THE ROLE AND SELECTION OF BOARDS OF DIRECTORS

by

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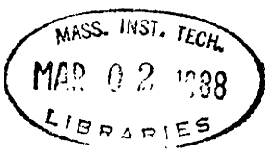

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ABSTRACT

This dissertation examines the roles and the selection process of boards of directors. The first chapter estimates the relation between the monitoring of CEOs by inside and outside directors and CEO resignations. CEO resignations are predicted using stock returns and earnings changes as measures of performance. There is a stronger association between performance and the probability of a resignation for companies with outsider-dominated boards than for companies with insider-dominated boards. This result does not appear to be a function of ownership effects, size effects, or industry effects. Unexpected stock returns on the days when resignations are announced are consistent with the view that boards of directors increase firm value by removing bad management.

The second chapter examines the board selection process by estimating the factors which lead firms to change the composition of their boards of directors. The results indicate that: 1) Inside directors tend to leave the board during the early part of a CEO's tenure. 2) Outside directors tend to be added to the board during the early part of a CEO's tenure. 3) There is a tendency both toward inside directors leaving the board and inside directors joining the board as the CEO approaches retirement age, with the overall effect being a net addition of insiders as the CEO approaches retirement. 4) Inside directors tend to leave following poor corporate performance or when a firm exits an industry. 5) Outside directors tend to be added following poor corporate performance or when a firm exits an industry.

The final chapter tests whether there is a relation between board composition and corporate profitability. The empirical work does not find such a relation. However, because of the relatively large standard errors involved in the estimation, non-result may be due to the lack of a sufficiently powerful test.

Thesis Supervisor: James M. Poterba

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My primary advisor, Jim Poterba, was extraordinarily helpful in the researching and the writing of my dissertation. Jim was especially good at emphasizing to me the importance of attention to seemingly minor details in data and in econometric procedures. Many other faculty members were helpful while I was writing my dissertation. In particular, I would like to thank Paul Healy, Rick Ruback, and Frank Fisher (my secondary advisor).

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Michael S. Weisbach

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Introduction

Boards of directors are legally mandated to govern the corporation. Yet, there is a longstanding debate in the popular, business, and academic press over whether they do anything at all. To date, there has been no comprehensive study providing evidence that boards are a useful element in corporate governance.

Boards vary widely in their composition. Some companies have boards made up almost entirely of members of management, called insiders. Other companies have boards made up mostly of directors from outside the company, called outsiders. While there has been public sentiment towards encouraging and even regulating the use of outsiders on boards, there is little evidence on the different effect of outside and inside directors on any aspect of corporate functioning.

My goal in writing this dissertation is to provide some evidence on boards of directors and their functions in the corporation. Each of the three chapters is empirical and addresses a different question regarding the relations between boards, chief executive officers, and corporate performance.

Chapter 1 of the dissertation examines the role of the board in the CEO succession process. In particular, it tests whether outsider-dominated boards of directors behave differently from insider-dominated boards in their decisions to replace the CEO following poor performance.

The results suggest that outsider dominated boards are more

sensitive to performance in their decisions to replace the CEO. The correlation between CEO resignations and poor performance is negative and significantly different from zero for firms with outsider-dominated boards of directors but not for firms with insider-dominated boards. Furthermore, the difference between the two groups of companies is significantly different from zero. This result does not appear to be a function of ownership effects, industry effects, or size effects.

Chapter 2 of the dissertation uses panel data on board composition to determine when firms choose to add insiders and outsiders to their boards. The results suggest that firms are more likely to add outsiders early in the CEO's tenure and insiders later in the CEO's tenure. They are more likely to add outsiders following poor corporate performance and when they drop out of industries.

Chapter 3 tests whether board composition affects corporate profitability. Using Tobin's q as the measure of profitability, we find no systematic differences between the two types of firms. We do find, however, that profitability increases with shareholdings at low levels of shareholdings and decreases with shareholdings at high levels of shareholdings. It also decreases with CEO tenure at high levels (> 20 years) of tenure.

Given these three chapters, how should one think about the board? I think that in the vast majority of situations, the CEO is the one who chooses the board. The results presented in Chapter 2 are consistent with this view. We argue that the board selection process is an important part of the internal promotion process, which is primarily

controlled by the CEO.

Given the results of Chapter 1, why would the CEO put outsiders onto the board? The results of Chapter 1 suggest that the correlation between CEO resignations and poor performance is larger for firms with outsider-dominated boards than for firms with insider-dominated boards. However, the total number of resignations and expected CEO tenure are approximately the same across the two types. This suggests that insider-dominated boards fire CEOs at about the same rate as outsider-dominated boards, although for nonperformance related reasons. If the CEO does not care why he will be fired, but only when he will be fired, he would not have any more to fear from outsider-dominated boards than from insider-dominated boards.

A second apparent contradiction between the chapters is that Chapter 1 provides some direct evidence on monitoring, while this monitoring does not manifest itself in higher profitability (Chapter 3). Some resolutions to this paradox would be that either this monitoring is not the most important function of the board or that insider have some advantage over outsiders, such as firm-specific human capital, which counteracts the monitoring of the outsiders, leaving the total effect neutral.

In sum, I think the board plays some role, although not as large a role as it might play, in corporate governance. Outsiders do seem to monitor better than insiders, although insiders may have some other neutralizing advantages. CEOs put directors onto the board to advance their own goals, which may or may not be in the shareholders'

interests. However, regulating such choices are unlikely to improve the functioning of the board and may be quite harmful. A better way to align the interests of the shareholders and the directors would be to require firms to pay directors in stock rather than in cash. This would give directors a financial incentive to fire incompetent CEOs and to retain good ones.

Chapter 1

Outside Directors and CEO Turnover

Boards of directors are widely believed to play an important role in corporate governance, particularly in monitoring top management. Directors are supposed to supervise the actions of management, provide advice and veto poor decisions. The board is the shareholders' first line of defense against incompetent management; in extreme cases, it will replace an errant CEO. Discussing boards' effectiveness in this role, Jensen (1986) claims that "the internal control mechanisms of corporations, which operate through the board of directors, generally work well" (p. 10).

Two recent studies, Coughlan and Schmidt (1985) and Warner, Watts, and Wruck (1987), provide some support for this view by showing that poor performance is associated with CEO turnover. However, these studies do not explore the differences in monitoring between the members of management who serve as directors, called inside directors, and directors who are not full-time employees of the company, known as outside directors. These outside directors are widely believed to play a larger role in monitoring management than inside board members. Fama (1980) argues that:

> The probability of [top management colluding and expropriating shareholder wealth] might be lowered, and the viability of the board as a market-induced mechanism for low-cost internal transfer of control might be enhanced, by the inclusion of outside directors. The latter might be regarded as professional referees whose task is to stimulate and oversee the competition among the firm's top management. (Fama (1980), pp. 293-94)

This view has led to numerous calls for regulation of board composition to increase outside representation and hence the level of monitoring of management in American corporations (see for example ALI (1982)).

Such regulatory proposals have been criticized by economists.[1] Demsetz (1983a) argues that "the board of directors can do very little to improve on the powerful incentives that presently guide management to serve the interests of shareholders." (p. B-6) He maintains that executive compensation contracts, which are designed to align shareholders' and managers' interests, and the pressures of the product and capital markets (Hart (1983)) already provide adequate monitoring of corporate managers. According to this argument, regulation of boards cannot improve and could possibly impose a harmful constraint on an optimizing management.

Understanding the role of the outside director remains an important and unresolved question. Unfortunately, most of the day-to-day actions of boards of directors are unobservable. Any attempt to isolate the differential effects of outside and inside directors must either examine their effect on some aspect of firm performance or concentrate on the observable actions of the directors. The most striking of such actions is the decision to remove a CEO.

This paper tests the hypothesis that inside and outside directors behave differently in their decisions to remove top management. It exploits the wide variation across firms in the composition of the board of directors to study how the relation between poor performance and management turnover varies with the makeup of the board. The findings suggest that firms with outsider-dominated boards are

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[1] See Andrews (1982), Demsetz (1983a), and MacAvoy, Cantor, Dana, and Peck (1983)).

significantly more likely to remove the CEO based on publicly available performance measures, such as earnings or stock returns, than firms with insider-dominated boards.

The paper consists of six sections. Section I reviews the role of boards of directors in the CEO succession process. Section II describes the data. The third section discusses the empirical specification. Section IV presents an econometric model that explains CEO turnover using stock returns and earnings changes as measures of performance. It then tests to see whether this relation is the same for firms with different board types. Section V analyzes the change in firm value associated with the announcement of CEO changes and tests whether the outside monitoring is causally related to the change in firm value. There is a brief conclusion that discusses possible directions for future research.

I Boards of Directors as Monitors of Management

One important duty of the board of directors is the evaluation of management. The board is responsible for evaluating the senior management of the corporation and replacing them if they fail to perform well. This evaluation task is likely to fall mainly on the outside directors. Inside directors' careers are tied to the CEO's and hence insiders generally are incapable or unwilling to remove incumbent CEOs.[2] Harold Geneen, the longtime CEO of ITT, once wrote that "Certainly, none of the inside directors would substantially challenge his boss in the boardroom". (Geneen (1984), p. 262)

Outside directors have the responsibility of removing bad management, but they may not have the incentives to do so. A recent Business Week editorial (Sept. 8, 1986) argues that outside directors without a significant stake in the firm have no incentive to cause trouble for management. However, outside directors are generally respected leaders from the business or academic community whose reputations suffer when they are directors of faltering companies. Both Fama (1980) and Fama and Jensen (1983) argue that

> outside directors will monitor the management that chooses them because outside directors have incentives to develop reputations as experts in decision control.... The value of their human capital depends primarily on their performance as internal decision managers in other organizations. They use their directorships to signal to internal and external

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[2] Much of the discussion here and below is taken from Mace (1971). An alternative view is that insiders are much more likely to remove the CEO so that they can replace him. This view is not consistent with the evidence in Mace (1971) or Vancil (1987).

> markets for decision agents that (1) they are decision experts, (2) they understand the importance of diffuse and separate control, and (3) they can work with such decision control systems. (Fama and Jensen (1983), p.315)

Outside directors thus will have an incentive to ensure the effective running of the company because being a director of a well-run company signals their competence to the market.

It may not be optimal to have a board composed entirely of outsiders though. While outsiders may be best able to judge when to remove a CEO, inside participation on the board can improve the decision of who the successor should be. Inside board members are often potential future CEOs. Their inclusion on the board serves two purposes. First, it gives them experience which may prove valuable should they become CEO. Second, it affords the outside board members an opportunity to evaluate potential candidates for CEO. Irrespective of the reasons for the CEO change, we might expect that mixed boards of directors, with a combination of outsiders and insiders, do a particularly good job of replacing management because this board type allows for superior training of the inside directors and better evaluation of them by outside directors.

Most studies of the monitoring functions of boards of directors have used the case study method. Perhaps the best attempt in this direction is Mace (1971)[3]. He interviewed CEOs and directors in order to explore their functions and their relationships. His results

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[3] Vance (1983) performs a similar study. There also have been a number of studies which document the composition and compensation of boards. Two representative examples are Bacon (1975) and Mruk and Gardinia (1985).

indicate that directors typically are not involved in important corporate decisions such as long-range planning, or selecting other directors. Directors do serve as a valuable source of advice for many CEOs and were responsible for removing the CEO in what Mace called crisis situations. Mace emphasized that outside directors were generally the ones who took the initiative to remove incumbent CEOs.

In addition to this case study approach, there have been several attempts to identify quantitatively the effects of boards of directors on profitability. MacAvoy, Cantor, Dana and Peck (1983), responding to the proposal by the American Law Institute (1982) for regulation of board composition, collected data on the composition of boards of directors for a cross-section of publicly traded companies. They compare two subsamples: those firms which met the proposed ALI regulations for a majority of outside directors and various other requirements, and all other firms. They tested whether there were any differences between the two subsamples with respect to various performance measures: accounting profits, sales, and return on equity. Their results indicated no differences between the two types of firms. A problem with this approach is that the causality of the relation between board composition and firm performance is unclear. For example, if they discovered that more profitable firms tended to have insider-dominated boards, we would not know whether the inside directors caused good business decisions to be made or whether CEOs of unprofitable firms tended to invite outsiders onto the board to help solve their problems. This simultaneity problem makes the MacAvoy,

Cantor, Dana, and Peck (1983) results difficult to interpret.

A related study by Morck, Shleifer, and Vishny (1987) explores how stockholdings by boards of directors affect performance. They find that profitability, measured by Tobin's Q, is highest at moderate levels of share ownership by the board. Additionally, they find that this result applies both to ownership by the firm's top officers and to ownership by the rest of the firm's board.

This result may be due to the tradeoff between the agency costs resulting from misalignment of directors' and shareholders' interests and the costs of managerial entrenchment (Demsetz (1983b)). Managerial entrenchment occurs when managers gain so much power that they are able to use the firm to further their own interests rather than the interests of shareholders. Demsetz argues that when CEOs are able to control the board, they are able to take on projects that are known to have negative net present value but provide utility for the CEO.

The extent of this entrenchment has been the subject of two recent studies. Coughlan and Schmidt (1985) and Warner, Watts, and Wruck (1987) estimate resignation equations for CEOs. Each study finds that poor performance of the company's stock increases the probability of a CEO removal, although Coughlan and Schmidt find a much larger effect than Warner, Watts, and Wruck. However, neither paper provides any direct evidence for this claim provides any direct evidence that the board of directors is actively monitoring. A nonmonitoring explanation which is consistent with the evidence presented in these studies is that CEOs resign voluntarily from companies that are doing badly

because of the difficulties of running a faltering company, including potential shareholder suits.

Warner, Watts, and Wruck (1987) also examine the residuals from a market model regression on the day of the announcement of the CEO change. They find that the mean excess return is not distinguishable from zero, but that the variance of the excess return increases on the event day. This finding implies that the announcement contains information but that the information is good news for some firms and bad news for others. They interpret this result as consistent with the announcement providing information about both past and future performance.

Coughlan and Schmidt (1985) and Warner, Watts and Wruck (1986) provide studies of the CEO succession process. Even though both papers claim that the board of directors is responsible for the CEO changes, neither paper attempts to link their work with work on the composition of boards of directors which has been done by MacAvoy, Cantor, Dana, and Peck (1983) and Morck, Shleifer, and Vishny (1987).

II Data

The data used in this study are an extension of the data collected by MacAvoy, Cantor, Dana, and Peck. They assembled data on board composition for all corporations listed on the New York Stock Exchange with a proxy statement available on microfiche, a total of 495 publicly held corporations between 1977 and 1980. For each firm, directors were classified as either outside, inside, or grey. MacAvoy, Cantor, Dana, and Peck classify directors who are full-time employees of the corporation as inside directors. They designate directors who neither work for the corporation nor have extensive dealings with the company as outside directors. Those directors who are not employees, but who may not be independent of current management because of extensive business dealings with the company or family relationships with management are classified as grey. In the analysis below, the measure of outside domination of the board is the fraction of board members who are outsiders.[4]

These data on composition are matched with data on CEO succession. Once a year Forbes Magazine lists the name, compensation, age, background, years with the company, and years as CEO for the CEOs of each corporation on one of their lists of the 500 largest corporations

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[4] An alternative measure is the fraction of insiders on the board. This alternative measure is highly correlated with the fraction of outsiders on the board as the correlation coefficient between the two is -.833 and the rank correlation is -.823. The fraction of outsiders is used in the empirical work because of the claims in the institutional literature (see Mace (1971) and Chandler (1975)) that grey directors do not monitor management.

in one of several categories (sales, profits, etc.). I followed the identity of the CEO over a 10 year window from 1974 to 1983 for each firm in both the MacAvoy, Cantor, Dana, and Peck sample and the Forbes Magazine surveys. All CEO changes were cross-checked with the Wall Street Journal to get the exact date of the announcement of the change as well as the reason given by the company for the CEO change.[5] Finally, the data were matched to financial data from CRSP, giving a total of 367 companies.[6]

Table 1 shows the distribution of outsider representation for the year 1980. Firms are grouped according to the percentage of outsiders on the board of directors. The distribution is centered around 50 %, with few firms in the tails of the distribution. The largest concentration of firms is in the 45 - 50 % range, with 61 firms (including 30 with exactly 50 % outsiders). To distinguish the differences between the firms on the basis of outside representation on the board, I divided the sample into approximate thirds. All firms in which outsiders made up no more than 40 % of the directors were considered inside-dominated firms, all firms in which at least 60 % of

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[5] For the years 1974-76 and 1981-83, for which MacAvoy et. al. did not collect any data, the board data were taken from the nearest available year (either 1977 or 1980). This approximation does not appear to be too inaccurate because board composition changes extremely slowly over time. For example, between 1977 and 1980, only 6 % of the firms in the MacAvoy et. al. sample changed the percentage of outsiders on their board by at least 20 %. When the equations are estimated on the 1977-80 subsample, the results are similar to the those on the entire sample, although the coefficients are not estimated as precisely as they are with the entire sample.

[6] For some of the analysis, earnings data from the COMPUSTAT Industrial file was used, reducing the total number of firms to 322.

the board were outsiders were designated outside-dominated firms, and firms where between 40 % and 60 % were outsiders were considered mixed boards. According to this assignment procedure, 146 firms had mixed boards, compared to 93 inside-dominated boards and 128 outside-dominated boards.[7]

Table 2 presents the reason given in the Wall Street Journal for the CEO resignations. Retirement (138 instances) is the most common. Perhaps the most striking feature of this table is that in only 9 of the 286 resignations was performance given as a reason why the CEO was replaced. In some of these cases, it was not the firm which mentioned performance but the Wall Street Journal which cited rumors that performance was the true reason.

Yet, there is evidence that poor performance does precede CEO resignations. The findings of Coughlan and Schmidt (1985) and Warner, Watts, and Wruck (1987) both imply that poor stock performance tends to raise the probability of a resignation. The same effect exists in my data. In the four quarters preceding retirements, market-adjusted returns were on average 4.8 % lower than the average annual return from my sample. In the four quarters preceding all other resignations market-adjusted returns were 6.5 % lower than average returns. Both differences are significantly different from zero but they are not

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[7] There are many firms with exactly the same percentage of outsiders. Therefore, it was impossible to divide the sample into exactly thirds without including two firms with exactly the same fraction of outsiders into the same category. This method of dividing the sample was chosen because of its simplicity. Alternative divisions such as dividing the sample as equally as possible yield similar results.

significantly different from each other.

This suggests that companies do not announce the true reason behind their CEO's resignations. Therefore, I ignore the stated reasons for resignation in constructing my sample. I do, however, eliminate the resignations for which I am able to corroborate the cause independently. Changes in CEOs caused by death and preceding a takeover are excluded because these "resignations" are totally verifiable.[8]

One other variable which is highly correlated with the probability of a planned resignation is the age of the CEO. A nontrivial number of the resignations take effect on the CEO's sixty-fifth birthday. These resignations are likely to be actual retirements, unrelated to performance. Since the Forbes data on the age of the CEO is only accurate to within a year, all firms with CEOs aged 64, 65, or 66 were excluded.[9] Excluding these observations is likely to increase the

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[8] The 4 public scandals and the 5 instances of CEOs taking prestigious positions elsewhere might also be considered verifiable. Excluding these observations from the sample does not change the results in any meaningful way.

[9] Excluding these observations did not meaningfully affect the results when stock returns are used as the explanatory variable. However, in the logits using earnings discussed below, excluding these observations drastically affected the results. This difference is possibly caused by CEOs who have compensation plans based on earnings. These CEOs have an incentive to manipulate the intertemporal structure of earnings to maximize their compensation. This strategy only makes sense if the resignation is anticipated, so it is not likely to be a problem in the case of an unanticipated removal. For a detailed study of how management can manipulate earnings to maximize their compensation, see Healy (1985).

signal to noise ratio and ultimately the precision of the estimates.[10]

III Empirical Specification

To test whether outside boards monitor management more effectively than inside boards, and to compare the sizes of the effects across board types, I relate CEO resignations to performance measures. If a stronger relationship exists between poor performance and the probability of a CEO being replaced for outsider-dominated than for insider-dominated boards, then this would provide evidence that outsiders play a role in monitoring management. Finding the same relationship across different types of boards would imply that boards do not differ systematically in terms of monitoring management.

I test this hypothesis using logit models to estimate the probability of a CEO change.[11] The logistic approach assumes that:

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[10] A number of resignations located in Forbes were not discussed by the Wall Street Journal. These resignations were also eliminated because it is impossible to isolate the date of the resignation accurately enough from the Forbes surveys.

[11] Ordinary least squares is not an appropriate statistical technique for this problem because the dependent variable is dichotomous. For a complete description of logit, see Amemiya (1985). Logit was used instead of probit to be consistent with the previous literature (Coughlan and Schmidt (1985), Warner, Watts, and Wruck (1986)). The results are similar if probit is used instead of logit.

$$\Pr(\text{CEO leaves his job}) = F(x\beta) = \exp(x\beta)/(1+\exp(x\beta))$$

where x is a vector of variables (including a constant) which may affect the CEO's probability of losing his job, and β is a parameter vector. The distribution F is known as the logistic distribution. I use maximum likelihood to estimate the parameters. The log of the likelihood function for the logit model is given by:

$$\log L = \Sigma\, C_i * \log[F(x_i\beta)] + \Sigma\, (1-C_i) * \log[1 - F(x_i\beta)]$$

where C_i is a dummy variable which is equal to one if there is a resignation in a given firm-year.

