

**FIRM PERFORMANCE AND MECHANISMS  
TO CONTROL AGENCY PROBLEMS  
BETWEEN MANAGERS AND SHAREHOLDERS**

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between Managers and Shareholders**

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## **Firm Performance and Mechanisms to Control Agency Problems between Managers and Shareholders**

### **Abstract**

This paper examines firms' choice of the mix of mechanisms used to reduce agency problems between managers and shareholders. We empirically address two questions. First, is there interdependence between the use of the various "control mechanisms"? Second, does cross-sectional evidence suggest that firms fail to adjust their use of these control mechanisms optimally? We consider the use of seven control mechanisms in a sample of nearly 400 large U.S. firms. These mechanisms are: shareholdings of insiders, institutions, and large blockholders; use of outside directors; debt policy; the labor market for managers; and the market for corporate control. We present two main empirical findings. First, there is evidence of interdependence among the use of these mechanisms. Second, given this interdependence, cross-sectional OLS regressions of single mechanisms on firm performance can be misleading. Like prior studies, we find a positive effect of insider shareholding on firm performance when insider shareholding is examined alone. However, this effect disappears when all of the mechanisms are included in an OLS estimation and when the relation is estimated within a systems framework. We also find a negative effect of a larger fraction of outside directors, greater debt, and more activity in the market for corporate control on firm performance in OLS estimations, but only the negative effect of board composition persists in the systems framework. The lack of a relation between insider shareholding and firm performance in the more inclusive estimations is consistent with the argument in Demsetz and Lehn (1985) that firms choose ownership structures optimally. In contrast, the persistent negative relation between board composition and firm performance suggests that boards contain too many outsiders.

## Firm Performance and Mechanisms to Control Agency Problems between Managers and Shareholders

Corporate managers are the agents of shareholders. This relation creates a problem for shareholders who must find ways to induce managers to pursue shareholder interests. Jensen and Meckling (1976) point out that this agency problem arises whenever a manager owns less than 100 percent of the firm's shares. Because the manager bears only a fraction of the cost when his behavior reduces firm value, he is unlikely to act in the (other) shareholders' best interest. One obvious mechanism that can work to reduce the agency problem is increased manager (insider) shareholding. But, even where managerial wealth permits, this is costly since it precludes efficient risk bearing. Other mechanisms are also available. More concentrated shareholdings by outsiders can induce increased monitoring by these outsiders and so improve performance by a firm's own managers. Similarly, greater outside representation on corporate boards can result in more effective monitoring of managers (Fama and Jensen, 1983) and so better performance. Greater reliance on debt can improve performance by inducing increased scrutiny from lenders (Jensen, 1986). Fama (1980) argues that the market for managers also can improve managerial performance by causing managers to become concerned with their reputations among prospective employers. And Manne (1965) and Jensen and Ruback (1983) argue that the threat of a takeover in the market for corporate control can impose a powerful discipline.

Each of these several "control mechanisms" (i.e., mechanisms to control manager-shareholder agency problems) *can* work to improve managerial performance, but *do* they? One strain of empirical work, and the focus of this paper, attempts to answer this question directly by searching across firms for relations between firm performance and greater use

of one or more of the control mechanisms.<sup>1</sup> Most noteworthy are a series of papers that examine the effect of more concentrated shareholdings on firm performance. Demsetz and Lehn (1985) find no cross-sectional relation between accounting rates of return and the concentration of shareholdings. In contrast, Morck, Shleifer and Vishny (1988a) find a nonlinear relation between the fraction of stock held by members of the board and firm performance as measured by Tobin's Q (and a less significant relation when firm performance is measured by accounting rate of return). At least when the fraction of shares held by the board is small, greater board shareholding improves performance. McConnell and Servaes (1990) find a similar nonlinear relation and, in addition, find a positive effect on firm performance from greater shareholding by institutions and large blockholders. Hermalin and Weisbach (1991) also note a nonlinear effect of insider shareholding in the course of an analysis of board composition and firm performance. While these findings are mixed, the latter papers imply that firms perform better when managers own a nontrivial fraction of the firm's shares and so seem to support recent calls for greater accountability in managerial compensation (see, e.g., Crystal, 1991; and Jensen and Murphy, 1990). These

