board meetings even if they are not board members. But there is no guarantee that they will be invited. Moreover, the interaction between senior managers (other than the CEO) and other directors may be different if the managers have seats on the board, are expected to attend every meeting, must vote, and are expected to participate in board discussions, than if they attend at the CEO's pleasure, speak only if invited to, and could be not invited to future meetings if the CEO so decides.

A further reason why inside directors may be valuable involves the tradeoff between independence and other essentials to good decisions. Inside directors are conflicted but well informed. Independent directors are not conflicted, but are relatively ignorant about the company. Perhaps independent directors will be quicker to act if something goes wrong, but more likely, in their ignorance, to do the wrong thing, especially if their deliberations are not leavened by the information available to fellow inside directors.

There is also a tradeoff between independence and incentives. Most independent directors own trivial amounts of their company's shares, and hence have limited incentives to monitor carefully. Inside directors lack independence, but have their human capital and often most of their financial capital, committed to their company. Hall and Liebman (1998) provide evidence of the sensitivity of managers' financial wealth to firm performance. The hypothesis that director incentives affect firm performance is

consistent with the evidence in Bhagat, Carey and Elson (1999) and the limited evidence we report in section 5.2 that independent directors perform better when they hold substantial amounts of a company's stock.

A priori, it is not obvious that independence (without knowledge or incentives) leads to better director performance than knowledge and strong incentives (without independence). Maybe the optimal board has some knowledgeable, incentivized inside directors, and some independent directors --who might thereby become better informed, and could also be better incentivized than many independent directors are today.

5.2 Interaction between independence and stock ownership

There are hints in Tables 4 and 5 that independent directors are more effective if motivated by significant stock ownership. To test for this possibility, Table 11 reports OLS results using interaction between log(f_{indep}) and outside director ownership as a board composition variable together with log(f_{inside}).

Table 11
Regression: Interaction Between Board Composition and Stock Ownership

Regression results for various performance variables on log (f_{inside}), stock ownership, and interaction between log(f_{indep}) and outside director ownership, for 928 large U.S. public companies for 1991-1993. The performance variables *Q, OPI/AST,* and *SAL/AST* are defined in the text. *Q* 91-93 means average *Q* during 1988-1990 and similarly for other performance variables. Board and stock ownership variables are based on early 1991 data. Significant results ($p < .05$) are in **boldface**.

	Independent Variables (other independent variables same as Table 4 but not shown)	
Dependent Variable	**log(f_{inside})**	**log(f_{indep}) * (Outside Director Ownership)**
Q 91-93	**.17 (2.43)**	.02 (.90)
OPI/AST 91-93	.014 (1.69)	**.008 (2.41)**
SAL/AST 91-93	**.15 (3.35)**	**.04 (2.04)**

In Table 11, the coefficients on log(f_{inside}) are positive, and statistically significant. For Q and *SAL/AST*, and marginally significant for *OPI/AST*. This is consistent with the negative coefficients on

INDEP for the regression with these performance variables in Table 4. The interaction variable f_{indep}*outside director ownership is positive for all three performance variables and is significant for *OPI/AST* and *SAL/AST*. Thus, Table 11 offers some support for the hypothesis that independent directors who hold significant stock positions may add value, while other independent directors do not. This is consistent with Bhagat, Carey and Elson (1999), who report that directors with substantial stock ownership are quicker to replace the CEO.

5.3 The arguments for independent directors

How might a case be made for a modified version of the conventional wisdom that favors highly independent boards? One possibility, explored in the previous section, is that independent directors need to be better incentivized. A second is that today's "independent" directors aren't independent enough. Perhaps, as Gilson and Kraakman (1991, p. 865) argue, "corporate boards need directors who are not merely independent [of management], but who are *accountable* [to shareholders] as well." But if so, institutional investors may need to put their own representatives on boards of directors, a step that few are interested in and which is hard for them to take under current U.S. legal rules (Black, 1990; Roe, 1994).

A third possibility is that some directors who are classified as independent are not truly independent of management, because they are beholden to the company or its current CEO in ways too subtle to be captured in customary definitions of "independence." For example, some nominally independent directors may serve as paid advisors or consultants to a company, or may be employed by a university or foundation that receives financial support from the company. Unfortunately, the data needed to capture these relationships are not available.