The first performance measure used is the return on the company's stock minus the return on a value-weighted market portfolio.[12] When stock returns are used as the performance measure, the logit equations are estimated using firm-quarters as the unit of observation and the return for the year prior to the quarter in question as the performance measure. This approach was adopted to minimize the time between the

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[12] An alternative approach involves estimating market model parameters for each firm by estimating the equation:

$$R_{it} = \alpha_i + \beta_i M_t + \varepsilon_{it}$$

where R_{it} is the return on firm i, M_t is the return on a market portfolio, and α_i and β_i are the market model parameters. The residuals from this equation could be used as the performance measure. The reason this approach was not used is because if the parameters were estimated using data from several years prior to the resignation, the estimate of the α would likely be biased downwards for firms with bad CEOs. For these firms, the residuals from the market model will not reflect true CEO performance.

performance period and the potential resignation. The alternative approach of using annual data would have associated a resignation in say, November, 1982, with the performance of the stock in 1981, leaving eleven months between the measured predictive period and the event. If boards of directors do remove CEOs for poor performance, it is plausible that the time lag would be relatively short. Therefore, annual data will, in general, paint a less accurate picture of the relationship between performance and removals than quarterly data.

IV Results of the Prediction Equations

A. Using Stock Returns as the Performance Measure

The removal equations with stock returns as predictors are shown in Table 3. The first column indicates the relationship for the entire sample. The coefficient on the return variable is negative and significantly different from zero. This means that a poor stock return increases the probability of a CEO losing his job. This result replicates the results of Coughlan and Schmidt (1985) and Warner, Watts, and Wruck (1987) with an effect smaller than the former and larger than the latter. The relationship between stock return and the probability of the CEO being replaced implied in these equations is illustrated in the first column in Table 4. For the median firm in the bottom decile of stock returns, with a return 33 % lower than the market, the CEO has a 6 % chance of losing his job, while the CEO of the median firm in the top decile which outperformed the market by 70 % has a 3 % chance of losing his job. Considering that CEOs leave their jobs for many reasons, the size of this difference seems fairly large.

The second column of Table 3 examines the effect of stock returns on resignations across different board types. For the inside boards, the returns coefficient is negative, but is small and not significantly different from zero. For mixed boards the coefficient (-.20 = -.46 + .26) is even smaller in absolute value and is also not significantly different from zero. However, there is a large effect for outside boards. The coefficient (-1.63 = -.46 - 1.17) is significantly

different from zero at the 1 % level and significantly different from the coefficients on either inside or mixed boards at the 10 % level.[13]

The derivative of the probability of resignation with respect to stock returns illustrates the impact of board type. The derivative (evaluated at a return of 0.0) is -.066 for companies with outside boards, -.022 for companies with inside boards, and -.010 for companies with mixed boards. This derivative, a measure of the responsiveness of the removal decision to stock performance, is three times as large for the companies with outside boards as for any other board type. While the larger effect for inside boards than for mixed boards is unexpected, the difference between the two is not significant. The difference between the outside boards and mixed boards is significant at the 5 % level. However, the difference between outside boards and

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[13] I use one-tailed tests here and below because there are many a priori reasons why outsiders would monitor better than insiders but few why insiders would monitor better than outsiders. The hypothesis is hence a "one-tailed" hypothesis.

For the whole sample (including CEOs of all ages) the right hand side of the estimated equation was:

$$\underset{(36.4)}{-4.00} \underset{(1.38)}{- .54\ R} + \underset{(.36)}{.19\ R*D_{Mixed}} \underset{(1.19)}{- .63\ R*D_{Outside}}$$

$$+ \underset{(.93)}{.14\ D_{Mixed}} + \underset{(.25)}{.04\ D_{Outside}}$$

(t-statistics are in parentheses.) The coefficient on outside boards is still significantly different from zero but is no longer significantly different from the coefficient on inside boards.

The equations shown in Table 4 and below include dummy variables for each board type. These dummy variables make each of these equations equivalent to estimating separate equations for each board type. The equations are shown in this form to facilitate testing whether various effects differ across board types.

inside boards is not significant at conventional significance levels.[14]

The probabilities of removal implied from these logit equations for each board type are shown in Table 4. For outside boards the probabilities range from 7 % for a firm in the bottom decile to 1.3 % for a firm in the top decile. The difference between these probabilities is 5.7 %, which is significant at the 1 % confidence level. For inside boards the probabilities range from 5.7 % to 3.6 %, a difference of just 2.1 %. This difference is not significant at any conventional significance level. These implied probabilities again illustrate the monitoring effect of the outside directors.

The third column of Table 3 includes a dummy variable for whether the CEO was past retirement age. (All CEOs at retirement age were excluded from the sample.) A possible objection to the results described above is that they are just proxies for effects due to age, a variable which seems likely to have an effect on the probability of retirement. Indeed, the coefficient on this age variable is significant and does increase the probability of retirement. However, it has little effect on the estimates of the other coefficients.

The final column of Table 3 includes the returns for two years

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[14] The standard errors used here and below are calculated using the delta method (see Rao (1965)). If a parameter vector w has a variance-covariance matrix V and g is a differentiable function, then the variance-covariance matrix of g(w) is approximated asymptotically by G'VG, where G is the Jacobian matrix of g. The numbers referred to in the text as t-statistics therefore do not actually have a small-sample t distribution but are equal to the ratio of the parameter estimate and an asymptotic approximation of the standard error. Under the null hypothesis that the coefficient is equal to zero they have an asymptotic standard normal distribution.

prior to the resignation as explanatory variables. The variable "$Return_{-1}$" is the market-adjusted return for the four quarters prior to the period covered in "Return", i. e. , the return between eight and five quarters prior to the quarter of the potential resignation. The estimates indicate that resignations are not sensitive to returns from previous years. This result, together with a similar one from Warner, Watts, and Wruck, suggests that boards react relatively quickly to poor performance in their decision to replace the CEO.

B. Using Earnings as the Performance Measure

A second measure of corporate performance is accounting earnings. Despite the many problems with using earnings data as a measure of profitability (see Fisher and McGowan (1983), Solomon (1970), and Stauffer (1971)), earnings data have one large advantage over stock price data for the purposes of measuring the performance of the CEO: earnings data measure short term profits. The stock price reflects the present discounted value of the expected future cash flows of the company. The stock price incorporates the market's estimate of the probability that a bad CEO will be fired. Therefore, the stock price of firms with bad CEOs is greater than it would be if the CEOs were given a lifetime job guarantee. If a company were known to be likely to replace bad management, e. g., one with an outside dominated board of directors, then this difference becomes even larger. This argument implies that using stock price data may underestimate the effect of outsiders in their monitoring of management. Additionally, if boards

of directors base executive turnover decisions on economic profitability, then a finding that accounting earnings data can predict CEO resignations is consistent with a relation between accounting profits and economic profits (Fisher and McGowan (1983)).

As the decisions to change CEOs are likely to be related to unanticipated changes in performance, I would like to use a measure of unexpected earnings. A large literature on the time series behavior of accounting earnings (see Ball and Watts (1972) and Foster (1978)) finds thac annual earnings follow approximately a random walk. This implies that changes in earnings are an unbiased estimate of unexpected earnings.[15]

The choice of the appropriate earnings measure presents some difficulties. The measure used below is earnings before interest and taxes (EBIT)[16]. This measure was used to prevent changes in capital structures or tax treatments from obscuring differences in earnings measures of performance. The change in EBIT was standardized by the book value of the firm's assets in the previous year (A_{-1}) to control for size differences.

Finally, to control for factors affecting earnings changes in the year of CEO turnover caused by industry effects, the average

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[15] An earlier version of this paper used earnings levels normalized by asset levels as the measure of performance. The results were all qualitatively identical. Earnings changes are used here because the appropriate benchmark for measuring CEO performance would seem to be the unexpected component of earnings.

[16] This variable is constructed by adding data items 15,16, 18, and 49 on the annual COMPUSTAT industrial tape.

standardized earnings change is computed for all the firms on the COMPUSTAT industrial tape with the same 2 digit SIC code as the test firm. This average is subtracted from the standardized earnings change for the test firm. The resulting variable provides a measure of unexpected earnings which should not be sensitive to the firm's size, industry, capital structure, or tax treatment.[17]

The results from these logits are shown in Table 5. The variable $\Delta EBIT$ reflects the most recent earnings change of which the board of directors have knowledge, and $\Delta EBIT_{-1}$ and $\Delta EBIT_{-2}$ the two prior changes. In the first column, earnings changes for the three years prior are used to predict resignations for the entire sample. The only variable with a significant coefficient is $\Delta EBIT_{-1}$. A possible explanation for this follows from the fact that CEOs can manipulate earnings streams (Healy (1985), DeAngelo (1987)) and have an incentive to report high earnings before their retirement. Since a large fraction of the resignations in my sample are likely to be planned in advance, high earnings changes for these firms might offset poor earnings changes for the firms where the board of directors removes the CEO, obscuring the relationship between poor unexpected earnings for the year prior to the resignation and the probability of resignation.

The results broken down by fraction of outsiders are shown in the

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[17] Because firms have fiscal years ending in months other than December, the timing of observations presented a problem. The unit of observation was taken to be a fiscal year. Since directors presumably know earnings before they are announced publicly, resignations occurring in the month of the announcement or the month before the announcement were said to have followed the announcement.

second column for the two earnings announcements prior to the resignation. The coefficients on the performance variables for inside and mixed are not significantly different from zero. The coefficient for outsiders is negative and significantly different from zero and from the insiders coefficient at the 5 % level for $\Delta EBIT$ and at the 1% level for $\Delta EBIT_{-1}$.[18]

The implied probabilities of a CEO change, calculated from this equation, are similar to those from the returns equations. For the entire sample, the probability of resignation for a CEO with earnings changes in the bottom decile for two subsequent years is .071 in the following year. The probability of a CEO resignation in the year following two earnings changes in the top decile is .033. The difference between the two is statistically significant (t-statistic = 2.94). For the outside boards, the two probabilities are .135 and .010. Again the difference between them is statistically significant (t-statistic = 3.80). For the inside boards, the poor earnings decrease the chance of a resignation, as earnings changes in the bottom

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[18] For the whole sample (including CEOs of all ages) the right hand side of the estimated equation was:

$$\begin{array}{llll} -2.60 & + 1.83\ \Delta EBIT & - 3.71\ \Delta EBIT*D_{Mixed} & - 3.76\ \Delta EBIT*D_{Outside} \\ (20.2) & (.72) & (1.02) & (1.04) \end{array}$$

$$\begin{array}{llll} - .79\ \Delta EBIT_{-1} & + 1.94\ \Delta EBIT_{-1}*D_{Mixed} & - 7.46\ \Delta EBIT_{-1}*D_{Outside} \\ (.37) & (.67) & (2.11) \end{array}$$

$$\begin{array}{ll} + .18\ D_{Mixed} & - .12\ D_{Outside} \\ (1.06) & (.63) \end{array}$$

Using the entire sample, the coefficient on outsiders is still negative for both $\Delta EBIT$ and $\Delta EBIT_{-1}$. It is significant for $\Delta EBIT_{-1}$ but not for $\Delta EBIT$.

decile predict a .067 % chance of a resignation and earnings changes in the top decile predict a .039 chance. However, the difference between these two numbers is not statistically significant (t-statistic = 1.45). That the difference is statistically significant for the outside boards but not for the inside boards is evidence that the outsiders engage in some monitoring.

These results show that there is a relation between both stock returns and changes in earnings and the probability that a CEO will be replaced for outsider-dominated firms but not for insider-dominated firms. Yet, the accounting literature has documented a well-known relation between stock returns and earnings (see Watts and Zimmerman (1985)). A possible explanation for this result for earnings changes is that the significant coefficients on the changes in earnings just act as a proxy for the "true" relation between stock returns and CEO changes.

To test this explanation I estimate equations including both earnings changes and stock returns as explanatory variables. A significant coefficient on changes in earnings in this equation would suggest that the boards of directors base their decision to retain a CEO in part on the component of changes in earnings not contained in stock returns.[19]

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[19] The fact that the returns were computed quarterly and the earnings changes were computed on an annual basis presented a problem. The equations presented here use firm-years as the unit of observation. The returns are the market adjusted returns for the year prior to the year of the observation and the earnings changes are exactly the same as discussed above. This method was employed instead of using quarterly earnings changes because annual data is available for a

For purposes of comparison, I re-estimate the returns equation using annual data on the 322 firms with earnings data available in the third column. The results are qualitatively identical to the results presented in Table 3. The coefficients for companies with outsider-dominated boards are all negative and significantly different from zero and from the coefficient on companies with insider-dominated boards.

In the fourth column, I include both earnings changes and returns. The coefficients on earnings changes for companies with outside boards are both negative and significantly different from both zero and the coefficient for companies with inside boards. Including returns in the equation does little to the coefficients on changes in earnings. However, the coefficient on returns for outsider dominated companies is noticeably smaller when earnings changes are included. It is still significant different from zero at almost the 5 % level using a one tailed test (t-statistic = -1.65) but is no longer significantly different from the coefficient for insider dominated companies. Thus, this equation provides support for the view that boards of directors look at accounting numbers when evaluating a CEO's performance, possibly even more than at stock returns.

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larger fraction of my sample.

C. Controlling for Shareholdings

A related concern is that shareholdings rather than the number of outside directors determines the board's level of monitoring. To test this hypothesis, I use data gathered by the Corporate Data Exchange on the shareholdings of 456 Fortune 500 corporations for the year 1980.[20] Of these 456 firms, 220 are in the sample of firms used for the returns equations and 208 are in the sample used for the earnings equations. The CDE lists the shareholdings of each director with a stake larger than .2 % of the total shares and identifies the top two officers of the corporation, usually the CEO and the chairman of the board. A deficiency of these data is that they do not distinguish between outsiders and insiders except for the top two officers. Nevertheless, the CDE data do provide some insights into the relations between board shareholdings, board composition, and CEO turnover.

A first pass at the CDE data merged with the composition data yields a strong relation between shareholdings and board composition. An ordinary least squares regression tells the basic story:

$$\begin{aligned} \text{fraction of outsiders on board} = {} & .515 - .532 \underset{(39.6)\ (4.63)}{\text{stake of top 2 officers}} \\ & -.434 \underset{(2.95)}{\text{stake of rest of board}} + .00007 \underset{(.032)}{\text{assets}} \end{aligned}$$

$$R^2 = .111 \qquad \text{Number of firms} = 236$$

(t-statistics in parentheses) Even controlling for size, shareholdings by both the top two officers of the firm and the rest of the board

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[20] Many thanks go to Randall Morck, Andrei Shleifer, and Robert Vishny for providing me with their data, which are described in detail in Morck, Shleifer, and Vishny (1987).

decrease the number of outsiders on the board.[21]

The same correlation is illustrated in more detail in Table 6. The top panel gives the average stakes of the top two officers and the rest of the board. For insider-dominated companies, the top two officers owned an average of nearly 8 % of their company's stock in 1980, while for outsider-dominated companies, the top two officers owned an average of only 1.57 %. The same effect is true for the rest of the board. For insider-dominated companies, the board other than the CEO and chairman owned 5.26 % of the shares, while for outsider-dominated companies, they owned only 1.75 %. The holdings of board exclusive of the top two officers are broken down in the second panel of Table 6. The pattern is the same as in the earlier columns. Insider-dominated firms have much greater ownership by directors than do outsider-dominated firms.

The relation between the CEO's shareholdings and outsiders on the board is relatively easy to explain. The evidence presented above and in the institutional literature on boards suggests that CEO's have incentives to avoid including outsiders on the board. One explanation for this relation is that CEOs with more shares have more power in the firm and hence can keep outsiders off the board. A second argument

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[21] The stakes here are expressed as fractions, so that the equation would predict that a firm whose CEO holds 10% of the company's stock and whose board outside the CEO had negligible holdings, would be predicted to have 47.8% outsiders on the board. Hermalin and Weisbach (1987a) obtain a similar result and show that the correlation between holdings of inside directors and shareholdings may be due to the family-dominated companies, which tend to be both insider-dominated and tightly held.

follows from the Jensen and Meckling (1976) agency cost story. As a CEO's shareholdings grow as a fraction of his wealth, his interests become more aligned with the shareholder's, so agency costs diminish. Thus, there may be less need for monitoring by outside directors when the CEO has a large stake in the firm.

There are a number of explanations for the correlation between the holdings of the rest of the board and the composition of the board. One explanation is that when an outsider has a significant stake in the firm, further outside directors are not deemed necessary, because the first outsider already has significant incentives to monitor management. A second explanation is that ownership by inside directors and monitoring by outside directors are alternative mechanisms used by shareholders to control agency problems so that when they use one, they have no need for the other. Yet a third explanation is that family-dominated companies are generally both tightly held and insider-dominated. Hermalin and Weisbach (1987a) have shown for a subsample of 142 of the firms from this study that much of the relation between board ownership and composition can be explained by family directors.

Shareholdings might affect the CEO turnover process in several ways. When a CEO has more power in the firm, he is more difficult to remove. Since shareholdings are likely to be one source of a CEO's power, one might expect that a large stake in the firm would decrease the probability that a CEO is replaced. To test this hypothesis, I include the CEO's shareholding in the resignation equations.

The results from these equations are shown in the second column of

Table 7. In each case, increased shareholdings of the CEO reduces the probability that he resigns, although the reduction is not significantly different from zero. Nonetheless, including this variable into the equation does not affect the other coefficients.

Since board shareholdings are correlated with board composition, a possible objection to these results is that board composition may not be what determines monitoring levels, but that board composition simply proxies for shareholdings. Morck, Shleifer, and Vishny (1987) argue that directors will not monitor management without a significant stake in the firm. I test this hypothesis by examining whether the monitoring level depends on the shareholdings of the non-controlling directors (other than the CEO and the chairman).

I divide the sample of firms into three subsamples based on the holdings of the non-controlling directors. The first subsample has no non-controlling directors with enough shares to be listed on the CDE directory (i. e., no director has .2 % of the shares). These 64 firms will be referred to as having negligible holdings. I split the remaining firms into two categories based on whether the noncontrolling directors hold more than 2 % of stock. While 2 % is arbitrary, it seems plausible that in the 64 companies in which non-controlling boards hold more than 2 %, they may exercise some significant power over management. In the 80 companies where the shareholdings of the noncontrolling directors hold less than 2 % but enough to be listed on the CDE directory, these directors are likely to exercise much less

control over management.[22]

In the third column of Table 7, I estimate the resignation equations separating the samples by ownership level instead of by board composition. The results do not indicate that any one group engages in more monitoring than any other group. The boards with moderate levels of ownership appeared to do the most monitoring, although the difference among the groups is not statistically significant. In the analogous earnings equations (not presented), the group of firms whose boards own negligible amounts of stock seem to do the most monitoring, although the effect only appears in the lagged earnings and not in the most recent earnings change. The two equations together do not lead to any clear conclusions about the role of shareholdings in motivating boards to monitor managers.

In the fourth column of Table 7, I separate the sample both by composition group and by ownership group. The one result from these equations is that having outsiders on the board seems to have a large effect on its monitoring level. The coefficients are essentially unchanged from the original equations, shown in the first column of Table 7.[23] The same result holds for the analogous earnings equation.

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[22] There are several problems with this approach. The most obvious of these is that I am using 1980 data to measure board control for 1974 to 1983. In doing so, I am implicitly assuming that board shareholdings do not change over this 10 year period. I also am not able to separate the shareholdings held by outsiders and insiders. These equations are intended as a first pass at an important question, using the data which are available.

[23] Because of the restriction that the firm must be included in the CDE directory, these equations are estimated on a smaller sample of firms and hence have slightly different parameter estimates.

Thus, the monitoring effect of the outsider-dominated boards does not appear to be a function of the ownership of the board. Rather, it seems that the composition of the board is what drives its level of monitoring.

D. Additional Tests

One possible objection to the above results is that the CEO replacement relationship might vary systematically depending on a firm's size or industry. Since board composition is correlated with both size and industry, it is possible that the relationship discovered above is caused by board composition proxying for size or industry effects. To evaluate this interpretation, I controlled for size and industry effects in my equations. Since the results are not particularly revealing, they are not reported.

Including a measure of size in the equation has essentially no effect, either by itself or on the other variables. Since one might expect the strength of the monitoring relation to vary depending on the size of the firm, I also included terms interacting size and performance measures into the equation. These variables had no statistically or economically meaningful effect, either by themselves or on the other variables. Finally, I included dummies which were equal to one if the firm is in a certain SIC two digit industry code. All industries with at least 4 firms in them were included. Including

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Therefore, I re-estimate the basic equations in the first columns of Table 7. These estimates are the ones against which the ones in the later columns of Table 7 should be compared.

these dummies did not affect the basic result: the coefficient on outside boards was still significant at the 10 % level in each equation.