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<sup>1</sup>Another strain looks at a particular event that alters the extent to which a mechanism is employed, such as the addition of an outside director to the firm's board (Rosenstein and Wyatt, 1990). If the event triggers an unexpected increase in the firm's stock price, this suggests that the mechanism works to improve performance. Other studies in this vein look at the adoption of antitakeover amendments (DeAngelo and Rice, 1983; Linn and McConnell, 1983; and Jarrell and Poulsen, 1987), poison pills (Malatesta and Walkling, 1988; and Ryngaert, 1988), dual-class voting structure for common stock (Partch, 1987; and Jarrell and Poulsen, 1988), state antitakeover laws (Karpoff and Malatesta, 1989), executive stock and option plans (Bhagat, Brickley and Lease, 1985; Brickley, Bhagat and Lease, 1985; and DeFusco, Johnson and Zorn, 1990), and golden parachute contracts (Lambert and Larcker, 1985).

calls seek a closer tie between managerial compensation and stock price performance as would occur automatically if managers owned more shares.<sup>2</sup>

It is this empirical literature and the related public policy prescriptions that motivate the present paper. We make two simple arguments. First, since alternative control mechanisms exist, more extensive use of one mechanism need not be positively related to firm performance. Where one specific mechanism is used less, others may be used more, resulting in equally good performance. The existence of alternative control mechanisms and their possible interdependence make regressions relating the use of any single mechanism to firm performance difficult to interpret. Because such regressions fail to consider interrelations among the control mechanisms, any findings may be spurious. Second, the extent to which several of the control mechanisms are used is decided within the firm. Examples are insider shareholding and the number of outsiders on the board. We (like Demsetz and Lehn) expect these choices will be made to maximize firm value (use of a mechanism will be increased until marginal costs and marginal benefits to the firm are just equal). Other mechanisms, like activity in the market for corporate control, are determined by external parties and so need not be chosen to maximize firm value. Consequently, a cross-sectional search for the effects of all mechanisms on firm performance (that properly accounts for their interdependence) should find no effect for the internally chosen mechanisms but may find an effect for those chosen externally. Our two arguments are not

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<sup>2</sup>And policy makers have responded. A recent change in the corporate income tax bars public corporations from deducting compensation paid to an executive that exceeds \$1 million unless this payment is based on performance criteria established by shareholders.

new, but they have been largely ignored in the literature.<sup>3</sup> Our contribution is to restate these arguments and to examine them empirically. To do this, we have collected data for nearly 400 large U.S. firms. This sample allows us to measure insider shareholding, institutional shareholdings, shareholdings of large blockholders (i.e., 5 percent owners), representation of outsiders on the board of directors, use of debt, use of the external labor market for managers, and takeover activity.

This paper has two purposes. First, we recognize the likely interdependence among alternative control mechanisms and seek to explain the use of each within a simultaneous equations system, after controlling for other determinants of each mechanism. This allows us to determine if, in fact, any of the mechanisms are substitutes or complements. A finding of interdependence suggests that empirical analyses relating firm performance to the use of control mechanisms, that do not take this interdependence into account, may be misleading. Second, we examine the effect of the control mechanisms on firm performance as measured by Tobin's Q. To do this, we first regress Tobin's Q on individual control mechanisms, ignoring the existence of alternative mechanisms and their possible interdependence. We

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<sup>3</sup>But not entirely. Several recent papers have been concerned with the interaction among control mechanisms. Jensen, Solberg and Zorn (1992) and Moyer, Rao and Sisneros (1992) both consider possible interactions. Jensen, Solberg and Zorn examine empirically the simultaneous determination of insider ownership, debt policy and dividend policy. Moyer, Rao and Sisneros consider substitutability among board composition, insider ownership, institutional shareholding, analyst following, debt policy and dividend policy, but not in a simultaneous system framework. Papers by Hermalin and Weisbach (1991) and by Holthausen and Larcker (1993) are most similar in approach to our own. Hermalin and Weisbach consider, in a simultaneous equations framework, the interaction between insider ownership and board composition. Their focus, however, is on the effect that these control mechanisms have on firm performance. Likewise, Holthausen and Larcker consider the interrelations among insider ownership, debt policy and firm performance.

next regress Tobin's Q on all of the mechanisms together. Finally, we estimate a simultaneous equations system that includes all of the mechanisms along with Tobin's Q.