Perhaps, too, some directors have personal relationships with the CEO that affect their

independence. This possibility is consistent with evidence that directors who were appointed during the current' CEO's tenure are more generous in determining the CEO's compensation (Holthausen and Larcker, 1993; Yermack, 1997). One way to begin to untangle these subtle relationships would be for the SEC to require additional disclosure of financial or personal ties between directors (or the organizations they work for) and the company or its CEO.

Fourth, perhaps some types of independent directors are valuable, while others are not. Maybe CEOs of companies in other industries (who are, by number, the majority of independent directors) are too busy with their own business, know too little about a different business, and are overly generous in compensating another CEO. Maybe "visibility" directors -- well-known persons with limited business experience, often holding multiple directorships and adding gender or racial diversity to a board, are not effective on average. But this explanation suggests that to push for greater board independence may be fruitless or even counterproductive, unless independent directors have particular attributes, which are currently unknown.

A fifth possibility, implicit in Klein's (1998) research on board committee structures, is that independent directors can add value, but only if they are embedded in an appropriate committee structure. This would let independent directors perform the monitoring function that, commentators argue they are best suited for while letting inside and affiliated directors perform the advising function to which they may bring more firm-specific expertise. However, most large firms already have such committee structures and Klein finds little evidence that the principal outsider-dominated "monitoring" committees -- audit, compensation, and nominating committees -- affect performance, regardless of how they are staffed.

5.4 Policy implications

What would the implications be, if our data are right -- if greater board independence does not improve, and may reduce, firm performance? Steps like insisting that independent directors own more shares, or that they be more completely independent, are worth trying. Pending those steps, our data don't support a wholesale return to the 1960s, when boards were entirely passive. They do suggest that companies should be free to experiment with modest departures from the current norm of a "supermajority independent" board with only one or two inside directors. A board with, say, 6 independent directors, 4 inside directors, and one affiliated director, instead of 9 independent directors and 2 inside directors, might bring some subtle benefits, and conveys no obvious harm. The independent directors will still numerically dominate the board, and can take appropriate action in a crisis.

References

Agrawal, Anup and Charles R. Knoeber, 1996. Firm performance and mechanisms to control agency problems between managers and shareholders. *Journal of Financial and Quantitative Analysis* 31, 377-397.

Agrawal, Anup and Charles R. Knoeber, 1999. Outside directors, politics, and firm performance. Working paper, *available* in Social Science Research Network Electronic Library, <http://papers.ssrn.com/papers.taf?abstract_id=125348>.

American Law Institute, 1994. *Principles of corporate governance*. Philadelphia, PA.

Barber, Brad M., and John D. Lyon, 1996, Detecting abnormal operating performance: The empirical power and specification of test statistics, *Journal of Financial Economics* 41, 359-399.

Barber, Brad M., and John D. Lyon, 1997, Detecting long-run abnormal stock returns: The empirical power and specification of test statistics, *Journal of Financial Economics* 43, 341-372.

Barnhart, Scott W. and Stuart Rosenstein, 1998, Board composition, managerial ownership and firm performance: An empirical analysis, *Financial Review* 33, 1-16.

Baysinger, Barry and Henry Butler, 1985. Corporate governance and the board of directors: Performance effects of changes in board composition. *Journal of Law, Economics and Organization* 1, 101-124.

Bhagat, Sanjai and Bernard Black, 1999. The uncertain relationship between board composition and firm performance, *Business Lawyer* 54, 921-963.

Bhagat, Sanjai, Dennis C. Carey and Charles M. Elson, 1999. Director ownership, corporate performance, and management turnover, *Business Lawyer* 54, 885-920.

Black, Bernard, 1990. Shareholder passivity reexamined. *Michigan Law Review* 89, 520-608.

Byrd, John W. and Kent A. Hickman, 1992. Do outside directors monitor managers?: Evidence from tender offer bids. *Journal of Financial Economics* 32, 195-222.

California Public Employees Retirement System, 1998. *Corporate governance core principles and guidelines*. Sacramento, CA, available at <http://www.calpers-governance.org/principles/domestic/us/page01.asp>

Cotter, James F., Anil Shivdasani and Marc Zenner, 1997. Do independent directors enhance target shareholder wealth during tender offers? *Journal of Financial Economics* 43, 195-218.

Council of Institutional Investors, 1991. *Definition of independent director*. Reprinted in *Corporate Control Alert*, Feb. 1991, at 11.

Council of Institutional Investors, 1998. *Shareholder bill of rights.* Washington D.C.