An independent way of confirming that the results represent boards of directors firing CEOs and not simply that poor stock returns and earnings tend to precede resignations in general is to consider resignations that are caused by exogenous forces. A finding that prior performance does not predict these resignations would provide support for the view that in the previous cases, poor performance does cause the resignations. I therefore estimate the logit equations on the subsample of CEOs who are 64, 65, or 66 and are highly likely to resign because of mandatory retirement. The right side of the removal equation using returns is:

$$\underset{(13.2)}{-2.51} \underset{(1.21)}{- .82\ \text{Return}} + \underset{(.76)}{.69\ \text{Return}*D_{\text{Mixed}}} + \underset{(.70)}{.57\ \text{Return}*D_{\text{Outside}}}$$

$$+ \underset{(1.04)}{.26\ D_{\text{Mixed}}} + \underset{(1.16)}{.29\ D_{\text{Outside}}}$$

(t-statistics in parentheses) The coefficient on returns for each of the groups is negative but the magnitudes are very small and none of the coefficients are significantly different from zero. The coefficient on outside boards is -.25, which is less than one sixth of -1.63, the coefficient in the equation for the CEOs not of mandatory retirement age.

E. Interpretations

The results suggest that outside boards rely more frequently on performance, at least as measured by publicly available measures, when making removal decisions. The obvious interpretation of these results is that the outside directors serve a monitoring role. However, a potential alternative explanation is that some third factor simultaneously determines which companies have outside boards and which companies have CEO turnover after poor performance.

One factor may be the amount of "power" the CEO has within the firm. Suppose some CEOs are weak, in the sense that they do not command much loyalty or control over their shareholders. Other CEOs are strong, because they do command such loyalty and control. Strong CEOs can impose their will on the director selection process, while weak CEOs cannot. Thus, we would expect that on average strong CEOs would have more insiders on their boards than weak CEOs. Similarly, strong CEOs would be less likely to be replaced following poor performance than would weak CEOs. According to this explanation, the relationship between the composition of the board and the correlation between poor performance and CEO turnover is spurious; both are actually caused by a third factor, the amount of power the CEO has within the firm.

This explanation, though, has an additional prediction which we can test. Suppose that strong CEOs only leave office when they retire voluntarily and weak CEOs leave office both when they are fired and they resign voluntarily. If there are no systematic differences

between the times when strong and weak CEOs choose to resign voluntarily, then we would expect to see strong CEOs remain CEO longer than weak CEOs. Thus, this differential power hypothesis predicts that the CEOs who resign with insider-dominated boards will have longer tenures than those who resign with outsider-dominated boards.

The data, however, do not confirm this prediction. The average tenure of CEOs who resign from insider-dominated boards is 11.7 years, while the average tenure of CEOs who resign from outsider-dominated boards is 9.7 years. This difference is not significantly different from zero (t-statistic = 1.50). Moreover, it is driven by a few outliers. The median tenure of CEOs who resign from outsider-dominated firms is actually longer than it is for insider-dominated firms; the median tenure is 9 years for outsider-dominated firms and 7.5 years for insider-dominated firms. The fact that there does not appear to be a systematic difference in the tenure of CEOs who resign between the two types of firms casts doubt on the hypothesis that the results are caused by some unobservable factor related to the power of the CEO within the firm.

Nevertheless, the question of how board composition is determined, and whether it is jointly endogenous with CEO removals, remains. The results can be plausibly explained by the following story: following poor performance, firms' first respond by adding outsiders to the board. If poor performance continues, these outsiders remove the CEO. If the two stages are approximately contemporaneous, and the unobserved forces which determine board composition are correlated with the ones

which determine CEO removal, then the coefficient estimates in the CEO removal equations would be biased and inconsistent.

Indeed, preliminary results from Hermalin and Weisbach (1987a) suggest that firms do add outsiders to their boards following poor performance. However, the effect is small -- a firm with earnings changes in the bottom decile is predicted to increase the fraction of outsiders on its board by less than 1 %. The effect of poor stock returns is similar. Since the change in board composition following poor performance is relatively small, and board composition changes very slowly over time, it is unlikely that the potential endogeneity of the board composition is a serious problem.

An interesting fact is that there is there is no significant difference in the overall number of resignations between board types. If anything, inside boards are more likely to remove CEOs than outside boards. The average probability of removal for an insider-dominated firm is about 5 % annually and is approximately 4 % for an outsider-dominated firm. This fact, together with the results above, suggests that inside boards have reasons for replacing their CEOs unrelated to publicly available performance measures such as stock returns or earnings. Another explanation is that inside boards have better information about true performance than is reflected in publicly available measures. Yet a third explanation is that outside board members tend to be short-sighted and remove managers following one bad year, ignoring the fact that the manager may in fact be maximizing the long-term value of the firm. I will now test these various

explanations.

V. Analysis of Share Price Movements

A. Measuring Price Responses to Announcement of Resignations

If the CEOs who are removed are in fact poor performers, then firm value should increase when the decision to remove them is made. Event studies are the traditional way to test hypotheses of this type.[24] This event study estimates the market model parameters α_i and β_i for each firm using daily data occurring both more than 120 trading days before and 60 days following the resignation by running the following regression:

$$R_{ij} = \alpha_i + \beta_i M_j + \varepsilon_{ij}$$

where R_{ij} is the return of firm i's stock on day j and M_j is the return of a value weighted market index on day j. The residuals from this predicted equation are computed on the days immediately surrounding the announcement of the resignation in the Wall Street Journal.[25] These

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[24] The event study methodology was developed by Fama, Fisher, Jensen and Roll (1969). The particular implementation adopted here follows Ruback (1982).

[25] For several of the firms, it was possible to isolate the month of the announcement but not the exact date. Usually, for these firms, there is an article describing the transition of power saying something like "Joseph Jones today replaced William Smith who announced last August he would step down in December as chief executive officer of XYZ Corporation." However, there was no article discussing the announcement in August. It was therefore possible to include the

residuals measure the percentage change in the expected future profits of the firm. A positive residual indicates that there has been good news about the firm's prospects unrelated to market factors. The cumulative abnormal residuals are computed for several "event windows" and a test is performed to see whether their average across firms is significantly different from zero. This procedure tests whether the news about the sample firms conveyed to the market on the event day is on average good news, or bad news. Through the estimation of the α_i and the β_i it controls for both systematic (market-related) risk and any possible anomalies such as the size effect (Banz (1981)).

The results of the event study are presented in Table 8. The excess returns are shown for several different event windows and broken down by board type and age of CEO. The excess returns are always positive and sometimes significantly different from zero. This result is different from Warner, Watts, and Wruck's (1987) finding that the mean of the excess returns was very close to zero. The entire sample, and the entire sample excluding CEOs at mandatory retirement age, are shown in the first two lines. The excess returns are positive and significantly different from zero for the three day window from the day before the announcement to the day after the announcement. The excess returns were larger for cases where the CEO was not of retirement age. This suggests that more news is revealed by these resignations, which is reasonable since retirements of 65 year old CEOs tend to be anticipated.

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change in the prediction equations but not in the event study.

The residuals are broken down by board composition in rows 3 through 8. Outside boards are shown in lines 3 and 4, mixed boards in lines 5 and 6, while inside boards are shown in lines 7 and 8. The effects are positive for outside and mixed boards and close to zero for inside boards. The positive residuals for the outside boards are consistent with the hypothesis that outside boards improve firm value through their replacement of bad management. The positive residuals for the mixed boards are consistent with the argument discussed above that mixed boards allow both better training for future CEOs and better observation by outside directors of future CEO candidates. However, the difference between the residuals of different board types is not significantly different from zero. Thus, it is impossible to conclude that outsiders add more to firm value than insiders do through their removal decisions.[26]

The excess returns from the market model provide weak evidence that outside and mixed boards increase their firms' values when they replace a CEO. This increase does not seem to be present for inside boards. These results are consistent with the hypothesis that outside boards engage in monitoring which improves firm value. The improvement for mixed boards is consistent with the argument that a combined board

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[26] This argument presumes that the market is correctly valuing the firm prior to the resignation. Warner, Watts, and Wruck (1987) argue that if the market only has noisy information about firm value, the resignation of the CEO may signal that the CEO and hence the firm have been performing poorly. This signalling effect may cause a stock price to drop following a resignation even though the resignation increases firm value. Hence, the event study may not be the appropriate way to investigate whether CEO removals increase firm value.

facilitates the evaluation of CEO candidates by the outsiders. The next section provides a test of these explanations.

B. Explaining the Share Price Responses

The final test evaluates whether the event day residuals can be explained by the prior performance measures. If boards improve firm value by replacing bad CEOs, then there should be a relationship between the quality of the CEO and the change in firm value when he is replaced. If the performance measures are correlated with the quality of the CEO and all replacements for the CEO are expected to be of roughly the same quality, then the change in the value of the firm surrounding the event day will be correlated with the performance measure. The test measures whether the cases where the board replaces bad management are those cases where there is an improvement in firm value when the change is announced. A finding that there is a relation between prior performance and the event day residual for outsider-dominated firms but not for insider-dominated firms would provide additional confirmation for the results discussed above.

The test is performed by regressing the cumulative excess returns from the day before the Wall Street Journal announcement until the day following it on the stock returns for the four quarters prior to the resignation.[27] The estimated equation is:

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[27] An earlier version of this paper also included analogous tests using changes in earnings with similar results.

For this test, it is not appropriate to use the residuals from the estimated market model as the measure of performance. If the market

$$\text{Excess Return} = \underset{(.13)}{-0.0010} + \underset{(1.66)}{.0343} * \text{Return} - \underset{(1.97)}{.0555}\ \text{Return}*D_{Mixed}$$

$$- \underset{(3.10)}{.0924}\ \text{Return}*D_{Outside} + \underset{(1.24)}{.0099}\ D_{Mixed} + \underset{(.10)}{.0009}\ D_{Outside}$$

$R^2 = .0776$ Number of Observations = 153

(t-statistics in parentheses). The relation between prior performance and the excess return surrounding the announcement of the CEO resignations is strongest for the companies with outside boards. The coefficient is significantly different from the inside boards at the 1 % level and from zero at the 5 % level. This implies that for outside boards, it is exactly when the resignation is preceded by poor performance that firm value rises the most around the day of the announcement of the resignation. No similar relation is true between prior performance and event day performance for companies with insider-dominated or mixed boards. The fact that the coefficient on the returns for mixed boards is not significantly different from zero is consistent with the story that the excess returns for the mixed boards are caused by good succession choices and not by throwing out bad CEOs.

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model residuals are used, then those firms with negative returns prior to the resignation will be precisely those firms with low estimated values of the intercept term. Therefore, even though all the firms may perform about the same around the event day, it would seem as there is a relation between prior performance and event day performance. This relation would be spurious, due to the estimation process and not to any decisions made by the boards of directors. For this reason the measure of excess return used for this test is the return on the stock minus the return on the market portfolio. In fact, the results are stronger if market model residuals are used because of this spurious effect.

VI Conclusions

The main result of this paper is that performance measures are more highly correlated with CEO turnover for firms in which outsiders dominate the board of directors than for firms in which insiders dominate. Outsider-dominated boards tend to add to firm value through their CEO changes. This addition to firm value is largest when the change is preceded by poor performance. No similar results hold for insider-dominated boards. Furthermore, these results do not appear to be caused by differences in the ownership structure of the firm, the size of the firm, or the industry of the firm.

A future project (Hermalin and Weisbach (1987b)) will be to relate the control structure of the firm to profitability. The results presented above suggest that outside directors are better than inside directors at removing badly performing CEOs. Yet, boards of directors perform many different duties within the firm. An important question concerns whether outside directors increase the overall profitability of the firm. We will attempt to address this question using longitudinal data.

While the results discussed above are for CEO removals, there are many other ways in which outside directors can control the CEO's actions. One way is the choice of accounting policies. The board of directors has the final decision over the amount of discretion the CEO can take in manipulating accounting numbers, in particular the accruals, to maximize their compensation (Healy (1985)). An interesting research project would test whether the ability of CEOs to

manipulate accruals differs systematically depending on the board type. Similar projects could test agency cost explanations of dividends (Easterbrook (1984)) and capital structure (Myers (1984)).

Table 1

The Frequency of Outsider Representation on the Boards of 367 NYSE Firms in 1980

Proportion of Directors who are Outsiders[a]	Number of Firms
0 -- 5 %	1
5 -- 10 %	2
10 -- 15 %	6
15 -- 20 %	7
20 -- 25 %	11
25 -- 30 %	9
30 -- 35 %	23
35 -- 40 %	34
40 -- 45 %	37
45 -- 50 %	61
50 -- 55 %	18
55 -- 60 %	40
60 -- 65 %	26
65 -- 70 %	32
70 -- 75 %	28
75 -- 80 %	20
80 -- 85 %	7
85 -- 90 %	5
90 -- 100 %	0
Total	367

[a]The ranges are inclusive of the upper bound. For example, the 30 firms with exactly 50 % outsiders are included in the 45 -- 50 % group rather than the 50 -- 55 % group.

Table 2

The Principal Reason Given by the Wall Street Journal for CEO Resignations

Sample: 367 NYSE firms between 1974 and 1983.

Reason	Number of Resignations
Retirement	138
Personal Reasons	17
Death	12
Normal Succession Procedure	11
Illness	9
Performance Mentioned	9
Policy or Personality Disagreement	8
Take Prestigious Appointment Elsewhere	5
Followed by Takeover	4
Scandal	4
Company Policy to Retire at 60	3
Merger	2
CEO Purchased a Subsidiary and will Run it	1
No Reason Given	63
Total	286

Table 3

Logit Equations Predicting CEO Turnover using Stock Returns[a]

Sample: 12997 firm-quarters between 1974 and 1983
(CEOs must be either younger than 64 or older than 66)

Asymptotic t-statistics are in parentheses.

Variable	Coeff.	Coeff.	Coeff.	Coeff.
Constant	-4.39 (54.9)	-4.39 (31.4)	-4.60 (28.8)	-4.60 (28.8)
D_{Mixed}[b]	----	.13 (.68)	.22 (1.15)	.23 (1.15)
$D_{Outside}$[c]	----	-.18 (.86)	.03 (.13)	-.03 (.14)
Return[d]	-.64 (2.28)	-.46 (.92)	-.44 (.88)	-.45 (.87)
Return * D_{Mixed}	----	.26 (.39)	.19 (.28)	.20 (.29)
Return * $D_{Outside}$	----	-1.17 (1.60)	-1.11 (1.52)	-1.07 (1.43)
$Return_{-1}$	----	----	----	-.10 (.20)
$Return_{-1}$ * D_{Mixed}	----	----	----	-.08 (.11)
$Return_{-1}$ * $D_{Outside}$	----	----	----	-.44 (.71)
Dummy if Age > 66	----	----	1.28 (5.82)	1.29 (5.61)
Log Likelihood	-846.76	-843.76	-830.88	-830.45

[a]The dependent variable is equal to 1 if there was a CEO change in a given quarter and 0 otherwise.

[b]D_{Mixed} is a dummy variables which is 1 if the company's board contains between 40 and 60 percent outsiders.

[c]$D_{Outside}$ is a dummy variables which is 1 if the company's board contains at least 60 percent outsiders.

[d]The variable "Return" is the return on a company's stock minus the return on a value weighted market portfolio in the four quarters prior to the period.

Table 4

Implied Annual Probability of Resignation by Market-Adjusted Stock Return Decile and Outsider Representation on the Board for 367 NYSE Firms from 1974-83[a]

Decile	Return - Market[c]	Implied Probability of Resignation (Standard Error[b]) Entire Sample[d]	Percentage Outsiders on Board ≤ 40 %[e]	> 40 %, < 60 %[f]	≥ 60 %[g]
1	-.331	.061 (.0073)	.057 (.0128)	.052 (.0105)	.070 (.0141)
2	-.204	.056 (.0054)	.054 (.0097)	.051 (.0082)	.057 (.0094)
3	-.125	.053 (.0046)	.052 (.0082)	.050 (.0071)	.050 (.0076)
4	-.065	.051 (.0042)	.050 (.0075)	.050 (.0065)	.045 (.0068)
5	-.005	.049 (.0039)	.049 (.0070)	.049 (.0061)	.041 (.0063)
6	.057	.047 (.0038)	.048 (.0068)	.048 (.0060)	.037 (.0061)
7	.117	.045 (.0039)	.046 (.0070)	.048 (.0062)	.034 (.0060)
8	.207	.043 (.0042)	.045 (.0076)	.047 (.0068)	.029 (.0060)
9	.371	.038 (.0050)	.041 (.0094)	.046 (.0088)	.022 (.0061)
10	.708	.031 (.0064)	.036 (.0132)	.042 (.0136)	.013 (.0056)

(Continued on Next Page)

Table 4 (Continued)

[a]Implied probabilities are obtained from logit equations which predict the probability of a CEO resignation in a given quarter using the market-adjusted returns for the four previous quarters as the independent variable. The probabilities are then multiplied by four to approximate annual probabilities.

[b]The standard errors are computed using the delta method (Rao (1965)).

[c]The "Return vs. Market" variable is the return on the company's stock for the median stock in a given decile of the firms ranked in terms of stock returns minus a value weighted market index.

[d]Estimated model:
ln(odds of resignation) = -4.39 - .64 (market-adjusted return).

[e]Estimated model:
ln(odds of resignation) = -4.39 - .46 (market-adjusted return).

[f]Estimated model:
ln(odds of resignation) = -4.26 - .20 (market-adjusted return).

[g]Estimated model:
ln(odds of resignation) = -4.57 - 1.63 (market-adjusted return).

Table 5

Logit Equations Predicting CEO Turnover[a] using Earnings Changes and Stock Returns

Sample: 2823 firm-years between 1974 and 1983
(CEOs must be either younger than 64 or older than 66)

Asymptotic t-statistics are in parentheses.

Variable	Coeff.	Coeff.	Coeff.	Coeff.
Constant	-3.02 (31.6)	-2.92 (18.9)	-2.91 (18.9)	-2.89 (18.6)
D_{Mixed}[b]	-----	-.05 (.22)	-.01 (.05)	-.10 (.43)
$D_{Outside}$[c]	-----	-.63 (2.31)	-.16 (.70)	-.62 (2.24)
$\Delta EBIT$[d]	-.33 (.17)	3.04 (1.03)	-----	4.18 (1.39)
$\Delta EBIT * D_{Mixed}$	-----	-3.95 (.90)	-----	-5.53 (1.22)
$\Delta EBIT * D_{Outside}$	-----	-10.08 (2.29)	-----	-9.38 (2.04)
$\Delta EBIT_{-1}$	-5.23 (3.49)	.58 (.26)	-----	.63 (.27)
$\Delta EBIT_{-1} * D_{Mixed}$	-----	-4.81 (1.41)	-----	-4.82 (1.39)
$\Delta EBIT_{-1} * D_{Outside}$	-----	-14.52 (3.73)	-----	-13.87 (3.29)
Return[e]	-.35 (1.29)	-----	-.29 (.73)	-.44 (1.05)
Return * D_{Mixed}	-----	-----	.57 (.97)	.75 (1.21)
Return * $D_{Outside}$	-----	-----	-1.38 (1.91)	-.72 (.86)
Log Likelihood	-554.85	-547.17	-555.31	-544.39

(Continued on Next Page)

Table 5 (Continued)

[a]The dependent variable is equal to 1 if there was a CEO change in a given year and 0 otherwise.

[b]D_{Mixed} is a dummy variables which is 1 if the company's board contains between 40 and 60 percent outsiders.

[c]$D_{Outside}$ is a dummy variables which is 1 if the company's board contains at least 60 percent outsiders.

[d]The variable ΔEBIT is the company's change in the earnings before interest and taxes weighted by the book value of assets in the most recent fiscal year prior to the potential resignation. This variable is adjusted for industry effects by subtracting from it the mean for all the firms on COMPUSTAT in the same two digit SIC code.

[e]The variable "Return" is the return on a company's stock minus the return on a value weighted market portfolio in the four quarters prior to the period.

Table 6

The Association between Board Composition and Board Shareholdings for 208 NYSE Corporations in 1980.n 1980.

A. Average Holdings by Board Type (%)

	Board Type			Entire Sample
	Inside[a]	Mixed[b]	Outside[c]	
Chairman & President	7.98	2.32	1.57	3.71
Rest of Board	5.26	2.39	1.75	3.01

B. The Distribution of Board Stakes by Board Type

Board Type	Num. of Firms	Number of Firms with Stake of Board (excluding the stake of Chair & President)			
		< .2%	≥.2%,< 2%	≥ 2%,< 20%	≥20%
Inside	60	12	18	25	5
Mixed	80	31	30	16	3
Outside	68	21	32	14	1
Entire Sample	208	64	80	55	9

[a]Inside boards have no more than 40 percent outsiders.

[b]Mixed boards have between 40 and 60 percent outsiders.

[c]Outside boards have at least 60 percent outsiders.

Table 7

Logit Equations Predicting CEO Turnover using Stock Returns and Management Shareholdings[a]

Sample: 8862 firm-quarters between 1974 and 1983
(CEOs must be either younger than 64 or older than 66)

Asymptotic t-statistics are in parentheses.