Our results show evidence of interdependence among the control mechanisms. Further, we find that when examined alone, insider shareholding, outside representation on the board, debt policy, and activity in the market for corporate control all have a cross-sectional effect on firm performance. When all the mechanisms are examined together, but not within a systems framework, the effect of insider shareholding on firm performance disappears but that of board composition, debt policy, and activity in the market for corporate control remain. When the interdependence among mechanisms is accounted for in a simultaneous system estimation, only the (negative) effect on firm performance of outsiders on the board persists. These findings are consistent with control mechanisms being chosen optimally except for board composition. Boards of directors seem to have too many outsiders. Since the composition of the board is determined internally, this finding is puzzling.

The remainder of this paper is organized as follows. Section I discusses the relationships among the alternative control mechanisms and, in turn, their relationship with firm performance. Section II details our empirical approach. Section III describes the sample and data. Section IV presents our empirical findings, and section V concludes.

## **I. Relationships among the Control Mechanisms and with Firm Performance**



Four broad mechanisms work to provide incentives to managers and so alleviate the agency problems between managers and shareholders. Three rely on parties outside the firm to monitor managers, and one relies on parties within the firm. The first three are: the use of debt, which relies on capital markets to evaluate a manager's performance (greater debt induces greater monitoring by lenders); the market for managers which assesses a manager's performance and determines his opportunity wage; and the market for corporate control, which relies on takeover specialists to identify and discipline poorly performing managers. The fourth mechanism is monitoring by the firm's own large shareholders and board members. This fourth mechanism, however, creates its own agency problem - how to monitor the monitors. Again, several solutions are possible. More concentrated shareholdings by insiders (officers and directors) provide a greater incentive to effectively monitor and reward the chief executive. Similarly, more concentrated shareholdings by outsiders (institutions or blockholders) also provide an incentive for diligent monitoring. Finally, the market for directors (like the market for managers) serves to motivate outside directors and so, greater use of outside directors can lead to more effective internal monitoring.

In our characterization, then, there are seven control mechanisms (the first three broad mechanisms and the four ways to facilitate the fourth broad mechanism). Two features of our characterization are noteworthy. First, we distinguish control mechanisms by the source of the monitoring (assessment of managerial behavior) that takes place. The use of debt relies on the capital market for monitoring. Similarly, the market for managers relies on prospective employers; the market for corporate control relies on prospective

acquirers; insider shareholding relies on inside owners; institutional shareholding relies on institutional owners; blockholding relies on large outside owners; and use of outsiders on the board relies on these board members. Since each mechanism relies on different actors, we treat them as fundamentally different.<sup>4</sup>

Second, the decision on the extent to which a particular mechanism is used is sometimes made within the firm (internally) and sometimes made outside the firm. We expect choices of internally selected mechanisms to take into account any interrelations and so be made to maximize firm value. Choices made external to the firm need not maximize firm value. Internal choices include the extent of insider shareholdings, the representation of outsiders on the board, a firm's reliance on the external labor market for managers, and the use of debt financing. External choices include institutional shareholdings, large blockholdings, and activity in the market for corporate control.