Denis, David J. and Atulya Sarin, 1999. Ownership and board structures in publicly traded corporations. *Journal of Financial Economics* 52, 187-223.

Eisenberg, Melvin A., 1976. *The structure of the corporation: A legal analysis.* Little Brown and Company. Boston, MA.

Gilson, Ronald J. and Reinier Kraakman, 1991. Reinventing the outside director: An agenda for institutional investors. *Stanford Law Review* 43, 863-906.

Hall, Brian J. and Jeffrey B. Liebman, 1998. Are CEOs really paid like bureaucrats? *Quarterly Journal of Economics* 113, 653-691.

Hermalin, Benjamin E. and Michael S. Weisbach, 1988. The determinants of board composition. *Rand Journal of Economics* 19, 589-606.

Hermalin, Benjamin E. and Michael S. Weisbach, 1991. The effect of board composition and direct incentives on firm performance. *Financial Management* 21(4), 101-112.

Himmelberg, Charles P., R. Glenn Hubbard and Darius Palia, 1999. Understanding the determinants of managerial ownership and the link between ownership and performance. *Journal of Financial Economics* 53, 353-384.

Holthausen, Robert W. and David F. Larcker, 1993. Boards of directors, ownership structure, and CEO compensation. Working paper, University of Pennsylvania (Wharton School).

Institutional Shareholder Services, 1998. *The ISS proxy voting manual*. Washington, DC.

Klein, April, 1998. Firm performance and board committee structure. *Journal of Law and Economics* 41, 275-303.

Klein, April, 1999. An empirical analysis of the relation between board of directors' composition, firm performance, and the degree of CEO domination over the board of directors. Working paper, New York University, Stern School of Business.

Koenker, Roger W. and Gilbert W. Bassett, 1978. Regression quantiles. *Econometrica* 46, 33-50.

Kole, Stacey, 1996, Managerial ownership and firm performance: Incentives or rewards? *Advances in Financial Economics* 2, 119-149.

Kothari, S. P. & Jerold Warner, 1997, Measuring long-horizon security price performance. *Journal of Financial Economics* 43, 301-339.

Longstreth, Bevis, 1994. Corporate governance: There's danger in new orthodoxies. *Corporate Governance Advisor*, July/Aug. 18-21.

MacAvoy, Paul W., S. Cantor, J. Dana and S. Peck, 1983. ALI proposals for increased control of the corporation by the board of directors: An economic analysis. In *Statement of the Business Roundtable on the American Law Institute's Proposed "Principles of Corporate Governance and Structure: Restatement and Recommendations*, exhibit C-1.

Mikhail, W.M., 1975. A comparative Monte Carlo study of the properties of econometric estimators. *Journal of the American Statistical Association* 70, 94-104.

Millstein, Ira, 1993. The evolution of the certifying board. *Business Lawyer* 48, 1485-1497.

National Association of Corporate Directors, 1996, *Report of the NACD blue ribbon commission on director professionalism*.

Noe, Thomas H. and Michael J. Rebello, 1996. The design of corporate boards: Composition, compensation, factions and turnover. Georgia State Univ. College of Business Administration working paper 96-01.

Roe, Mark J., 1994. *Strong managers, weak owners: The political roots of American corporate finance*. Princeton University Press, Princeton, NJ.

Rosenstein, Stuart and Jeffrey G. Wyatt, 1990. Outside directors, board independence, and shareholder wealth. *Journal of Financial Economics* 26, 175-191.

Rosenstein, Stuart and Jeffrey G. Wyatt, 1997. Inside directors, board effectiveness, and shareholder wealth. *Journal of Financial Economics* 44, 229-250.

SpencerStuart, 1998. *1997 Board Index: Board Trends and Practices at S&P 500 Corporations*.

Theil, Henri, 1971. *Principles of Econometrics*. Wiley, New York, NY.

Vance, Stanley C., 1964. *Board of directors: Structure and performance*. Harvard Business School Press, Boston, MA.

Vancil, Richard F., 1987. *Passing the baton: Managing the process of CEO selection*. Harvard Business School Press, Boston, MA.

Weisbach, Michael S., 1988. Outside directors and CEO turnover. *Journal of Financial Economics* 20, 431-460.

Yermack, David, 1996. Higher market valuation of companies with a small board of directors. *Journal of Financial Economics* 40, 185-212.

Appendix: Some results using stock market returns (MAR) as performance variable.