Variable	Coeff.	Coeff.	Coeff.	Coeff.
Constant	-4.34 (25.5)	-4.25 (23.6)	-4.19 (26.2)	-4.14 (20.7)
D_{Mixed}[b]	.03 (.10)	-.03 (.13)	-----	.02 (.09)
$D_{Outside}$[c]	-.18 (.72)	-.24 (.92)	-----	-.19 (.70)
Return[d]	-.15 (.26)	-.15 (.26)	-.59 (1.00)	-.10 (.14)
Return * D_{Mixed}	-.48 (.59)	-.45 (.55)	-----	-.53 (.64)
Return * $D_{Outside}$	-2.09 (2.32)	-2.08 (2.28)	-----	-2.10 (2.19)
Stake of CEO	-----	-1.28 (1.11)	-----	-1.04 (.84)
D_{Shnil}[e]	-----	-----	-.22 (.96)	-.20 (.83)
D_{Sh02}[f]	-----	-----	-.32 (1.39)	-.29 (1.16)
Return * D_{Shnil}	-----	-----	.38 (.45)	.78 (.88)
Return * D_{Sh02}	-----	-----	-1.08 (1.27)	-.68 (.75)
Log Likelihood	-586.49	-585.84	-587.04	-583.88

(Continued on Next Page)

Table 7 (Continued)

[a]The dependent variable is equal to 1 if there was a CEO change in a given year and 0 otherwise.

[b]D_{Mixed} is a dummy variables which is 1 if the company's board contains between 40 and 60 percent outsiders.

[c]$D_{Outside}$ is a dummy variables which is 1 if the company's board contains at least 60 percent outsiders.

[d]The variable "Return" is the return on a company's stock minus the return on a value weighted market portfolio in the four quarters prior to the period.

[e]D_{Shnil} is a dummy variable which is 1 if the directors collectively own less than .2 % of the company's stock.

[f]D_{Sh02} is a dummy variable which is 1 if the directors collectively own between .2 % and 2 % of the company's stock.

Table 8

Excess Returns Around the Date of the Announcement of CEO Resignations

Day 0 is the Wall Street Journal Announcement Date
t-statistics are in Parentheses
367 NYSE Firms, 1974-83

Board Types	Age Restrictions	Event Window 0 to 0	-1 to 0	to 1	-1 to 1	-3 to 3	Number of Resignations
All	None	.0016 (1.41)	.0028 (1.77)	.0022 (1.39)	.0035 (1.77)	.0027 (0.89)	259
All	Age < 64 or Age > 66	.0017 (1.30)	.0034 (1.79)	.0037 (1.93)	.0054 (2.29)	.0039 (1.07)	153
Outside[a]	None	.0049 (2.11)	.0037 (1.09)	.0062 (1.81)	.0050 (1.19)	.0060 (0.91)	83
Outside	Age < 64 or Age > 66	.0045 (1.55)	.0006 (0.15)	.0105 (2.50)	.0066 (1.28)	.0080 (1.01)	44
Mixed[b]	None	.0007 (0.40)	.0043 (1.77)	-.0002 (-0.10)	.0033 (1.13)	.0011 (0.25)	101
Mixed	Age < 64 or Age > 66	.0015 (0.77)	.0087 (2.82)	.0002 (0.06)	.0072 (1.90)	.0021 (0.35)	62
Inside[c]	None	-.0009 (-0.50)	-.0001 (-0.57)	.0012 (0.55)	.0019 (0.79)	.0011 (0.35)	75
Inside	Age < 64 or Age > 66	-.0007 (-0.28)	-.0010 (-0.28)	.0019 (0.58)	.0016 (0.41)	.0022 (0.37)	47

[a]Outside boards have at least 60 percent outsiders. Of 367 firms in the sample, 128 have outside boards.

[b]Mixed boards have between 40 and 60 percent outsiders. Of 367 firms in the sample, 146 have outside boards.

[c]Inside boards have no more than 40 percent outsiders. Of 367 firms

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Chapter 2

The Determinants of Board Composition

(with Benjamin E. Hermalin)

Boards of directors have recently attracted a good amount of attention from the legal, business, and economics community.[28] This attention has been focused on what boards do, how their composition affects what they do, and what should be done to improve their effectiveness. What has been ignored, though, is how boards get to be the way they are: the composition of the board has often been treated as given. The questions of how board members are selected and how the composition of the board is determined have been left largely unanswered. Our goal is to answer such questions empirically.

Understanding how board composition gets determined is crucial to understanding corporate organization, particularly corporate governance: who selects the board and what determines composition will in turn determine the roles the board can play and how effectively it can play them. Furthermore, without understanding the current method for determining board composition, it is difficult to evaluate properly proposed reforms, such as those put forth by the ALI (1982) or Dunn (1987).

Most work on boards (e.g. Baysinger and Butler (1985), Brickley and James (1987), Brickley and Van Drunen (1987)) has concentrated on the monitoring and control roles played by boards: boards should remove incompetent management, while preventing competent management from pursuing objectives at odds with the interests of shareholders.

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[28] ALI (1982), MacAvoy et. al. (1983), Business Week, Sept. 8, 1986, Brickley and Van Drunen (1987), and Weisbach (1987) are some examples.

We instead focus on the role which boards play in facilitating a successful CEO succession process. We argue that having insiders on the board may be part of the CEO succession process and we find empirical evidence consistent with this view.

To the extent previous work has worried about who chooses the board, it has tended to assume that the board is chosen to benefit shareholders, either directly by the shareholders or by the forces of economic Darwinism (companies whose boards were not chosen to the benefit of shareholders would not survive)(Fama and Jensen (1983)). We instead assume that it is the CEO and his objectives which determine who sits on the board. While in principle the shareholders have the right to choose the board, in practice, the CEO generally makes those decisions (Mace (1971), Vancil (1987)). We model the factors which lead the CEO to add (remove) insiders to (from) the board and which factors will lead him to add (remove) outsiders. We then test these predictions.

The three factors on which we concentrate are firm performance, CEO tenure, and changes in the structure of the firm. Following poor performance, CEOs may clean house. Those insider directors held responsible for the poor performance may be asked to resign. CEOs may also respond to poor performance by adding outside directors who can assist in solving their firm's problems. Thus, we would expect to see firms which perform poorly to fire insiders and hire outsiders.

After a new CEO is selected, we expect that a number of insiders, losing candidates to become the new CEO, will leave the board. This

will increase the proportion of outsiders on the board. Also young CEOs need more advice than their more experienced counterparts. Consequently, they may prefer to add outsiders rather than insiders to their boards during their first years as CEO.

Towards the end of the CEO life-cycle, CEO succession becomes a crucial duty of the CEO. He will often put a number of insiders on the board to "groom" them as candidates to be the next CEO (Vancil (1987)). Therefore, we would expect to see the composition of the board change over the CEO life-cycle: boards should become more outsider-dominated in the early years of a CEO's tenure and more insider-dominated toward the end of his tenure.

When firms enter or leave markets, we expect them to change the structure of their organization. When they leave a market, the insider responsible for that market is no longer needed on the board. Consequently, we expect him to be replaced, possibly by an outsider. Similarly, when the firm enters a new market, a representative from the responsible division may join the board. Thus, we might expect board structure to change around the times that firms move in and out of new markets.

In this paper, we test the hypotheses that corporate performance, CEO tenure, and industry structure affect who gets chosen as a director. The results suggest that outside directors are added and inside directors leave when there is a new CEO, when firms are performing poorly, and when firms move out of industries. These results are consistent with a model of director choice in which the CEO

chooses the board and in which the board plays a positive role in the CEO succession process.

In Section I, we develop the hypotheses to be tested. Section II describes our data set. Section III presents the empirical results. Section IV discusses potential explanations for these results. There is a brief conclusion which discusses possible directions for future research.

I. Theory

Who determines the composition of the board of directors? The CEO? The board? The shareholders? All are possibilities. Large shareholders may force themselves onto the board or otherwise influence who sits on it. Through the proxy process, all shareholders vote to approve management's slate of director candidates. The current board also plays a role in determining its future make-up. By resigning, a director can affect the immediate composition of the board and his replacement must be approved by the remaining directors. The board must also approve management's slate of director candidates.

Yet, for the majority of cases, it is the CEO and other top management who play the largest role in determining board composition. Evidence from both academic and business sources (e.g. Mace (1971), Vancil (1987)) suggests that the CEO is free to choose the board which best suits his objectives, his choice is rubber-stamped by the current board, and approved by complacent shareholders. Therefore, a suitable model for analyzing the determinants of board composition should have the CEO in the role of central decision-maker. Shareholders and the board should be relegated to more passive roles; essentially their right of veto serves as a (possibly non-binding) constraint on who or what composition the CEO can choose for the board.

In choosing the board, the CEO will seek to advance his interests. Some of his interests, such as developing a reputation as a good manager (Fama (1980)), are consistent with profit maximization, while others, such as avoiding an interfering and independent board, may not

be. Almost surely some of his interests are to retain his job and to be free to pursue whatever course of action he sees fit. Such interests are likely to lead the CEO to choose a board friendly to him, i. e., a board which is unlikely to interfere and which would fire him only in the most extreme emergency, if at all. Consequently, choosing a board which will play an effective monitoring and control role is not likely to be a concern of the CEO. Therefore we have chosen to focus on other concerns of the CEO which might affect how he determines board composition.

There is evidence (see Vancil (1987)) that a major concern of the CEO, particularly toward the end of his tenure, is the choice of his successor. Both the business press and some academic work (Mace (1971), Vancil (1987)) suggest that the insiders are added to the board largely to give them exposure to a variety of corporate issues and more visibility to the other board members. Broader exposure, seeing and evaluating the work and problems of other divisions, is valuable experience for a potential CEO. Being exposed to the other members of the board will help them evaluate the candidate as a future CEO. So, through his choice of inside directors, the CEO facilitates a successful succession process. Although some boards have only two insiders, the CEO and his "heir apparent", many boards include a number of "CEO candidates", who engage in a beneficial rivalry for the top job (or to be anointed heir apparent).[29] In this section, we focus on the

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[29] The horse race among seven candidates, three of whom were added to the board, at General Electric to determine Reg Jones' successor is an example of this (Vancil (1987)).

link between board selection and the CEO succession process.

Of course we are abstracting away somewhat from other motives behind the CEO's choice of board composition. For example, the CEO may choose outside directors who will give good advice and counsel, who can bring valuable experience and expertise to the board, and who offer a contrast to the perspectives and opinions found within the firm. The CEO may use his choice of inside directors to enhance monitoring of subordinates or to reward valuable personnel.

The link between the board and the CEO succession process generates a number of hypotheses. First, toward the end of his tenure, the CEO should tend to add insiders, in order to facilitate his succession. Also, insiders who feel they have little chance to become the next CEO may leave the company.[30] At the beginning of his tenure a number of insiders, losing candidates to become the new CEO, will leave, since they will not have another chance to become CEO for quite awhile. Since the new CEO is not ready or, perhaps, even able to begin his own succession process, he is not likely to replace the departed insiders with other insiders. Also the new CEO may wish to fill the board vacancies with outsiders who can offer good advice and counsel as he begins this particularly demanding job.

A second hypothesis involves corporate performance: poor corporate performance can be an indication that someone in management

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[30] One example if this may be the departure of two of three executive vice-presidents of Allied Chemical following John Connor's rejection of the outgoing CEO's recommendation to make one of them COO and heir apparent. (Vancil (1987)).

is not doing his job well. If this person is on the board and he is fired for this bad job, we would expect to see poor corporate performance leading to resignations of insiders.[31] The insider's immediate successor on the board may or may not be an insider. At least to the extent that poor performance indicates a need for a fresh perspective and outside expertise, a board vacancy following poor performance may be more likely to be filled by an outsider than an insider.

Finally, the model suggests that if a firm exits a market, the insider who was in charge of that market will lose his job, or otherwise be demoted from the board. Therefore, there should be a positive correlation between reduction in the number of markets in which the firm operates and the number of insiders who leave the board. When a firm enters a market, an old insider may be given this responsibility in addition to his other responsibilities, or, if a new person takes charge, he may not be considered a potential CEO or his CEO potential is still to be determined. Consequently, entering a market will be only slightly correlated with the addition of insiders to the board.

So far we have focused on insiders and ignored outsiders. However, such a focus may be justified. When an insider leaves the

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[31] It is almost impossible to distinguish between firings and voluntary resignations. Corporations rarely announce publicly that they are firing top executives. Instead, they typically invent a face-saving explanation for the executive which is indistinguishable from a voluntary resignation to the econometrician. (See Weisbach (1987), Warner, Watts and Wruck (1987), or Vancil (1987) for evidence.)

board, it is generally because he has left the company. This creates a vacancy both in the company's hierarchy and on the board. The person who fills the vacancy in the hierarchy, generally is not immediately placed on the board. First, this person may, or may not, be a potential CEO. If not, then he is unlikely ever to be selected by the CEO for a board seat. Second, the current CEO may wish or need to observe this person before deciding whether he is potential CEO material (see Vancil (1987) for examples). Hence when an insider leaves the board, the CEO's choices for a replacement may be limited to outsiders.

However, this discussion should not be interpreted as saying that outsiders only get on the board when there is no qualified insider. First, we are talking about vacancies created by the departure of insiders. Second, as we have noted, there may be reasons for the CEO to want outsiders on the board. Finally, the current CEO may find the succession process in disarray, leading him to bring in someone from outside the firm as a potential successor.[32]

This view of board selection should be contrasted with the model generated by the principal-agent framework. Under that framework, the board is generally considered to play a monitoring and disciplinary role: the board reduces agency costs by making sure management's actions are in the best interests of the shareholders, by detecting and replacing incompetent management, and by deterring management from poor

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[32] The succession of Hicks Waldron to the CEO position at Avon is an example of this (Vancil (1987)).

actions through threats of punishment (see, for a more detailed discussion, Fama and Jensen (1983)). Although the principal-agent framework does not contain an explicit model of board selection, implicitly it assumes a) that the board will consist of individuals competent to play a monitoring/disciplinary role (in the nomenclature of Fama and Jensen (1983) "experts in decision control") and b) the principals (the shareholders) choose such a board to protect their interests against poor or self-serving actions by the agent (the CEO).

Assumption b) just says that the people who have interests at stake should pick the monitors who protect their interests. Although a logical assumption in the principal-agent framework, this assumption is at odds with the facts on how the board selection process operates. Furthermore, if the principal-agent framework is expanded to incorporate the notion of a free-rider or collective-action problem among the shareholders (see, for example (in somewhat different contexts) Grossman and Hart (1980) or Ruback (1987)), it is not clear how the shareholders coordinate in choosing the board.[33]

Before concluding this section, we need to reconcile the idea of the CEO controlling the board selection process with the fact that boards do, on occasion, fire the CEO and the fact that outsiders seem to play an important role in that process. Why would the CEO ever choose a board which might be hostile to him? Although we have no definite theory, we do have some ideas. First, the selection of an

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[33] Assumption a) might also be questionable. If it is true, then why do we see so many boards which are insider-dominated, or why aren't all boards overwhelming outsider-dominated?

independent board, is a way for the CEO to signal information to the market: for example, if the CEO knows of a good project to undertake for which he needs outside financing, selecting an independent board might be a way for the CEO to signal his confidence in the project; because should the project fail, the board might fire him.

Another explanation is that outsiders wish to maintain reputations as experts in decision control, so they will remove the CEO if he performs poorly.[34] This view has recently received support from two empirical studies. Kaplan and Reishus (1987) suggest that a reputation as a good manager does help CEOs get outside directorships. They show that CEOs whose reputations suffer when their firms reduce dividends are less likely to receive outside directorships than a control sample of CEOs. Weisbach (1987) shows there is a relation between poor firm performance and CEO resignations for firms with outsider-dominated boards but not for firms with insider-dominated boards. His result suggests that outsiders play a role in the CEO removal process.

Such a role may, however, be interrelated with the "natural" CEO life-cycle and succession process. When the CEO is just starting, the board, who was largely selected by the CEO's predecessor, will monitor him closely to make sure it made the right choice. Vancil (1987) reports that the outgoing CEO often stays on the board a year, or two, after stepping down, and, if he is dissatisfied with the way his successor is performing, he will lead the board in removing his

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[34] Of course, outside directors might wish to develop a reputation for not rocking the boat, so that they will get chosen to serve on many boards.

successor. To the extent that the other insiders are part of the new CEO's management team, they are unlikely to play a big role in such a "coup", and therefore such "coups" require the presence of outsiders to carry them through.

II. Data

This section is divided into two parts. Part A discusses the data: where it comes from, how it was constructed, and what the variables are. Part B provides some descriptive statistics concerning the data. Part B also contains a brief cross-sectional analysis of board composition.

A. An Overview of the Variables

To investigate the factors determining board composition we assembled a database on the boards of directors for a sample of NYSE companies. We started with the 322 firms used by Weisbach (1987), all of which had data available on both earnings (from annual COMPUSTAT) and stock returns (from CRSP).[35] The rationale for beginning with this data set was that it contains very detailed information about CEOs for a number of years in our sample period. For each firm in the sample we collected data from corporate proxy statements between 1971 and 1983. Because we were interested in the endogenous determinants of board composition, we eliminated all firms whose board composition was likely to be affected by regulation. This restriction eliminated 23 public utilities, two airlines, and one railroad. Since banks and financial

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[35] This data set in turn comes from a sample of 495 firms used by MacAvoy et al. (1983). The 495 firms represent all the firms for which proxies were available in the Yale library. 128 firms were excluded because they were not in the Forbes compensation surveys which provide the data on CEO tenure and turnover we use below. Finally, 45 firms were excluded because they were missing earnings data from COMPUSTAT.

institutions have different structures than industrial firms, we eliminated 13 banks and financial institutions from our sample. We also required that each firm have a proxy available in Harvard's Baker library for each year between 1971 and 1983. A total of 140 firms had missing proxies for at least one of the 13 years. The resulting sample contained 142 firms.[36]

We collected as detailed information as possible from the 1971, 1974, 1977, 1980, and 1983 proxies (hereafter called the sample proxies) and used the remaining proxies to supplement that information. We recorded from each of the sample proxies information on each director's tenure as director, his age (when reported), his occupation, his shareholdings in the firm, his relationship to other members of the board and to the firm. Calculating tenure for directors required some approximation. Corporations are required to list on the proxy the year in which each director joined the board. For directors who left the board between 1971 and 1983, we calculated approximately when they departed by determining the final proxy on which they appeared.

We classified each director according to his principal occupation. Full-time employees of the corporation were classified as insiders. Directors who did not work full-time for the corporation were classified as outsiders. Directors who were closely associated with the firm, but were not full-time employees, were classified as greys.

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[36] In addition we eliminated Chrysler Corporation because different directors represented different classes of stocks, rather than representing all shareholders. We felt this structure differed too much from the rest of the sample to be included.

Greys either were related to an officer of the company, or had extensive business dealings with the company (as reported on the proxy), which made their independence from management questionable. Directors who were classified as grey because of business dealings were often lawyers, bankers, investment bankers, or consultants. Because of the conflict of interest problems inherent in having investment bankers on the board (see Mace (1971) for a discussion), investment bankers were always designated as greys. Lawyers were classified as grey whenever their firm handled legal matters for the company. Bankers were classified as grey when their bank was listed on the proxy as having business dealings with the corporation.

We collected the shareholdings of each director from the sample proxies. The shareholdings recorded for each director included all shares over which the director had voting power.[37] Although for most directors this was a straightforward calculation, for some directors determining the shares over which they had voting power was a matter of interpreting lengthy footnotes or making judicious decisions when more

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[37] For most directors this number was identical to the number of shares beneficially owned. However, for a number of directors, the two were considerably different. The most common reason was family holdings. Often, a director will deny beneficial ownership of shares held by another member of his family. Even if the director does not exercise direct voting power of such shares, it would seem likely that they would be voted as he suggested, and so we attributed them to the director.

Another frequent reason for differences between beneficial and voting ownership was trusts and foundations. Often a director would be a trustee of a trust or foundation in which he had no beneficial interest, but in which he controlled that trust or foundation's voting rights. In such cases we tended to include the holdings of the trust or foundation with the holdings of the director.

than one director held voting power over a set of stock.

For those directors who were the company's CEO we used data from Weisbach (1987), as well as collecting additional information, to determine their tenures as CEO. This was done because our model predicts that CEO tenure might be an important determinant of board composition. For the years within our sample period, we calculated CEO tenure by locating the exact date of any CEO change in the Wall Street Journal Index (the proxies allowed us to detect CEO changes within a given year). We obtained the starting year for CEOs who started before 1971 from the Forbes compensation surveys or from Who's in Finance and Industry.[38]

As a measure of firm diversification, we use the number of different industries in which a firm operates. Our measure of the firm's number of industries is the number of four digit SIC codes for which the firm was listed by Standard and Poor's Register of Corporations. Because we are interested in measuring when firms move in and out of markets, we look at the change in the number of these SIC codes. Since different industries seem to be associated with a different number of SIC codes (for example, companies which make auto parts seem to have a disproportionately large number of SIC codes), we scale changes in the number of SIC codes by the original number of SIC codes.

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[38] Occasionally precise starting and finishing dates were reported in the proxies as part of the CEO's biography.

For those CEOs beginning prior to 1971, and for whom we only knew the starting year, we assumed they began July 1st of that year to minimize bias when carrying out certain calculations.