As noted earlier, stock price returns must be used with caution as a performance measure because they are susceptible to investor anticipation. If investors fully anticipate the effects of board composition on performance, stock returns will be insignificant, even if a significant correlation between performance and board independence exists in fact. For this reason, we rely mostly on Tobin's q, ratio of operating income to assets, and ratio of sales to assets as our performance measures. Results using stock market returns as performance measure are not inconsistent with the results reported in the paper using Tobin's q, ratio of operating income to assets, and ratio of sales to assets as the performance measures.

Table 4: Stock Market Return as performance measure
OLS Regression: Performance Variables on Board Independence and Ownership Structure
Ordinary least squares regression results for various performance variables on board independence and stock ownership for 928 large U.S. public companies for 1988-1990 and 1991-1993. *MAR 88-90* means average MAR during 1988-1990 and similarly for other performance variables. Board and stock ownership variables are based on early 1991 data. Industry control for each regression is the mean of the dependent variable for that regression for each firm's industry group; 302 industry groups are constructed on the basis of 4-digit SIC codes from Compustat. Sample size varies from 552 to 684 because of missing data. *t*-statistics are in parentheses. Significant results ($p < .05$) are in **boldface** (not shown for firm size or industry control).

	Independent Variables							
Dependent Variables	***INDEP***	**Board size**	**CEO ownership**	**Outside director ownership**	**No. of Outside 5% Holders**	**Log (firm size)**	**Industry control**	**Adj. R^2**
MAR 88-90	**-.19 (-2.60)**	.001 (.05)	.003 (1.44)	-.001 (-.28)	**-.08 (-4.80)**	.01 (.35)	.23 (.66)	.055
MAR 91-93	.09 (1.24)	.009 (1.34)	**.005 (2.08)**	.004 (1.20)	.02 (1.20)	.01 (.83)	1.00 (6.64)	.087

Table 5: Stock Market Return as performance measure
Simultaneous Equations (3SLS) Instrumental Variables Estimates

Simultaneous equations (three stage least squares) regression results for various performance variables on board independence and stock ownership for 928 large U.S. public companies for 1988-1990 and 1991-1993. *MAR 8*8-90 means average MAR during 1988-1990 and similarly for other performance variables. Board and stock ownership variables are based on early 1991 data. Industry control for each regression in Panel A is the mean of the dependent variable for that regression for each firm's industry group; 302 industry groups are constructed on the basis of 4-digit SIC codes from Compustat. Sample size varies from 552 to 684 because of missing data. *t*-statistics are in parentheses. Significant results ($p < .05$) are in **boldface** (not shown for firm size or industry control).

Panel A: Equation 5.1 (Firm Performance as Dependent Variable)

Dependent Variable: Firm Performance	Independent Variables							Adj. R^2
	INDEP	Board Size	CEO Ownership	Outside Director Ownership	No. of Outside 5% Holders	Log (firm size)	Industry Control	
MAR 88-90	**-.19 (-2.33)**	-.001 (-.03)	.003 (.97)	-.001 (-.39)	**-.08 (-5.03)**	.01 (.77)	-.17 (-.20)	.0561
MAR 91-93	**.13 (1.55)**	.011 (1.24)	.006 (1.94)	.005 (1.35)	.03 (1.82)	.03 (1.63)	.70 (1.30)	.0189

Panel B: Equation 5.2 (Board Independence as Dependent Variable)

	Independent Variables						Adj. R^2
	Firm Performance Measure	Firm Performance	CEO Ownership	Outside Director Ownership	No. of Outside 5% Holders	Log (firm size)	
Dependent Variable	MAR 88-90	**-.45 (-5.31)**	**-.01 (-5.52)**	-.002 (-.91)	-.008 (-.55)	.03 (2.49)	.134
	MAR 91-93	**3.17 (2.64)**	**-.03 (-2.59)**	-.018 (-1.33)	-.084 (-1.25)	-.12 (-1.57)	.008

Panel C: Equation 5.3 (CEO Ownership)

	Independent Variables				Adj. R^2
	Firm Performance Measure	Firm Performance	Outside Director Ownership	Log (firm size)	
Dependent Variable	MAR 88-90	**9.64 (5.02)**	.11 (1.55)	-1.47 (-4.89)	.066
	MAR 91-93	**35.6 (3.44)**	-.17 (-1.07)	**-2.51 (-3.69)**	.023