The company information gathered from the proxies was supplemented by data from CRSP and COMPUSTAT on returns and earnings. The returns used below are the total return on a company's stock for the twelve months prior to the proxy year in question. If, for example, board changes between 1975 and 1976 are being analyzed for a firm with proxies mailed in April, we would use the returns over the year from April 1974 to March 1975 as an independent variable. These returns are adjusted for industry factors by subtracting from them a measure of the average return in the firm's industry. This measure is constructed by computing the average return of all the firms in the given firm's 2 digit SIC code on the CRSP tape for the relevant twelve month period.[39]

The construction of the earnings measure is more complicated. As our model suggests that changes in the composition of the board are likely to be related to deviations from average performance, we would like to use a measure of unexpected earnings. A large literature on the time series behavior of accounting earnings (see Ball and Watts (1972) and Foster (1978)) finds that annual earnings can be approximated by a random walk. This implies that changes in earnings are an unbiased estimate of unexpected earnings.

The earnings variable used below is earnings before interest and taxes (EBIT).[40] This measure is used to prevent changes in capital structures or tax treatments from obscuring differences in earnings

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[39] We also have estimated our equations using market-adjusted returns with similar results.

[40] This variable is constructed by adding data items 15,16, 18, and 49 on the annual COMPUSTAT industrial tape.

measures of performance. The change in EBIT is standardized by the book value of the firm's assets at the end of the previous year to control for size differences. Finally, to control for factors affecting earnings changes caused by industry effects, the average standardized earnings change is computed for all the firms on the COMPUSTAT industrial tape with the same two digit SIC code as the test firm. This average is subtracted from the standardized earnings change for the test firm. The resulting variable provides a measure of unexpected earnings which should not be sensitive to the firm's size, industry, capital structure, or tax treatment.

Since we are interested in explaining board composition and changes in board composition, we need to construct board composition for each year, where board composition is the number of insiders, greys, and outsiders, on the board that time. Determining board composition for 1971, 1974, 1977, 1980, or 1983 is straightforward, since that information was recorded for each sample proxy. For the other years, our data collection procedure creates some problems for determining composition, all of which are, in our opinion, minor. The first problem is that our collection procedure under-samples directors with very short tenures (less than three years), since any director who joined and left the board between two sample proxies would not be recorded (e.g. a director who joined in 1975 and left in 1976). Therefore we are likely to miscalculate the off-sample year composition

occasionally because we fail to include some of the directors.[41] As this essentially creates errors in our dependent variables, to the extent this problem affects our results it will bias us toward not finding strong relationships between our theorized determinants of board composition and actual composition.

A second problem created by our collection procedure is that our data on when directors join the board is taken from proxy statements and is on a calendar year basis, rather than a proxy year basis (a proxy year is the year between two proxies). As the study of board composition is naturally done on the basis of proxy, rather than calendar years, some procedure was necessary for translating joins from a calendar year to a proxy year basis. Our procedure is simply to attribute additions in a given year according to the month in which proxies are issued. If a company issues its proxies during the first half of the year, we assumed that all directors who joined in that calendar year joined following the issuance of the proxy. If a company issues its proxies during the second half of the year, we assumed that all directors who joined in a given year joined prior to the issuance of the proxy. For example, if a firm issues its proxies in March, any join in the year 1975 would be attributed to the 1975-76 proxy year,

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[41] The fraction of directors who leave the board within three years of joining it (calculated using only directors who joined in 1971, 1974, 1977, and 1980) is .1176 (with a standard error of .3226). The fraction who leave one year after joining is .0455 (.2086) and the fraction leaving after two years is .0468 (.2115). Given our method of calculation, these numbers tend to overstate greatly the probabilities of missing a director. Using these estimates we calculate the number of directors we missed to be approximately 113, or 3% of the directors serving our 142 firms during the period 1971 to 1983.

but if it issued proxies in September, such joins would be attributed to the 1974-75 proxy year.

B. Descriptive Statistics

Table 1 provides a description of our data for the year 1977, the mid-point of our sample period. The median firm had 45% outsiders and 13 directors, with the percentage of outsiders ranging from General Instruments with 10 % to Western Union with 89 % and board size varying between 4 (National Semiconductor) and 21 (Philip Morris).

Casual observation of this table would reveal that some of the variables have very skewed distributions. For example the median CEO tenure is only 5.9 years, but one CEO (S. Rabb of Stop & Shop) was in office almost 47 years at the time of the 1977 proxy. Similarly, the inside members of the median board own slightly more than 1 % of the stock, but for Campbell's Soup, insiders control almost 65 % of the stock. It is important to recognize the importance of such outliers so that a few corporations do not drive the results.

Table 2 shows how board composition and ownership have changed through time. A striking feature of the data is that between 1971 and 1983 there has been a substantial movement toward replacing insiders with outsiders. The average percentage of outsiders rose from 37.6 % to 53.9 %, while the average percentage of insiders fell from 49.1 % to 34.3 %.[42] The average fraction of stock held by insiders also declined

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[42] This trend confirms the results of other studies (Conference Board (1973), Mruk and Gardinia (1985)) Since 1983, though the pattern has reversed. Because of increased director liability

over this period, although this effect may be caused by the decrease in the number of insiders.

Table 3 gives a correlation matrix of some of the important variables in our data set. This correlation matrix shows the cross-sectional relations between our variables. The fraction of outsiders on the board is negatively correlated with CEO tenure, as we predict in our theoretical discussion. However, this relation is not significantly different from zero. A potential explanation for this lack of significance is that new CEOs inherit their boards from their predecessors. Thus, a more powerful test would be to look at the relation between changes in board composition and CEO tenure. We perform this test below.

The fraction of outsiders on the board is correlated with several other variables in our data set: the median tenure of directors, the shareholdings of top management, and the number of industries in which the firm operates. All of these correlations are significant at least the 10 % level. The negative correlation between median board tenure and fraction of outside directors suggests that outside directors turn over more rapidly than do inside directors. This is not surprising: outside directors, because they are frequently CEOs of other firms, distinguished professors, retired politicians, etc., tend to be older than inside directors, who, except for the CEO, tend to be vice-presidents. Consequently, the retirement rate for outside directors

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insurance costs, firms have begun to move back towards having more insiders on their boards (Business Week, Sept. 8, 1986).

should be higher. Another possible explanation for this result is that outside directorships are not the primary occupation of most outside directors. Therefore, they are more likely to resign as directors for reasons, either personal or professional, which would not cause inside directors to resign.

As noted in Weisbach (1987), the fraction of outside directors is negatively correlated with the shareholdings of top management. This fact is consistent with the view that monitoring by outside directors and the direct incentives created by management's stock ownership are alternative ways to control agency costs. However, upon, closer examination, we find that this fact might be better explained by the tendency of top management with a large stake in their firm to put family members on the board (the correlation coefficient between fraction of the board related to top management and the shareholdings of top management is .5208, with a t-statistic of 8.9013). As we never count family members as outsiders, this tendency to add family members will necessarily reduce the fraction of the board who are outsiders. When we examined the correlation between the fraction of non-family board members who are outsiders and the shareholdings of top management we found no significant relation (the correlation coefficient was -0.0834, with a t-statistic of 0.9479).

The fraction of outsiders on the board is positively related to the number of different industries in which a firm operates as well as to the size of the firm. These results are consistent with the view that larger firms and firms which are more complex have more need for

external monitoring than do smaller and less complex firms. They are similar to those in Brickley and Van Drunen (1987) and provide support for the Fama and Jensen (1983) agency cost view. However these results may also be spurious: the fact that firms with large management ownership tend to be in fewer industries and be smaller, suggests that the correlation between fraction of outsiders and size and number of industries may be the result of the strong negative correlation between these variables and ownership by top management.

III. Empirical Specification and Results

In Section I, we sketched a model in which certain economic and organizational forces lead to changes in board composition. To test this model, we regress changes in the board against measures of those forces.

There are two ways to examine changes in board composition. We could look only at the net change in composition. Alternatively, we could examine all additions and departures from the board, the components of net change. As our theory says more about the components of net change than net change itself, we choose to focus on analyzing those components. Furthermore, in order to interpret results concerning net changes, it is first necessary to understand the determinants of the components of net change. Therefore, in Sections A and B, we concentrate on the additions and departures of directors. Then, in Section C, we examine the net change in board composition.

The forces which determine board composition affect insiders and outsiders differently. Consequently, we estimate separate equations for each type. Similarly, the forces which cause firms to add directors are different from those which cause firms to remove directors. For this reason, we estimate separate equations for additions to the board and departures from the board. We will first discuss departures from the board.

A. Departures from the Board

To predict departures of director type i from the board, we estimate the following equation:

$$\text{Depart}_i = f(\text{CEO tenure}, \Delta\text{Earnings}, \text{Stock Returns}, \Delta\text{Industries}, \text{Median Dir. Tenure}_i, \text{Retirement Dummy}, \text{Number}_i, \text{size of firm}, \text{period dummies})$$

Where f( ) is assumed to be linear in its arguments. The dependent variable measures the departures of directors of a given type from the board from one proxy to the next. We analyze the departures of directors both in levels and as a fraction of total board membership. The results are roughly the same whether the dependent variable is a fraction or in levels. The firm-years are pooled, with each firm-year representing a separate observation. Because we do not have data on the number of industries in 1971, we use 11 years of data for each firm. After omitting observations with missing data, we have 1521 observations.

The first variable in the specification is CEO tenure. Because of the skewness problem discussed previously, we measure CEO tenure using dummy variables which indicate whether a CEO is in the lowest third of the sample in terms of his tenure (less than 4.5 years) or in the middle third in terms (at least 4.5 years and less than 10 years). The dummy for the CEOs with at least ten years experience as CEOs is omitted.

The performance measures, the changes in earnings and the stock returns, are included for the two years prior to the proxy in question. We have experimented with longer lags on these variables, but as their coefficients were never significantly or meaningfully different from

zero, these equations are not reported.

The measure of the change in the numbers of industries in which the firm operates is broken down into its positive and negative components (i.e. $\Delta SIC = \Delta SIC_+ + \Delta SIC_-$, where ΔSIC is the change in the number of industries, ΔSIC_+ (> 0) is the positive component and ΔSIC_- (< 0) is the negative component). We do this because adding industries and dropping industries are likely to be different types of events and there is no reason to suspect that the effects of the two on board composition are the same.

We include the median tenure of directors of type i to control for the natural turnover process of the board. As boards get older, there are likely to be more voluntary resignations of directors, both because of age reasons and because of professional norms which limit the tenure of directors. In the equations reported here, we use the median tenure of directors of a given type (e. g., median tenure of insiders or median tenure of outsiders). We have also estimated equations using the median tenure of the whole board with similar results.

As we have suggested that board composition is intimately related to the CEO succession process, we attempt to control for retirements of CEOs. Since a large number CEOs retire at age 65 (see Weisbach (1987) for evidence), we include a dummy which is 1 if the CEO is between 62 and 66. This dummy attempts to capture any "grooming" effects prior to a CEO change.

Because the number of directors of a given type who leave the board is likely to be related to the number of directors of that type

on the board, we include the number of directors of the type in question in the equation. We also control for firm size in our equations. As our measure of size we use the market value of the firm's equity at the start of the proxy year in question (e.g. if we are examining departures between the March 1975 proxy and the March 1976 proxy, we use market value as of March 1975). We have also used the book value of the firm's assets with practically identical results. Finally, to control for the time trends noted in Table 2, we include three period dummies.

The one remaining specification issue is firm-specific effects. Each company has its own history, traditions, and culture, which are likely to affect director choice. As these effects are not captured in the specification discussed above, we need to control for these types of effects in the estimation process. One way to do so would be to include firm-specific fixed effects into the equation. A problem with this approach is that it ignores variation among firms and only uses within-firm variation. As we have only 11 years of data for each firm, using fixed effects is likely to substantially lower the power of our tests. This will be particularly true when testing the significance of effects that change relatively slowly. Thus, we choose to report each of our equations with and without firm-specific fixed effects.

The results are shown in Table 4 for departures of insiders and in Table 5 for departures of outsiders. In the first two columns the dependent variable is in levels and in the last two columns it is a proportion. The first and third columns do not contain firm-specific

fixed effects, while the second and fourth columns do contain fixed effects.

The equations for insiders departing the board support the hypotheses discussed above. In the equations without fixed effects, the coefficient for NEWCEO is positive and significantly different from zero at the 5 % level. When the fixed effects are added this effect goes away. This can be explained by realizing that much of the variation in CEO tenure is variation among firms, rather than variation within a given firm. This inter-firm variation is eliminated by the firm-specific fixed effects.

Stock returns seem to affect the departure of insiders. The coefficient on stock returns for the year prior to the proxy year is negative (poor (negative) returns increase the number of insiders who depart). The coefficient is significantly different from zero at the 1 % level in the equations without fixed effects and at the 5 % level in the equations with fixed effects. The coefficient on returns for two years prior to the proxy is negative and, in the equations without fixed effects, is significant at the 10 % level. However, there does not appear to be an analogous effect for earnings changes. The coefficients on earnings changes are insignificantly different from zero.

Decreases in the number of industries in which firms operate seem to increase the departures of insiders from the board. The coefficients on the negative component of the proportional change in SIC codes are negative and significantly different from zero at the 10

% level in the equations without fixed effects and is negative, but not significantly, in the equations with fixed effects. Presumably, this effect is caused by the departure of the insiders who were in charge of the exited industries. Increases in the number of industries had no effect on departures of insiders from the board. The coefficients on the positive component of the proportional change in SIC codes are close to zero and not significant.

The number of insiders who leave the board is significantly and positively related to the CEO approaching retirement (the dummy variable RETIRE) for the pooled regressions. This is consistent with the idea that as the CEO nears retirement and his replacement is announced, the losing candidates leave the firm for jobs elsewhere (Vancil (1987)). The fact that this effect is not significant for the fixed-effects regressions is likely due to the lack of within firm variation in the RETIRE variable.

Thus, we see that new CEOs, poor stock returns, exiting industries, and imminent CEO succession increase the chances of an insider leaving the board. From Table 5, it is clear that these factors do not play a role in the departure of outsiders. Indeed, from Table 5, the only significant variables are the median tenure of outsiders and the number of outsiders on the board. That these two variables are significant is not surprising, as they simply control for the exposure to risk. That we find significant relations between the economic/organizational variables and the departure of insiders, but not for the departure of outsiders, is consistent with the arguments

presented earlier.

We also tested the null hypotheses that there were no fixed-effects (no idiosyncratic differences across firms). For three of four regressions we could reject the null hypothesis at the 1% level.[43] Only for the departure of outsiders, measured in levels, regression (columns one and two of Table 5) did we fail to reject the null hypothesis of no fixed effects (F-statistic of .6397 with 141 and 1364 degrees of freedom).

B. Additions to the Board

We have argued that we should see departing insiders replaced with outsiders when a new CEO takes office, the company performs poorly, and a company drops out of industries. We have shown that the departures of insiders seems to occur at these times. We now examine additions to the board. We estimate the following equation for additions of directors of a given type:

$$\text{Addition}_i = g(\text{CEO tenure}, \Delta\text{Earnings}, \text{Stock Returns}, \Delta\text{Industries}, \text{Current Composition}, \text{Retirement Dummy}, \text{Number of Vacancies}, \text{size of firm}, \text{period dummies})$$

Again, we assume that the function is linear in its arguments. We measure additions to the board both in levels and as a fraction of

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[43] The F-statistic for the test that there were no fixed effects in the departure of insiders, in levels, regression (columns one and two of Table 4) was 1.6326 with 141 and 1364 degrees of freedom. For the departure of insiders, as a fraction of board size, regression (columns three and four of Table 4), the F-statistic was 1.7364 with 141 and 1364 degrees of freedom. The analogous statistics for the two outsider regressions were, respectively, .6397 and 1.6449, both with 141 and 1364 degrees of freedom.

total board membership. We use the same 1521 observations for the additions equations as we do for the departures equations.

The variables in the additions equations were also included in the departures equations with two exceptions: we include the current composition of the board and a measure of the possible number of vacancies. Current composition will affect who is added to the board, if management is wary of having boards which are extremely inside-dominated or extremely outside-dominated. We use the current proportion of outsiders as our measure of current composition.

We control for vacancies, because board size is generally fixed by the firm's by-laws. Although firms do, on occasion, change the board size, board size appears to be more, or less, constant over time. Hence the number of additions to the board is limited by the number of vacancies. To control for this, we include the number of directors who left in the previous twelve month period as a measure of the number of vacancies on the board.[44]

There is another reason to control for past departures: imagine that given a vacancy, top management always chose, <u>independent of the circumstances</u>, to fill the vacancy with an insider with probability p and with an outsider with probability 1-p. Suppose further that no one was added to the board when there wasn't a vacancy. Then a regression of the number of type i directors added to the board, which did not

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[44] We would have liked to also control for the vacancies created during the proxy year in question, but which preceded the addition of directors. However given the information on the proxies, we could not determine whether a given departure in the proxy year t to t+1 preceded or followed a given addition in that proxy year.

control for the number of vacancies, would result in the spurious finding that the addition of type i directors was related to the variables which determined the vacancies. Such a finding would give the misleading impression that who was being added to the board was determined by those variables, when, in fact, who was added was independent of those variables. Therefore, to avoid that mistake, it is important to control for the number of vacancies. If, controlling for the number of vacancies, it is found that the addition of type i directors is significantly related to a set of variables, then we can conclude that those variables do determine who gets added to the board, i.e. that the probabilities p and 1-p are not independent of the circumstances.

The results from these addition equations are shown in Table 6 for insiders and Table 7 for outsiders. The results in Table 6 suggest that insiders are not added to the board when the firm has a new CEO, when it performs poorly, or when it drops industries; none of the coefficients are either significantly or meaningfully different from zero. However, there appear to be some significant determinants of the addition of insiders: replacement, board composition, the CEO succession process, and time trends.

As hypothesized, the addition of directors is directly related to the previous departure of directors. The size of this coefficient (looking at columns one and two of Table 6) might strike the reader as quite low, particularly given how small this same coefficient is in the addition of outsiders regression (Table 7). One point to remember is

that many of the vacancies created in the previous 12 month period were filled in that period, i.e. prior to the current period. Other possible explanations are: sometimes "grey" directors are added to the board; some departures may be part of a permanent reduction in board size; for promotion and CEO succession reasons some firms may carry vacancies for more than a year; and the factors which created the vacancies (e.g. poor performance, dissention in the board room, etc.) may also make it difficult to fill those vacancies, either because no agreements can be reached on who should be the replacements, or because potential directors do not want to become involved with a company in crisis.

The effects of current board composition on the decision to add insiders is significant at the 5% level for all four regressions. The sign is however different between the fixed effects regressions and the pooled regressions. An explanation for this anomaly is that the between firm variation and the within firm variation effects have different signs. From the results, it seems that the between firm effect is negative and the within firm effect is positive. The negative between firm effect is not surprising, and can be explained in two ways. First, management may like to replace like with like, so an outsider-dominated board will likely have more outsider departures, and hence be more likely to add outsiders. Secondly, an insider-dominated board is likely to mean that management is wary of having too independent a board, hence they will be predisposed to add insiders, ceteris paribus, given the opportunity. The positive within effect is

also not surprising. Given that board is unusually outsider-dominated (i.e. the fraction of outsiders is above average), management will be wary of moving even further from their long-run goals for board composition (which are partially determined by the factors discussed in Section I). Consequently, they will be eager to add an insider, if at all possible.

The CEO succession effect, measured by the dummy variable RETIRE, is positive and significant at the 10% level. This suggests that CEOs use the period prior to their resignation as a grooming period, during which rival candidates to be CEO are added to the board. Along with the results on CEO tenure from the departure equations, this supports the notion that board composition is intricately related to the internal promotion and CEO succession processes.

Turning to the outsiders equations in Table 7, we see that the coefficients on NEWCEO are all positive, but only significantly different from zero in the pooled regression with the dependent variable in levels. Since there is not much within firm variation in this variable, it again appears that ignoring the between firm variation is reducing the power of the test.

Following poor performance it seems to take longer for outsiders to be added than for insiders to leave. While the coefficients are all negative, the coefficient for returns immediately preceding the proxy are smaller than the coefficient on returns in the prior year. The coefficient for returns immediately preceding the proxy is insignificantly different from zero. The coefficients on $Return_{-1}$, the

returns between 24 and 12 months prior to the proxy, are all significantly different from zero at the 5 % level. Again, there does not appear to be an earnings effect. Thus, it appears that firms base their directorship decisions on stock market performance rather than accounting numbers.

There is an effect of exiting industries (decreases in the number of SIC codes) on the number of outsiders added to the board. The coefficient is negative and significantly different from zero at the 1 % level. Thus the more industries the firm exits, the more outside directors get added, ceteris paribus. The coefficient on increases in the number of industries is once again close to zero and insignificantly different from zero. From this result, and the earlier one, it seems that firms replace departing insiders with outsiders as they reduce the number of industries in which they operate, but do not change their board as they increase the number of industries in which they operate.

This last result seems at odds with the positive static correlation between percentage outsiders and number of SIC codes (Table 3). One explanation is that firms add outsiders only with a lag when they expand into new industries. We have attempted to uncover this process using longer lags of changes in number of industries, but have been unsuccessful, most likely because there is a very low signal-to-noise ratio in these types of tests.

As with the addition of insiders, there is a relation between current composition and the decision to add outsiders. This relation

is also similar in that the sign of the effect for the pooled regression (although insignificantly different from zero) is the opposite of the sign of the effect for the fixed-effects regression. The explanation for this anomaly is the same as for the addition of insiders regression.

Finally the addition of outsiders is positively correlated with the number of vacancies on the board. Although the coefficients are statistically significant, they appear to be quite small. Our explanation of this is the same as for the addition of insiders regression.

As with the departure regressions, we tested the null hypotheses of no fixed effects. For the two outsider regressions, we found we could not reject the null hypothesis (F-statistics of 1.007 and 1.065 with 141 and 1364 degrees of freedom for the addition of outsiders measured in levels and as a fraction of board size respectively). For the two insider regressions, we could, however, reject the null hypotheses at the 1% level (F-statistics of 1.503 and 1.307 with 141 and 1364 degrees of freedom for the "levels" and "fractions" regressions respectively).

C. The Net Change in Board Composition

So far we have examined the departure and addition of insiders and outsiders separately. Although from these results and some simple arithmetic, it is possible to get a sense of the net effect of our economic and organizational variables on overall composition, we wish

to conclude this section with an analysis of the changes in overall composition caused by those variables.

To do this we estimate:

$\Delta PEROUT = h(\text{CEO tenure}, \Delta\text{Earnings}, \text{Stock Returns}, \Delta\text{Industries}, \text{Current Composition}, \text{Retirement Dummy}, \text{size of firm}, \text{period dummies})$

where h is linear in its arguments and $\Delta PEROUT$ is the fraction of outsiders at time t+1 minus the fraction of outsiders at time t. The pooled and fixed-effects estimates of this equation are shown in Table 8.

The results are largely expected given the discussion in Section I and the results in subsections A and B. This is particularly true when examining the pooled results (column one of Table 8). New CEOs are significantly (at the 1% level) more likely to have growing outsider representation on the board, as are CEOs in the middle of their tenure (this result is also significant at the 1% level).

Unlike the results in subsections A. and B., changes in earnings in the 12 months prior to when the proxy was issued were a significant determinant of changing board composition. The sign is as predicted: poor performance leads to greater outsider representation on the board. The returns measures are also significant at the 10% level. The signs are again as predicted and are consistent with the findings on departures and additions.

Exiting industries leads to greater outsider representation. The coefficient on ΔSIC_{-} is negative and significantly different from zero at the 1% level. This result is consistent with the findings above.

We also find that current composition has an effect on future changes in composition. Boards which already have substantial outsider representation are less likely to increase outsider representation than boards with little current outsider representation. This result is consistent with the arguments given previously.

Finally, there is a significant relation between imminent retirement and greater outsider representation. Again this confirms with our hypotheses, as well as with our earlier results.

The fixed-effects results are less striking than the pooled results in terms of the significance of the coefficients. However a number of variables remain significant at close to, or better than, the 10% level, and, with the exceptions of the RETIRE dummy and the 1977-1980 period dummy, the signs of those coefficients which were significant in the pooled regression remain the same in the fixed-effects regression. The reduction in significance levels is due to the lack of within firm variation for many of the variables (e.g. RETIRE, NEWCEO, etc.). A test of the null hypothesis of no fixed effects can be rejected at better than the 1% level (F-statistic of 2.157 with 141 and 1365 degrees of freedom).

IV. Conclusion

Board composition is determined by a number of economic and organizational variables. We have hypothesized that some of these variables are the internal promotion and CEO succession processes, poor performance, and the structure of the firm in the product market. We have provided some empirical support for each of these hypotheses.

The internal promotion and CEO succession processes have a number of effects on the board. The years just preceding and following a CEO change see a number of insiders leave the board. Prior to a CEO change, a number of insiders are also brought onto the board, as part of the grooming process. New CEOs, perhaps not yet ready to begin their own succession process, replace departing insiders with outsiders.

When firms perform poorly, they tend to remove insiders. They also tend to add outsiders to the board. There are two explanations of these results. We have argued that firms may fire the insiders held responsible for poor performance. Having no sufficiently senior personnel within the company to fill the vacancy, they fill it with an outsider. Thus, we see a correlation between poor performance and the removal of insiders and the hiring of outsiders. An alternative explanation is that, when the company is performing poorly, management decides they need the advice of experienced outsiders on their boards. To make room for these outsiders, they must fire some insiders. This explanation also predicts that poor firm performance is correlated with

the removal of insiders and the hiring of outsiders.

On a priori grounds we dislike the second argument: why does management need to put outsiders on the board in order to get their advice (after all management consultants do exist)? Given the other roles played by boards (monitoring, internal promotion, etc.), firing insiders simply to gain the advice of outsiders seems like a costly way to proceed. Nonetheless, the second argument is clearly a plausible one, and future research should be devoted to distinguishing between the two arguments. In particular, future research should establish the timing for the removal of insiders and the hiring of outsiders between proxies.

The final result of the paper is that firms tend to fire insiders and hire outsiders when they drop out of industries. Again, the explanation for this result could work two ways. Firms could fire the insiders responsible for the product lines which they drop. Given the vacancy and no insider sufficiently senior to fill it, they hire an outsider. A second explanation is that dropping out of industries proxies for a component of poor corporate performance not contained in earnings or stock returns. The firms might wish to hire experienced outsiders to mitigate this poor performance. Again, distinguishing between these explanations would be an interesting project for future research.

Table 1

Variables on Firms and their Boards

of Directors Ranked by Percentile

Sample: 142 NYSE Companies in 1977

Data Item	Percentile						
	1	10	33	50	67	90	99
Percentage Outsiders (%)	10.0	21.4	33.3	45.4	53.8	66.7	88.9
Board Size	4	10	12	13	14	17	21
CEO Tenure (Years)	0	1.5	4.8	5.9	.7	19.8	46.8
Shareholdings of Insiders (%)	0.00	0.12	0.39	1.13	2.89	28.59	64.89
Shareholdings of Top Manag. (%)	0.00	0.02	0.11	0.36	1.07	21.88	64.89
Shareholdings of Outsiders (%)	0.00	0.00	C 01	0.04	0.21	1.83	27.68
Assets ($ Millions)	134	365	839	1214	1859	3839	93972

Table 2

The Composition and Ownership of Boards of Directors Over Time

Sample: 142 NYSE Firms between 1971 and 1983

Year	Average Percentage of			Avg. Percent Stock Held by		
	Insiders	Greys	Outsiders	Insiders	Greys	Outsiders
1971	49.1	13.3	37.6	9.21	.76	1.07
1974	46.0	13.3	40.7	8.34	.64	.77
1977	42.4	13.1	44.5	7.92	.55	.80
1980	38.9	12.0	49.1	7.49	.60	1.10
1983	34.3	11.8	53.9	6.72	.72	1.67

Table 3

Correlation Matrix of Variables about Firms

and Their Boards of Directors

Sample: 142 NYSE Firms in 1977

t-statistics are in parentheses.

Variable	CEO Tenure	Median Dir. Ten.	Stake of Top Management	Number of Industries	Mkt Val of Equity
Fraction Outsiders on Board	-.104 (1.17)	-.157 (1.72)	-.167 (1.82)	.136 (1.73)	.168 (2.18)
CEO Tenure	-----	.242 (3.30)	.204 (2.70)	-.024 (.297)	- 072 (.825)
Median Tenure of Directors	-----	-----	.043 (.52)	-.090 (1.05)	-.088 (1.00)
Stake of Top Management[a]	-----	-----	-----	-.205 (2.21)	-.094 (1.07)
Number of Industries[b]	-----	-----	-----	-----	-.033 (.38)

[a] Stake of top management includes the shareholdings of the present CEO, as well as all former CEOs still on the board. It is measured as a fraction of the company's shares.

[b] The measure of the number of industries of a firm is the number of different four digit SIC codes a firm is associated with in Standard and Poor's Register of Corporations.

Table 4

Equations Predicting Departures of Insiders from Boards of Directors

Sample: 142 NYSE Firms, 1972-83

Estimation Technique: Ordinary Least Squares
(t-statistics are in Parentheses)

Independent Variable	Dependent Variable: Insiders Leaving	Insiders Leaving	Insiders Leaving / Board Size	Insiders Leaving / Board Size
Firm Specific Fixed Effects?	No	Yes	No	Yes
Intercept	-.095 (1.14)	-----	-.002 (.30)	-----
NEWCEO[a]	.122 (2.47)	.057 (.89)	.0097 (2.64)	.0010 (.21)
MIDCEO[b]	.052 (1.07)	-.086 (1.42)	.0042 (1.16)	-.0038 (.85)
$\Delta EBIT$[c]	.287 (.68)	.342 (.79)	.018 (.59)	.017 (.53)
$\Delta EBIT_{-1}$	-.397 (.94)	-.254 (.58)	-.024 (.78)	.023 (.70)
Return[d]	-.185 (2.61)	-.131 (1.84)	-.015 (2.81)	-.011 (2.13)
$Return_{-1}$	-.118 (1.66)	-.096 (1.34)	-.005 (1.72)	-.008 (1.45)
ΔSIC_{+}[e]	.002 (.03)	-.008 (.13)	-.002 (.42)	-.003 (.61)
ΔSIC_{-}[f]	-.431 (1.79)	-.282 (1.13)	-.034 (1.92)	-.024 (1.31)
MEDIN[g]	-.005 (1.25)	.040 (6.55)	.0001 (.52)	.003 (6.92)
RETIRE[h]	.109 (2.17)	.009 (.17)	.009 (2.46)	.002 (.39)

on Board	(14.0)	(12.4)	(11.1)	(11.0)
Mkt. Value of Equity	-.003 (.77)	-.018 (.90)	-.0006 (1.82)	-.001 (.69)
Dummy if Yr=72-73	-.040 (.69)	-.125 (2.09)	.000006 (.001)	-.006 (1.34)
Dummy if Yr=74-76	-.055 (1.04)	-.138 (2.54)	-.001 (.26)	-.007 (1.70)
Dummy if Yr=77-80	-.059 (1.16)	-.104 (2.07)	-.003 (.80)	-.006 (1.58)
Number of Observations	1521	1521	1521	1521
R^2	.137	.262	.097	.234

[a] NEWCEO is a dummy variable which takes the value 1 if the CEO has held his job for less than 4.5 years.

[b] MIDCEO is a dummy variable which takes the value 1 if the CEO has held his job for at least 4.5 years and less than 10 years.

[c] The variable ΔEBIT is the company's change in the earnings before interest and taxes weighted by the book value of assets in the most recent fiscal year prior to the potential resignation. This variable is adjusted for industry effects by subtracting from it the mean for all the firms on COMPUSTAT in the same two digit SIC code.

[d] The variable Return is the return on the company's stock for the 12 months prior to the date the proxy was mailed minus the return on an equally-weighted portfolio comprising all firms listed as having the same principal two digit SIC code on CRSP for the same period.

[e] The variable ΔSIC_+ is the positive component of the change in the number of four digit SIC codes over the period of the potential board changes weighted by the number of SIC codes at the start of the period.

[f] The variable ΔSIC_- is the negative component of the change in the number of four digit SIC codes over the period of the potential board changes weighted by the number of SIC codes at the start of the period.

[g] The variable MEDIN is the median tenure of insiders currently on the board as directors.

[h] The variable RETIRE is dummy variable which takes the value 1 if the CEO is at least 62 and no older than 66.

Table 5

Equations Predicting Departures of Outsiders from Boards of Directors

Sample: 142 NYSE Firms, 1972-83

Estimation Technique: Ordinary Least Squares
(t-statistics are in Parentheses)

Independent Variable	Dependent Variable: Outsiders Leaving	Outsiders Leaving	Outsiders Leaving / Board Size	Outsiders Leaving / Board Size
Firm Specific Fixed Effects?	No	Yes	No	Yes
Intercept	-.263 (3.74)	-----	-.012 (2.30)	-----
NEWCEO[a]	.055 (1.25)	.026 (.43)	.002 (.63)	.002 (.50)
MIDCEO[b]	.032 (.72)	-.010 (.17)	.002 (.58)	-.0005 (.11)
ΔEBIT[c]	.264 (.69)	.381 (.37)	.012 (.41)	.017 (.56)
$\Delta EBIT_{-1}$	.141 (.37)	-.256 (.61)	.012 (.41)	.011 (.34)
Return[d]	-.040 (.62)	-.016 (.23)	-.002 (.43)	-.004 (.87)
$Return_{-1}$	-.083 (1.27)	-.066 (.96)	-.005 (1.00)	-.006 (1.20)
ΔSIC_{+}[e]	-.020 (.35)	-.00004 (.001)	-.001 (.33)	-.001 (.30)
ΔSIC_{-}[f]	.159 (.73)	.130 (.55)	.013 (.76)	-.00005 (.003)
MEDOUT[g]	.020 (4.33)	.040 (6.15)	.0015 (4.41)	.004 (8.62)
RETIRE[h]	.067 (1.47)	.047 (.84)	.005 (1.52)	.005 (1.18)
No. Outsiders on Board	.078 (10.7)	-.023 (.28)	.0049 (8.85)	.010 (8.50)

Mkt. Value of Equity	.002 (.47)	.017 (.90)	-.0002 (1.21)	.003 (2.14)
Dummy if Yr-72-73	.136 (2.50)	-.018 (.32)	.009 (2.23)	.019 (4.12)
Dummy if Yr-74-76	.074 (1.53)	-.028 (.58)	.005 (1.28)	.013 (3.16)
Dummy if Yr-77-80	.018 (.38)	-.038 (.79)	.001 (.37)	.006 (1.58)
Number of Observations	1521	1521	1521	1521
R^2	.098	.154	.065	.201

[a] NEWCEO is a dummy variable which takes the value 1 if the CEO has held his job for less than 4.5 years.

[b] MIDCEO is a dummy variable which takes the value 1 if the CEO has held his job for at least 4.5 years and less than 10 years.

[c] The variable ΔEBIT is the company's change in the earnings before interest and taxes weighted by the book value of assets in the most recent fiscal year prior to the potential resignation. This variable is adjusted for industry effects by subtracting from it the mean for all the firms on COMPUSTAT in the same two digit SIC code.

[d] The variable Return is the return on the company's stock for the 12 months prior to the date the proxy was mailed minus the return on an equally-weighted portfolio comprising all firms listed as having the same principal two digit SIC code on CRSP for the same period.

[e] The variable ΔSIC_+ is the positive component of the change in the number of four digit SIC codes over the period of the potential board changes weighted by the number of SIC codes at the start of the period.

[f] The variable ΔSIC_- is the negative component of the change in the number of four digit SIC codes over the period of the potential board changes weighted by the number of SIC codes at the start of the period.

[g] The variable MEDOUT is the median tenure of outsiders currently on the board as directors.

[h] The variable RETIRE is dummy variable which takes the value 1 if the CEO is at least 62 and no older than 66.

Table 6

Equations Predicting Additions of Insiders to Boards of Directors

Sample: 142 NYSE Firms, 1972-83

Estimation Technique: Ordinary Least Squares
(t-statistics are in Parentheses)

Independent Variable	Dependent Variable: Insiders Added	Insiders Added	Insiders Added / Board Size	Insiders Added / Board Size
Firm Specific Fixed Effects?	No	Yes	No	Yes
Intercept	.327 (4.76)	-----	.024 (4.17)	-----
NEWCEO[a]	-.011 (.24)	-.100 (1.59)	-.002 (.47)	-.007 (1.29)
MIDCEO[b]	-.040 (.86)	-.096 (1.63)	-.004 (1.13)	-.007 (1.39)
$\Delta EBIT$[c]	.216 (.53)	-.077 (.18)	.015 (.46)	-.011 (.31)
$\Delta EBIT_{-1}$	.008 (.02)	-.156 (.36)	.012 (.37)	.007 (1.32)
Return[d]	-.100 (1.46)	-.079 (1.13)	-.007 (1.33)	-.006 (1.04)
$Return_{-1}$	-.032 (.47)	.001 (.02)	-.001 (.15)	.002 (.34)
ΔSIC_{+}[e]	-.022 (.37)	-.042 (.69)	-.002 (.54)	-.004 (.84)
ΔSIC_{-}[f]	.021 (.09)	-.070 (.29)	-.011 (.57)	-.019 (.94)
PEROUT[g]	-.288 (2.80)	.907 (3.87)	-.018 (2.14)	.081 (4.19)
RETIRE[h]	.087 (1.78)	.103 (1.82)	.007 (1.76)	.008 (1.76)
No. Directors Who Left Last Year	.052 (3.25)	.010 (.62)	.005 (3.92)	.002 (1.80)

Mkt. Value of Equity	.009 (2.25)	.020 (1.01)	.0002 (.66)	.002 (.92)
Dummy if Yr=72-73	.257 (4.45)	.409 (6.46)	.022 (4.61)	.035 (6.57)
Dummy if Yr=74-76	.075 (1.46)	.181 (3.27)	.008 (1.93)	.017 (3.73)
Dummy if Yr=77-80	.084 (1.69)	.144 (2.87)	.007 (1.75)	.012 (3.00)
Number of Observations	1521	1521	1521	1521
R^2	.037	.167	.037	.151

[a] NEWCEO is a dummy variable which takes the value 1 if the CEO has held his job for less than 4.5 years.

[b] MIDCEO is a dummy variable which takes the value 1 if the CEO has held his job for at least 4.5 years and less than 10 years.

[c] The variable ΔEBIT is the company's change in the earnings before interest and taxes weighted by the book value of assets in the most recent fiscal year prior to the potential resignation. This variable is adjusted for industry effects by subtracting from it the mean for all the firms on COMPUSTAT in the same two digit SIC code.

[d] The variable Return is the return on the company's stock for the 12 months prior to the date the proxy was mailed minus the return on an equally-weighted portfolio comprising all firms listed as having the same principal two digit SIC code on CRSP for the same period.

[e] The variable ΔSIC_+ is the positive component of the change in the number of four digit SIC codes over the period of the potential board changes weighted by the number of SIC codes at the start of the period.

[f] The variable ΔSIC_- is the negative component of the change in the number of four digit SIC codes over the period of the potential board changes weighted by the number of SIC codes at the start of the period.

[g] The variable PEROUT is the fraction of outsiders on the board at the time of the initial proxy.

[h] The variable RETIRE is dummy variable which takes the value 1 if the CEO is at least 62 and no older than 66.

Table 7

Equations Predicting Additions of Outsiders to Boards of Directors

Sample: 142 NYSE Firms, 1972-83

Estimation Technique: Ordinary Least Squares
(t-statistics are in Parentheses)

Independent Variable	Dependent Variable: Outsiders Added	Outsiders Added	Outsiders Added Board Size	Outsiders Added Board Size
Firm Specific Fixed Effects?	No	Yes	No	Yes
Intercept	.280 (3.40)	-----	.022 (3.00)	-----
NEWCEO[a]	.134 (2.37)	.100 (1.30)	.008 (1.47)	.008 (1.22)
MIDCEO[b]	.084 (1.51)	.039 (.066)	.005 (.929)	.004 (.67)
$\Delta EBIT$[c]	-.621 (1.27)	-.571 (1.10)	-.079 (1.79)	-.071 (1.51)
$\Delta EBIT_{-1}$	.651 (1.32)	.702 (1.33)	.071 (1.60)	.063 (1.32)
Return[d]	.076 (.93)	-.046 (.53)	-.004 (.57)	-.003 (.35)
$Return_{-1}$	-.178 (2.15)	-.167 (1.95)	-.016 (2.09)	-.016 (2.04)
ΔSIC_{+}[e]	.053 (.74)	.033 (.44)	.002 (.34)	-.001 (.19)
ΔSIC_{-}[f]	-.919 (3.28)	-.856 (2.88)	-.095 (3.75)	-.095 (3.55)
PEROUT[g]	.136 (1.11)	-1.93 (6.70)	.017 (1.50)	-.177 (6.81)
RETIRE[h]	.036 (.62)	-.009 (.13)	.002 (.005)	-.002 (.25)
No. Directors Who Left Last Year	.120 (6.21)	.103 (5.05)	.013 (7.24)	.012 (6.61)

Mkt. Value of Equity	.014 (2.86)	.016 (.02)	-.00007 (.17)	.001 (.55)
Dummy if Yr=72-73	.082 (1.18)	-.180 (2.31)	.006 (.98)	-.018 (2.52)
Dummy if Yr=74-76	.002 (.03)	-.199 (2.91)	-.0008 (.14)	-.019 (3.03)
Dummy if Yr=77-80	.033 (.55)	-.077 (1.26)	(.004) (.68)	-.006 (1.09)
Number of Observations	1521	1521	1521	1521
R^2	.063	.151	.064	.157

[a] NEWCEO is a dummy variable which takes the value 1 if the CEO has held his job for less than 4.5 years.

[b] MIDCEO is a dummy variable which takes the value 1 if the CEO has held his job for at least 4.5 years and less than 10 years.

[c] The variable ΔEBIT is the company's change in the earnings before interest and taxes weighted by the book value of assets in the most recent fiscal year prior to the potential resignation. This variable is adjusted for industry effects by subtracting from it the mean for all the firms on COMPUSTAT in the same two digit SIC code.

[d] The variable Return is the return on the company's stock for the 12 months prior to the date the proxy was mailed minus the return on an equally-weighted portfolio comprising all firms listed as having the same principal two digit SIC code on CRSP for the same period.

[e] The variable ΔSIC_+ is the positive component of the change in the number of four digit SIC codes over the period of the potential board changes weighted by the number of SIC codes at the start of the period.

[f] The variable ΔSIC_- is the negative component of the change in the number of four digit SIC codes over the period of the potential board changes weighted by the number of SIC codes at the start of the period.

[g] The variable PEROUT is the fraction of outsiders on the board at the time of the initial proxy.

[h] The variable RETIRE is dummy variable which takes the value 1 if the CEO is at least 62 and no older than 66.

Table 8

Equations Predicting Changes in the Fraction of Outsiders on Boards of Directors

Sample: 142 NYSE Firms, 1972-83

Estimation Technique: Ordinary Least Squares
(t-statistics are in Parentheses)

	Dependent Variable	
Independent Variable	ΔPEROUT	ΔPEROUT
Firm Specific Fixed Effects?	No	Yes
Intercept	.004 (1.30)	-----
NEWCEO[a]	.021 (5.79)	.008 (1.55)
MIDCEO[b]	.014 (3.87)	.005 (1.03)
ΔEBIT[c]	-.068 (2.03)	-.050 (1.50)
$\Delta EBIT_{-1}$	-.007 (.205)	.009 (.250)
Return[d]	-.010 (1.75)	-.005 (.981)
$Return_{-1}$	-.010 (1.74)	-.008 (1.50)
ΔSIC_{+}[e]	.002 (.328)	-.0001 (.030)
ΔSIC_{-}[f]	-.069 (3.57)	-.053 (2.72)
PEROUT[g]	-.020 (3.31)	-.266 (14.1)
RETIRE[h]	.008 (1.99)	-.004 (.878)

Mkt. Value of Fquity	-.0002 (.459)	-.0008 (.556)
Dummy if Yr=72-73	.004 (1.07)	-.037 (7.26)
Dummy if Yr=74-76	.006 (1.61)	-.027 (6.16)
Dummy if Yr=77-80	.009 (2.34)	-.015 (3.76)
Number of Observations	1521	1521
R^2	.024	.202

[a] NEWCEO is a dummy variable which takes the value 1 if the CEO has held his job for less than 4.5 years.

[b] MIDCEO is a dummy variable which takes the value 1 if the CEO has held his job for at least 4.5 years and less than 10 years.

[c] The variable ΔEBIT is the company's change in the earnings before interest and taxes weighted by the book value of assets in the most recent fiscal year prior to the potential resignation. This variable is adjusted for industry effects by subtracting from it the mean for all the firms on COMPUSTAT in the same two digit SIC code.

[d] The variable Return is the return on the company's stock for the 12 months prior to the date the proxy was mailed minus the return on an equally-weighted portfolio comprising all firms listed as having the same principal two digit SIC code on CRSP for the same period.

[e] The variable ΔSIC_+ is the positive component of the change in the number of four digit SIC codes over the period of the potential board changes weighted by the number of SIC codes at the start of the period.

[f] The variable ΔSIC_- is the negative component of the change in the number of four digit SIC codes over the period of the potential board changes weighted by the number of SIC codes at the start of the period.

[g] The variable PEROUT is the fraction of outsiders on the board at the time of the initial proxy.

[h] The variable RETIRE is dummy variable which takes the value 1 if the CEO is at least 62 and no older than 66.

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Chapter 3

The Effect of Board Composition on Corporate Performance

(with Benjamin E. Hermalin)

The role of the board of directors in corporate governance has been hotly debated by economists, businessmen, and others. On the one hand there are those (ALI (1983), Dunn (1987)) who believe boards are generally failing in their duty to monitor management and guide the company. On the other hand, there are those who argue that market pressures and concern for reputation will lead directors to fulfill their duty (Fama (1980), Fama and Jensen (1983), Demsetz (1983)). The empirical evidence is also divided: Baysinger and Butler (1985) find evidence that companies with independent boards, i.e. those boards most likely to monitor management, outperform companies without independent boards. However, MacAvoy et al. (1983) find no evidence that board structure significantly affects corporate performance.

In this paper we offer new evidence concerning the relationship between board structure and performance, as well as evidence concerning other aspects of corporate control and performance. We feel our methods are an improvement on the methods used by previous studies: in particular, we consider aspects of the corporation's control structure which have been overlooked by previous studies. By taking these aspects into consideration, we accomplish three things: first, we can better judge whether any correlation between board structure and performance is meaningful or spurious; second, we increase the signal to noise ratio for tests of the significance of the effect of board structure on performance; and third, we eliminate much of the omitted variable bias which undoubtedly affected previous studies.

Another aspect of our methodology which we view as an improvement

over previous studies is that we control for possible biases due to the joint endogeneity of our variables. For example, Hermalin and Weisbach (1987) find that poor performance leads to changes in board composition, so any cross-sectional regression of performance on board composition will be biased by the effects of performance on composition.

The next section of the paper reviews the theory behind our empirical work, as well as touching on the important methodological issues. The second section of the paper discusses our data. In the third section we present our specifications and results. The last section is a short conclusion.

Theory and Methods

The economic theory behind our work is agency theory. As applied in the present context, agency theory consists of two players: the principal(s), the owner(s) of the firm, and the agent(s), the manager(s) of the firm. It is assumed that the objectives of the principals and the agents diverge (for example, agents may prefer to be lazy, while principals prefer that they work hard). To (partially) overcome such problems, the principals may resort to (a) monitoring of the agents and/or (b) providing the agents with the proper incentives through contracts (incentive contracts). By monitoring management, the owners seek to detect deviations by management from the profit maximizing course and to ascertain the competence of management to run the firm properly. Incentive contracts, by giving management a share in the profits, help to align management's interests with shareholders' interests.

Of course in the context of the large modern corporation it is naive to think of the thousands of owners as collectively monitoring management or designing the optimal incentive contracts. Free rider problems, both in terms of collecting information and organizing owners, prevent owners from being the active principals the theory supposes them to be. Instead, owners leave that role to the board of directors.

Owners do not escape the agency and free-rider problems by leaving them to the board. In the first place, the directors are themselves agents. Second, the owners must somehow act collectively to select and

monitor the directors. As we and others have argued previously (see Hermalin and Weisbach (1987)), free-rider problems generally prevent owners from actively selecting and monitoring directors, and the responsibility for selection generally devolves on management. Although the idea of management choosing their own overseers is reminiscent of the foxes guarding the chicken coop, economists (and others) have argued that directors may nevertheless behave in the best interests of the shareholders; particularly when the directors are independent of management (cf. Mace (1971), ALI (1982), or Weisbach (1987)) or when they are concerned with establishing reputations as good overseers (cf. Fama (1980) or Fama and Jensen (1983)).[45]

Concern for reputation is, of course, an unobservable variable.[46] Consequently previous work in this area has focused on how independent the board is from management; where independence has been measured as the proportion of the board made up of outside directors. (Outside directors are defined as directors whose association with the firm is limited to their directorships, i.e. non-management directors without extensive business dealings with the firm.) Since the

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[45] On the other hand, directors may seek to establish a reputation for not rocking the boat, in order to make them more attractive to management. Also, as shown by Holmstrom (1982), concern for reputation can cut both ways, leading to either too much activity or too much caution.

[46] Recently Kaplan and Reishus (1987) have attempted to formalize the reputation idea by examining whether CEOs of poorly performing firms are asked to serve as directors of other companies with the same frequency as CEOs of well performing firms. They find that poor performance, measured as reduction in dividends, leads to fewer outside directorships for the CEO.

interests of outside directors and management are unlikely to coincide exactly, outside directors may oppose self-serving or incompetent management. This will be especially true, if outside directors are concerned with their reputations or the threat of shareholder suits for breach of fiduciary responsibility.

There is some evidence, anecdotal and statistical, that this view of outside directors is correct. Mace (1971) reports that exceedingly poor performance or obviously losing propositions will be opposed by outside directors. Baysinger and Butler (1985) report that greater board independence in 1970 led to better performance, measured as returns to equity, in 1980. Weisbach (1987) found that outside-dominated boards were significantly more likely than inside-dominated boards to respond to poor performance by firing the CEO. He also found that the market's reaction to the firing of a CEO differed significantly depending on whether the board was inside or outside-dominated, with the market generally reacting favorably to firings induced by outside-dominated boards.

On the other hand, MacAvoy et al. (1983) found no evidence of a link between board composition and various measures of performance and corporate activity. They found that they could not reject the null hypothesis that the distributions of those measures were the same for both outside- dominated boards and inside-dominated boards.

There are number of drawbacks to this previous research, which leads us to question how well they address the issue of whether outside-dominated boards are better at controlling the agency problem

than inside-dominated boards. Weisbach's results indicate that outside-dominated boards may be better in a crisis than inside-dominated boards. However, as CEO dismissals are fairly rare (Vancil (1987) estimates that only 10% of CEOs are ever fired), his results do not speak definitively on whether a outside-dominated board means the firm is likely to perform better, i.e. how does the firm perform the other 90% of the time?[47] Given anecdotal and statistical evidence (Vancil (1987) and Hermalin and Weisbach (1987)) that the selection of insiders to the board is part of the (non-crisis) CEO succession process, it could well be that an outside-dominated board is non-optimal in non-crisis situations, if too few insiders on the board leads to an inefficient succession process or the selection of a poor successor.

A problem with Baysinger and Butler is that is unclear what inferences should be drawn from the relationship between return on equity (standardized by the industry average) in 1980 and board composition (essentially fraction of outside directors) in 1970. Given the rate at which directors and top management turnover (Hermalin and Weisbach (1987), Vancil (1987)), few of the monitors or those being monitored will still be around after ten years. Consequently, it is unclear by what mechanism composition a decade ago will affect performance today.

The biggest problem with Baysinger and Butler, however, which is

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[47] Also left unanswered by his study is the question of how the company became mired in such a crisis in the first place.

also shared by MacAvoy et al., is that their analysis does not control for other factors which could affect performance. As a result, it is impossible to reject the hypothesis that their results are spurious or distorted by the influence of these other factors. For example, Morck et al. (1987) find that performance is significantly related to the board's ownership of the company's stock. We find similar results looking at ownership by top management (Table 1). A finding of these works is that, over certain ranges, increased ownership leads to lower profitability. Other work, Hermalin and Weisbach (1987), finds that ownership is inversely correlated with the proportion of outsiders on the board. Thus the findings of Baysinger and Butler could instead be due to ownership effects rather than monitoring effects.

Even ignoring the possibility that a regression of performance on fraction of outsiders could be spurious, failure to control for ownership (among other variables) creates two further problems: first, to the extent ownership is a substitute for monitoring, leaving ownership out of such regressions will greatly diminish the signal to noise ratio; and, second, given that both board composition and performance are correlated with ownership, leaving out ownership subjects these regressions to omitted variable bias.

The idea that ownership by management may substitute for monitoring comes straight out of agency theory: the more stock management own, the more incentives they have to act in the best interests of owners. Therefore, firms where management own a large share of the stock may require less monitoring than firms where

management owns little of the stock. If there are factors which influence board composition toward greater insider representation (see Hermalin and Weisbach (1987)), then we would expect to see firms with large management ownership having a lower fraction of outside directors than firms without much management ownership.

On the other hand, we must keep in mind that in real life agency costs need not be monotonically decreasing with ownership by top management. This is because large management ownership may insulate management from other forces which reduce agency costs, such as the threat of takeovers and the discipline of the board (see Demsetz (1983) for a discussion). Furthermore, given that large management ownership is often a characteristic of family-controlled firms and given that family-controlled firms are often run to maximize the utility of the family (Mace (1971)),[48] we might expect agency costs to actually increase with ownership over some ranges. Indeed both Morck et al. (1987) and we find that performance does <u>not</u> vary monotonically with ownership.

In addition to controlling for ownership, we might also wish to control for the length of tenure of both the board and top management. If management has been around for a long time, this may indicate that they are better than average; as they have not been fired (i.e. are not in the bottom of the distribution with respect to ability) and may even have been asked to stay on because of their good performance (i.e. are

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[48] Examples of this include selecting family members for high management positions or board seats, creating foundations to honor family members, and use of company resources by family members.

in the top of the ability distribution). On the other hand, Vancil (1987) reports that there is some consensus among CEOs that a CEO should not serve too long, with ten years commonly being cited as the right tenure. This could be because CEOs become set in their ways and lose necessary flexibility over time. An other explanation is that long tenure may indicate a proclivity for dominance on the part of the CEO, which may also be reelected in the CEO attempting to make too many decisions himself and failing to develop new managerial talent by delegating authority. Consequently, we may see that performance declines if management stays on too long. Since there is evidence that board composition changes systematically over the tenure of the CEO (Hermalin and Weisbach (1987)), failure to control for length of tenure, in addition to reducing the signal to noise ratio, may lead to omitted variable bias.

In our analysis below, we control for both ownership and length of tenure in our regressions. From the discussion above, it is clear that both ownership and length of CEO tenure should enter in a piecewise linear fashion, so as to reflect the fact that these effects may not be linear or even monotonic. Board composition, measured as the proportion of the board who are outside directors, should also enter in a piecewise linear fashion. The reason for this is that we might expect that the benefits of increased monitoring would be more pronounced the smaller the proportion of outside directors. It may also be that too many outside directors is bad, in which case the relationship between performance and outside directors will be non-

monotonic.

Another issue with which we are concerned is the question of simultaneity. Hermalin and Weisbach (1987) show that poor performance leads to the removal of inside directors and the addition of outside directors. Therefore any cross-sectional regression of performance on proportion of outside directors is likely to be contaminated by simultaneity bias. Indeed, because of the effect documented by Hermalin and Weisbach, it is possible that such a regression would yield a negative coefficient on the proportion of outside directors, i.e. would suggest that more outside directors lower profits.

Ownership is another variable which might be jointly endogenous with performance. To the extent management has better information than the market, we might expect managers to buy when they anticipate good performance and sell in advance of poor performance. An additional possible effect, which acts in the opposite direction, is for managers to realize capital gains when the stock has been doing well, and buy or stay put when the stock is performing poorly.

Finally, given the work of Warner et al. (1987) and Weisbach (1987), we might expect that CEO tenure is jointly endogenous, as those papers find a relation between poor performance and CEO dismissals. However, as that effect is economically small, we do not expect this potential simultaneity to generate any serious biases. Indeed, we have estimated our regressions treating CEO tenure as both exogenous and endogenous, and we have obtained almost identical results. For the sake of space, only the results treating CEO tenure as exogenous are

shown here.

II Data

One measure of profitability is average Tobin's q: the ratio of the a firm's market to the replacement cost of its assets. In the absence of market power, a divergence of q from 1 represents the value of the assets not included in the denominator of q, such as the value of the internal organization or the value of expected agency costs. A q above 1 indicates that the market views the firm's internal organization as exceptionally good or the expected agency costs as particularly small.[49]

Our estimates of q are taken from Schaller (1987). To compute the numerator of q, the market value of the firm, we sum the market values of the firm's equity and debt. The market value of the firm's common stock is equal to the number of common shares outstanding times the price per share at the end of the year. We add to this an estimate of the value of the preferred stock, which we derive by dividing the preferred stock dividends by the Standard and Poor's preferred stock yield. The market value of the firm's debt is equal to the sum of the values of the short-term debt and the long-term debt. We assume that the market value of short-term debt is equal to its book value. To estimate the market value of the firm's long-term debt, we use the

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[49] q has been used as a measure of profitability by a number of studies (see for example Morck, Shleifer, and Vishny (1987), Lindenberg and Ross (1981), or Salinger (1984)).

procedure developed by Brainard, Shoven, and Weiss (1980). We assume that all new issues of long-term debt have a maturity of 20 years, the coupon rate is the prevailing BAA rate, and that the maturity distribution for each firm is proportional to the maturity distribution of aggregate outstanding issues. Given these assumptions, we can calculate the market value of the long-term debt.[50]

The denominator of q, the replacement value of the firm's assets, has three main components: the market value of the capital stock, the market value of inventories, and other assets. To compute the market value of the capital stock, we adjust the book values for inflation and depreciation, assuming that economic depreciation is exponential.[51] For inventory methods other than LIFO, we assume the book value of inventories equals their market value. If LIFO was used, we make an adjustment based on an estimate of the proportion of the firm's inventories which were LIFO. Other assets are intangibles and shares held in other firms. Their market value is assumed equal to its book value.

We control for factors affecting q which are due to time effects

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[50] For more detail on the estimation of the market value of long-term debt as well as the rest of the construction of q, see Salinger and Summers (1983).

[51] One might object that this assumption could bias the results because true depreciation is not exponential and deviations of true depreciations from estimated depreciations could be correlated with the independent variables. To test the importance of this objection, we recomputed q under the assumption that the firm's reported depreciation was the actual depreciation. The q's were very similar to the q's used below; the correlation coefficient between the two sets of q's was .995. When the equations were reestimated using the q's with the firm's depreciation, the results were almost identical to those reported.

and the nature of the firm's industry, and not related to managerial performance. We do this by computing q for all firms on the annual Compustat industrial file each year in our sample. For each firm in our sample, we then subtract from its q the mean q for all firms in its two digit SIC code, including those not in our sample. This procedure reduces the variation in q due to industry specific factors.[52]

Our sample consists of 142 NYSE firms for which we gathered data on board composition and ownership from corporate proxy statements available in Harvard's Baker Library. We classified each director according to his principal occupation. Employees and former employees of the firm were classified as insiders. Non-employee directors were classified as outsiders. Directors whose status is questionable, such as family members of employees, lawyers, bankers, and investment bankers, are classified as grey directors.[53]

We collected the shareholdings of each director from the sample proxies. The shareholding figures recorded for each director included all shares over which the director had voting power.[54] Although for

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[52] We believe this procedure is superior to introducing industry-specific dummy variables into the equation we subtract the population mean from our dependent variable while using industry-specific dummies would subtract the sample mean.

[53] For a detailed discussion of how the sample was constructed and how the directors were classified, see Hermalin and Weisbach (1987).

[54] For most directors this number was identical to the number of shares beneficially owned. However, for a number of directors, the two were considerably different. The most common reason was family holdings. Often, a director will deny beneficial ownership of shares held by another member of his family (typically a wife or minor children). Even if the director does not exercise direct voting power of such shares, it would seem likely that they would be voted as he

most directors this was a straightforward calculation, for many directors determining the shares over which they had voting power was a matter of interpreting lengthy footnotes or making judicious decisions when more than one director held voting power over a set of stock.[55]

For those directors who were (had been) the company's CEO we used

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suggested, and so we attributed them to the director.

Another frequent reason for differences between beneficial and voting ownership was trusts and foundations. Often a director would be a trustee of a trust or foundation in which he had no beneficial interest, but in which he controlled that trust or foundation's voting rights. In such cases we tended to include the holdings of the trust or foundation with the holdings of the director. In cases where the director's control of the voting rights was felt to be minimal or unclear (for example when director A was a trustee of director B's family trust), we did not add in the trust's shares, but rather noted the association and the size of the trust's holdings.

[55] To standardize our attribution of shareholdings, we established a set of guidelines which covered most of the cases we encountered. The goals of the guidelines were (1) to attribute shares to the director who was likely to have the greatest say in how they were voted; (2) to avoid double counting; and (3) to establish a way to note that directors were associated with a set of stock when it was either unlikely they had absolute control over the set, or when disentangling control was impossible given the information on the proxy. As part of meeting goals (1) and (2), when two (or more) directors clearly controlled a set of stock, we attributed the stock to the employee director, when one director was a full-time employee of the firm, while the other was not; or to the director who was a member of top management, when one director was top management, while the other was not; or to the senior family member, when the directors were related.

Goal (3) was met by recording the set of stock in question and noting which directors were connected with it. For example, in 1980 Bendix owned roughly 20% of Asarco, and consequently two members of Bendix's board served as directors of Asarco. Bendix's holdings were recorded separately and it was noted that the two directors in question were connected with those holdings. Other examples are firms dominated by a single family where the family's shareholdings are in complex trusts and holding companies. For three companies, Carnation, Winn-Dixie Stores, and Zayre, we chose to record only the sum of the family holdings and note the family directors associated with those holdings rather than attempt to disentangle complicated family ownership.

data from Weisbach (1987), as well as collecting additional information, to determine their tenures as CEO. For the years within our sample period, we calculated CEO tenure by locating the exact date of any CEO change in the Wall Street Journal Index (the proxies allowed us to detect CEO changes within a given year). We obtained the starting year for CEOs who started before 1971 from the Forbes compensation surveys or from Who's in Finance and Industry.[56]

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[56] Occasionally precise starting and finishing dates were reported in the proxies as part of the director's biography.

For those CEOs beginning prior to 1971, and for whom we only knew the starting year, we assumed they began July 1st of that year to minimize bias when carrying out certain calculations.

III. Empirical Specification and Results

To examine the effects of the control structure of the corporation on profitability, we regress q, our measure of profitability, on measures of the control structure as well as other variables which should affect q. We first estimate the equations using ownership variables to replicate the results of Morck, et. al. Because we have time series data on ownership, we are able to control for possible simultaneity between ownership and q. As top management is likely to have inside information about the firm's future prospects, they have an incentive to adjust their portfolios based on their estimate of future performance. Thus, cross-sectional regressions of q on ownership may be misleading as well as statistically incorrect because the results are contaminated by the effect of q on ownership.

To estimate the effects of ownership on profitability, we follow Morck et. al. and use a specification which is piecewise linear in ownership levels. Because the marginal effect of additional ownership on profitability may be different in different regions, we divide the ownership levels into four regions: less than 1 %, between 1 and 5 %, between 5 and 20 %, and greater than 20 %.[57]

We also control for variables other than those in the control structure which might affect q. We include expenditures on research

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[57] Morck et. al. use a slightly different division. Since we have data on very low levels of ownership by top management while Morck et. al. do not, we chose our divisions to make use of this data. The results using their divisions are similar, though less pronounced.

and development and advertising, each of which we normalize by size, into the equation. We also include the log of the replacement value of the firm's assets as a direct measure of size. One variable which we would like to control for is the amount of market power the firm has. Salinger (1984) has shown that firms in more concentrated industries do have higher q's. However, we do not have data on the concentration of the firm's industry. This failure may bias the results if the degree of monopoly power the firm has is correlated with the control structure of the firm. There are reasons to suspect that such a bias may exist, though the direction of the bias is unclear. If competition restrains management from deviating from profit maximization, then competition may be substitute for direct monitoring by the board or control through incentives (e.g. shareholdings). Consequently, we might expect firms with a high degree of market power to have larger outsider representation and higher management ownerships. On the other hand, the theory of X-inefficiency predicts that monopolies may be more tolerant of slack. Consequently monitoring and incentives may be less of a concern for owners of monopolies than for owners of competitive firms.

The results are shown in Table 1. In the first column we estimate the equation using ordinary least squares for all five years pooled. At levels of ownership less than 1 %, q increases with ownership. This result suggests that there is a noticeable reduction in agency costs resulting from increasing ownership concentration at low levels of ownership. At levels greater than 20 %, q decreases with ownership.

This result is suggests that increases in ownership above 20 % causes management to become more entrenched, and less interested in the welfare of their shareholders. The marginal effect of additional ownership at moderate levels of ownership (between 1 % and 20 %) on q seems to be negative at lower levels and positive at higher levels, although neither of these effects is significantly different from zero. Expenditures on both advertising and research and development raise q. Finally, smaller firms seem to have higher q's.

In the second column of Table 1, we reestimate the equations treating the shareholdings variables as endogenous, using their lagged values as instruments. The relation between shareholdings and q is larger when we do this. The signs on the ownership variables are all the same as with ordinary least squares, but the sizes of the coefficients and the t-statistics are all larger. This larger effect appears due to the elimination of the simultaneity problem discussed previously. A specification test (Hausman (1978)) to determine whether ordinary least squares or instrumental variables is the correct specification rejects the hypothesis that there is no simultaneity at the 5 % level (Chi-Square Statistic = 10.47).

One objection to these results might be that q's for the same firm in different years may not be independent observations. One solution to this problem would be to include firm-specific dummy variables into the equation. This approach, however, would eliminate all between-firm variation from the data. Since we believe that the primary force driving our results is between-firm variation, we do not adopt this

approach. We do, however, reestimate the equation using just one year of data to determine the extent of the potential bias due to non-independent observations. We choose the year 1977 because it is the central year of our sample.

The results for 1977 are shown in the third column of Table 1 using ordinary least squares and in the fourth column of Table 1 using instrumental variables. The pattern of the signs is the same for 1977 as it is for the entire sample. Once again, treating the ownership variables as endogenous increases the size of the coefficients. However, a specification test does not have sufficient power to reject the hypothesis that there is no endogeneity problem.

We are also interested in the effects of board composition on q. We estimate similar piecewise linear equations using board composition. We chose to break our sample at 40 % and 60 % outsiders, following Weisbach (1987). The pooled OLS equation analogous to those in Table 1 with the composition variables representing the marginal change in q resulting from more outsiders is as follows:

q=Controls	- .02 (.06)	Less than 40 % Outsiders	- .12 (.23)	Between 40 and 60 % Outsiders	- .18 (.26)	More than 60% Outsiders

(t-statistics are in parentheses) There is basically no effect of board composition on q. Treating board composition as endogenous makes no meaningful difference to the results.

In Table 2, we reestimate the q equations, controlling for a number of factors likely to be correlated with managerial entrenchment and the control structure of the firm. Since we expect that one way

for a CEO to become entrenched is by being a CEO for a long time, we control for CEO tenure in our q equations. We also control for the median tenure of the directors. A board which does not turn over rapidly may just be a symptom of an entrenched management which is, in the words of Fama (1980), colluding to expropriate rents from shareholders. Conversely, longer director tenures might simply signal that directors in the firm invest in firm-specific human capital to make them more proficient directors. Finally, we include a dummy variable which takes the value 1 if two or more of the directors are related in any of the years of our sample. We include this variable because family companies are sometimes believed to be fundamentally different from other companies (Mace (1971)) and we wished to control for this difference.

The results of these equations are similar to those discussed above for both shareholdings and composition. Shareholdings still seem to affect q. The effects once again seems larger when we treat the shareholdings variables as endogenous. There does not seem to be a relation between board composition and q, even treating board composition as endogenous using lagged composition as instruments.

CEO tenure does not seem to affect profitability at low levels of tenure. However, for CEOs who have been on the job more than 15 years, each additional year reduces profitability. When we treat the other variables in the equation as endogenous (the second column), this effect is significant at the 5 % level. This suggests that CEOs who remain on the job for too long become entrenched and reduce corporate

performance.

Boards with longer median tenures tend to have higher q's. However, when we treat these variables as endogenous, the effect goes away for the inside directors but not for outside directors. This result suggests that firms whose outside directors invest more heavily in firm-specific capital tend to outperform those where directors turn over more rapidly.

One potential objection to these results is that they are not generated by relations between the control structure and corporate performance. Rather, they may be generated by some spurious correlation between our variables and our measure of q. We test this objection by rerunning our regressions using an earnings-based measure of profitability. While there are many problems with this approach (Fisher and McGowan (1984)), we nonetheless feel that using the accounting measures of profitability can provide an independent check of the results using q.

The accounting measure of profitability we use is earnings before interest and taxes.[58] This measure is a particularly good one for our purposes because it is not sensitive to changes in capital structure or special tax treatments. We normalize this number by our estimate of the replacement cost of the firms assets.[59]

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[58] This variable is constructed by adding data items 15, 16, 18, and 49 on the annual COMPUSTAT industrial tape.

[59] We would like to control for industry effects in the same manner as the q equations. A problem with the COMPUSTAT tape prevented us from doing this for this version of the paper but in the future we will subtract the industry means from our dependent variable.

Piecewise linear equations predicting earnings levels are shown in Table 3. The pattern of the signs is similar to Table 2. Profitability still increases at very small ownership levels (< 1 %) and declines at moderate ownership levels (1 - 5 %). Once again these effects are larger and more significant when instrumental variables is used to control for the endogeneity of the shareholdings.

The one variable which is significant in the pooled ordinary least squares earnings equation which is not significant in the analogous q equation is the fraction of outsiders between 40 and 60 %. However, the effect goes away completely when we treat it as endogenous (the second column). Therefore, this correlation is most likely due to firms who perform poorly adding outsiders (Hermalin and Weisbach (1987)) rather than firms with outsiders on their board performing poorly.

Conclusions

We have examined the relation between the control structure of the firm and corporate profitability. We do not find an effect of board composition on profitability. This result suggests that even though board composition may play a large role in the decisions boards make regarding CEO succession (Weisbach (1987)), in the majority of cases in which it is not necessary to remove the CEO, performance does not differ systematically depending on board composition. However, because of our relatively large standard errors, this finding may be due to the lack of a sufficiently powerful test.

We also find that corporate profitability increases with ownership of top management at low levels of ownership (< 1 %) and decreases with ownership at top management at high levels of ownership. Furthermore, corporate profitability decreases with CEO tenure when the CEO tenure is at least 15 years. The increase in profitability at low levels of ownership is consistent with the idea that increased stock ownership aligns the interests of the managers and the shareholders (Jensen and Meckling (1976)). As ownership increases to more substantial levels, the CEO becomes more powerful within the firm and may have a proclivity towards dominance at the expense of other shareholders (Demsetz (1983)). This proclivity towards dominance may also explain why the effect of additional years of CEO tenure on performance is negative at high levels of tenure.

Table 1

Piecewise Linear Regressions Predicting Tobin's Q using Ownership of Top Management[a]

Sample: 134 NYSE firms in 1971, 1974, 1977, 1980, and 1983

t-statistics are in parentheses.

Variable	Coeff.	Coeff.	Coeff.	Coeff.
Constant	.227 (.94)	.105 (.52)	-.198 (.628)	-.287 (.851)
OWNL1[b]	19.20 (1.66)	34.20 (2.92)	31.72 (2.38)	38.79 (2.18)
OWN15[c]	-6.55 (1.56)	-12.53 (2.82)	-14.50 (2.63)	-21.85 (2.47)
OWN520[d]	1.72 (1.40)	2.74 (2.19)	2.52 (1.57)	5.23 (2.09)
OWNG20[e]	-1.01 (2.03)	-1.12 (2.51)	-.82 (1.28)	-1.35 (1.66)
ADV[f]	4.53 (4.16)	3.66 (4.59)	4.60 (3.69)	4.58 (3.61)
R & D[g]	5.00 (4.61)	3.85 (4.45)	4.46 (3.08)	5.05 (3.21)
ln (Assets)[h]	-.067 (2.23)	-.050 (2.10)	.001 (.03)	.009 (.225)
Estimation Method	OLS	IV	OLS	IV
Years used	All Years Pooled	All Years Pooled	1977	1977
R-Squared	.081	-----	.177	-----
Number of Observations	644	504	134	134

(Continued on Next Page)

[a] The dependent variable is an estimate of Tobin's q minus the equally weighted average of Tobin's q for all firms on COMPUSTAT in the sample firm's 2 digit SIC code.

[b] OWNL1 is the fraction of the company's stock held by the present CEO and all former CEOs still on the board if this number is less than .01 and .01 otherwise.

[c] If the fraction of the company's stock held by the present CEO and all former CEOs still on the board is both greater than .01 and less than .05, OWN15 equals this number minus .01. If it is less than .01, OWN15 equals 0 and if it is greater than .05, OWN15 equals .04.

[d] If the fraction of the company's stock held by the present CEO and all former CEOs still on the board is both greater than .05 and less than .20, OWN520 equals this number minus .05. If it is less than .05, OWN520 equals 0 and if it is greater than .20, OWN520 equals .15.

[e] If the fraction of the company's stock held by the present CEO and all former CEOs still on the board is greater than .20, OWNG20 equals this number minus .20. Otherwise, OWNG20 equals 0.

[f] The variable ADV is the company's expenditures on advertising weighted by an estimate of the replacement value of the firm's assets.

[g] The variable R & D is the company's expenditures on research and development weighted by an estimate of the replacement value of the firm's assets.

[h] The variable log(Assets) is the natural logarithm of an estimate of the replacement value of the firm's assets.

Table 2

Piecewise Linear Regressions Predicting Tobin's Q using Management Ownership, Board Composition, and CEO Tenure[a]

Sample: 134 NYSE firms in 1971, 1974, 1977, 1980, and 1983

t-statistics are in parentheses.

Variable	Coeff.	Coeff.	Coeff.	Coeff.
Constant	-.106 (.36)	-.042 (.14)	-.316 (.71)	-.933 (1.56)
OWNL1[b]	16.00 (1.35)	37.97 (3.02)	30.51 (2.16)	34.77 (1.80)
OWN15[c]	-7.73 (1.77)	-14.52 (3.07)	-14.66 (2.42)	-16.04 (1.57)
OWN520[d]	.99 (.77)	2.48 (1.85)	3.30 (1.71)	5.15 (1.62)
OWNG20[e]	-.77 (1.48)	-.77 (1.53)	-.99 (1.28)	-1.71 (1.56)
COMPL40[f]	-.04 (.09)	-.21 (.36)	-.06 (.10)	.78 (.75)
COMP4060[g]	-.18 (.34)	.005 (.007)	.32 (.50)	-.25 (.23)
COMPG60[h]	-.31 (.45)	-.29 (.34)	-.32 (.33)	.03 (.03)
CEOL5[i]	.033 (1.18)	-.024 (1.18)	-.02 (.65)	-.021 (.58)
CEO59[j]	-.022 (1.02)	.012 (.76)	-.002 (.08)	-.0038 (.15)
CEO1014[k]	.021 (.81)	.025 (1.28)	.05 (1.43)	.042 (1.19)
CEOG15[l]	-.015 (1.44)	-.018 (2.18)	-.03 (2.29)	-.034 (2.68)
MEDIN[m]	.011 (1.77)	-.0009 (.13)	0.0002 (.02)	.008 (.59)
MEDOUT[n]	.015 (1.88)	.025 (1.91)	.009 (.89)	.018 (.99)

FAMILY COMPANY[o]	.32 (2.48)	.17 (1.68)	-.005 (.03)	-.13 (.64)
ADV[p]	4.37 (3.95)	3.78 (4.49)	5.00 (3.82)	5.13 (3.70)
R & D[q]	5.55 (5.00)	4.28 (4.67)	4.64 (3.10)	4.54 (2.71)
ln (Assets)[r]	-.05 (1.73)	-.036 (1.38)	.02 (.39)	.05 (.92)
Estimation Method	OLS	IV	OLS	IV
Years used	All Years Pooled	All Years Pooled	1977	1977
R-Squared	.107	-----	.225	-----
Number of Observations	644	504	134	134

[a] The dependent variable is an estimate of Tobin's q minus the equally weighted average of Tobin's q for all firms on COMPUSTAT in the sample firm's 2 digit SIC code.

[b] OWNL1 is the fraction of the company's stock held by the present CEO and all former CEOs still on the board if this number is less than .01 and .01 otherwise.

[c] If the fraction of the company's stock held by the present CEO and all former CEOs still on the board is both greater than .01 and less than .05, OWN15 equals this number minus .01. If it is less than .01, OWN15 equals 0 and if it is greater than .05, OWN15 equals .04.

[d] If the fraction of the company's stock held by the present CEO and all former CEOs still on the board is both greater than .05 and less than .20, OWN520 equals this number minus .05. If it is less than .05, OWN520 equals 0 and if it is greater than .20, OWN520 equals .15.

[e] If the fraction of the company's stock held by the present CEO and all former CEOs still on the board is greater than .20, OWNG20 equals this number minus .20. Otherwise, OWNG20 equals 0.

[f] COMPL40 is the fraction of the company's directors who are outsiders if this number is less than .40 and .40 otherwise.

[g] If the fraction of the company's directors who are outsiders is

greater than .40 and less than .60, COMP4060 equals this number minus .01. If it is less than .01, OWN15 equals 0 and if it is greater than .05, OWN15 equals .04.

[h] COMPG60 is the fraction of the company's directors who are outsiders minus .60 if this number if greater than .60 and 0 otherwise.

[i] The variable CEOL5 is the tenure of the CEO if it is no more than 4.5 years and 4.5 otherwise.

[j] The variable CEO59 is the tenure of the CEO minus 4.5 if the CEO's tenure is greater than 4.5 years and less than 10 years. If the CEO's tenure is less than 4.5 years, CEO59 equals 0 and if the CEO's tenure is greater than 10 years, CEO59 equals 5.5.

[k] The variable CEO1014 is the tenure of the CEO minus 10 if the CEO's tenure is greater than 10 years and less than 15 years. If the CEO's tenure is less than 10 years, CEO1014 equals 0 and if the CEO's tenure is greater than 15 years, CEO59 equals 5.

[l] The variable CEOG15 is the tenure of the CEO minus 15 if the CEO's tenure is greater than 15 years. If the CEO's tenure is less than 15 years, CEO15 equals 0.

[m] MEDIN is the median tenure of the inside directors on the board.

[n] MEDOUT is the median tenure of the outside directors on the board.

[o] Family company is a dummy variable which takes the value 1 if any two directors are related.

[p] The variable ADV is the company's expenditures on advertising weighted by an estimate of the replacement value of the firm's assets.

[q] The variable R & D is the company's expenditures on research and development weighted by an estimate of the replacement value of the firm's assets.

[r] The variable log(Assets) is the natural logarithm of an estimate of the replacement value of the firm's assets.

Table 3

Piecewise Linear Regressions Predicting Earnings Levels using Management Ownership, Board Composition, and CEO Tenure[a]

Sample: 134 NYSE firms in 1971, 1974, 1977, 1980, and 1983

t-statistics are in parentheses.

Variable	Coeff.	Coeff.	Coeff.	Coeff.
Constant	.094 (3.86)	.100 (2.51)	.110 (2.01)	.085 (1.15)
OWNL1[b]	1.60 (1.64)	5.55 (3.27)	3.36 (1.94)	5.08 (2.10)
OWN15[c]	-.92 (2.55)	-2.24 (3.52)	-2.19 (2.94)	-3.75 (2.93)
OWN520[d]	.08 (.78)	.28 (1.52)	.53 (2.23)	.96 (2.41)
OWNG20[e]	.03 (.60)	.016 (.22)	-.023 (.24)	-.01 (.10)
COMPL40[f]	-.011 (.31)	-.12 (1.57)	-.039 (.52)	-.027 (.21)
COMP4060[g]	-.099 (2.29)	.02 (.18)	-.055 (.69)	-.038 (.27)
COMPG60[h]	-.036 (.63)	-.04 (.34)	-.083 (.71)	.006 (.04)
CEOL5[i]	.0025 (1.10)	.002 (.80)	.00004 (.01)	.0006 (.12)
CEO59[j]	-.0004 (.23)	.0007 (.33)	-.002 (.42)	-.0010 (.30)
CEO1014[k]	.0016 (.75)	.0015 (.58)	.008 (1.93)	.008 (1.83)
CEOG15[l]	-.0010 (1.14)	-.0008 (.77)	-.003 (1.75)	-.0025 (1.65)
MEDIN[m]	.0003 (.53)	-.0002 (.19)	-.0006 (.57)	-.0009 (.50)
MEDOUT[n]	.0007 (1.03)	.0011 (.62)	.011 (.93)	.0026 (1.18)

FAMILY COMPANY[o]	.025 (2.32)	.026 (1.86)	-.014 (.69)	-.025 (1.00)
ADV[p]	.468 (5.10)	.503 (4.44)	.50 (3.12)	.486 (2.81)
R & D[q]	.401 (4.36)	.576 (4.68)	.54 (2.96)	.646 (3.09)
ln (Assets)[r]	-.0006 (.26)	.0009 (.25)	-.001 (.22)	.0006 (.08)
Estimation Method	OLS	IV	OLS	IV
Years used	All Years Pooled	All Years Pooled	1977	1977
R-Squared	.105	-----	.206	-----
Number of Observations	644	504	134	134

[a] The dependent variable is an the level of earnings before interest and taxes for the firm in a given year weighted by an estimate of the replacement value of the firm's assets.

[b] OWNL1 is the fraction of the company's stock held by the present CEO and all former CEOs still on the board if this number is less than .01 and .01 otherwise.

[c] If the fraction of the company's stock held by the present CEO and all former CEOs still on the board is both greater than .01 and less than .05, OWN15 equals this number minus .01. If it is less than .01, OWN15 equals 0 and if it is greater than .05, OWN15 equals .04.

[d] If the fraction of the company's stock held by the present CEO and all former CEOs still on the board is both greater than .05 and less than .20, OWN520 equals this number minus .05. If it is less than .05, OWN520 equals 0 and if it is greater than .20, OWN520 equals .15.

[e] If the fraction of the company's stock held by the present CEO and all former CEOs still on the board is greater than .20, OWNG20 equals this number minus .20. Otherwise, OWNG20 equals 0.

[f] COMPL40 is the fraction of the company's directors who are outsiders if this number is less than .40 and .40 otherwise.

[g] If the fraction of the company's directors who are outsiders is greater than .40 and less than .60, COMP4060 equals this number minus .01. If it is less than .01, OWN15 equals 0 and if it is greater than .05, OWN15 equals .04.

[h] COMPG60 is the fraction of the company's directors who are outsiders minus .60 if this number if greater than .60 and 0 otherwise.

[i] The variable CEOL5 is the tenure of the CEO if it is no more than 4.5 years and 4.5 otherwise.

[j] The variable CEO59 is the tenure of the CEO minus 4.5 if the CEO's tenure is greater than 4.5 years and less than 10 years. If the CEO's tenure is less than 4.5 years, CEO59 equals 0 and if the CEO's tenure is greater than 10 years, CEO59 equals 5.5.

[k] The variable CEO1014 is the tenure of the CEO minus 10 if the CEO's tenure is greater than 10 years and less than 15 years. If the CEO's tenure is less than 10 years, CEO1014 equals 0 and if the CEO's tenure is greater than 15 years, CEO59 equals 5.

[l] The variable CEOG15 is the tenure of the CEO minus 15 if the CEO's tenure is greater than 15 years. If the CEO's tenure is less than 15 years, CEO15 equals 0.

[m] MEDIN is the median tenure of the inside directors on the board.

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[o] Family company is a dummy variable which takes the value 1 if any two directors are related.

[p] The variable ADV is the company's expenditures on advertising weighted by an estimate of the replacement value of the firm's assets.

[q] The variable R & D is the company's expenditures on research and development weighted by an estimate of the replacement value of the firm's assets.

[r] The variable log(Assets) is the natural logarithm of an estimate of the replacement value of the firm's assets.

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