Since all of these control mechanisms are alternative ways to provide incentives to managers, all seven might plausibly be substitutes. But they need not be. Complementary relationships might also exist. Consider, for example, the market for corporate control. Since takeover specialists must acquire control of a firm in order to displace poorly performing managers, greater inside shareholding might assist the market for corporate control by making insiders less obstructive (since they gain more from the stock price

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<sup>4</sup>Other "control mechanisms" have been suggested in the literature. For example, Moyer, Rao and Sisneros (1992) include dividend policy, and Holthausen and Larcker (1993, fn. 3) suggest that the form of the compensation contract may also be important. We do not include these partly because they introduce no new actors and partly to limit the number of mechanisms that we consider.

appreciation).<sup>5</sup> So, insider shareholding may substitute or complement the market for corporate control as mechanisms to provide incentive to managers.<sup>6</sup> A similar argument can be made for the relation between the market for corporate control and greater representation of outsiders on the board. Likewise, greater institutional shareholdings might facilitate takeovers<sup>7</sup> as could bigger blocks held by outsiders (both because transaction costs may be less and because the size of these holdings would reduce the free-rider problem that could lead small shareholders to refuse to tender).<sup>8</sup> Finally, greater reliance on the external managerial labor market means that a manager has less to fear from displacement. As a consequence, he is less likely to resist a takeover attempt. So, several of the other mechanisms might plausibly complement (or substitute for) the market for corporate control. A similar ambiguity exists for the relations between many of the mechanisms. Given this

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<sup>5</sup>The evidence in Walkling and Long (1984) and Cotter and Zenner (1994) is consistent with this possibility.

<sup>6</sup>The empirical evidence on this issue is mixed. Morck, Shleifer and Vishny (1988b) find that managerial shareholding ( $\alpha$ ) has a positive effect on the probability of a friendly acquisition of the firm, but has no effect on the probability of a contested acquisition. Both Mikkelson and Partch (1989) and Song and Walkling (1993) find that high  $\alpha$  reduces the probability of a takeover bid for the firm; Mikkelson and Partch also find that it increases the chance that an attempt, once made, is successful. However, Ambrose and Megginson (1992) find no relation between  $\alpha$  and the probability of becoming a target.

<sup>7</sup>Ambrose and Megginson (1992) find that the probability of receiving a takeover bid is unrelated to the level of institutional shareholdings.

<sup>8</sup>See Shleifer and Vishny (1986). Shivdasani (1993) finds that the probability of receiving a hostile takeover bid is unrelated to the shareholdings of all large blockholders. Dividing blockholders into those likely to be affiliated with management and those not, however, yields a relationship. Greater affiliated blockholdings reduce the probability of a hostile takeover, but greater unaffiliated blockholdings increase it.

ambiguity, we cannot test for particular relations but we can explore these relations empirically and use our results to interpret the forces at work. This is our first task.

Of the seven alternative control mechanisms, four are selected by those making internal decisions within the firm and three are determined by "outside" parties. Insider shareholding, outside representation on the board, reliance on debt financing, and reliance on external labor markets are all internal decisions. Institutional shareholdings, outsider blockholdings, and activity in the market for corporate control are decisions made by outsiders (those not involved with decision making within the firm).

Will decisions about the extent of use of each of these mechanisms be made optimally? That is, greater use of each mechanism yields a benefit by improving managerial incentives but also entails a cost. This cost might be a direct cost, for example the additional cost of risk bearing due to the loss of portfolio diversification associated with greater insider shareholding, or an indirect cost, for example the greater cost of internal contracting when takeovers are more likely (Knoeber, 1986). Optimal choices require the use of a mechanism to be increased until marginal benefit just offsets marginal cost. For those mechanisms chosen internally by decision makers within the firm, all of the costs and benefits should be considered. For example, while a manager might choose to hold too few shares when making an independent decision (since he bears all of the cost of lost diversification and enjoys only a part of the benefit from better firm performance), we would expect the extent of insider shareholding to be negotiated within the firm (not chosen independently by each manager) and so to reflect all of the costs and benefits. Conversely, for those mechanisms chosen by "outside" parties, we would not necessarily expect optimal

(firm value maximizing) choices. For example, a takeover decision will be made on the basis of the benefit and cost to the acquirer. Gains going to other parties (shareholders of the target) will be ignored. Likewise, costs incurred by other parties (as when additional takeover activity interferes with internal contracting) will be ignored. As a result, it is possible for greater takeover activity to yield marginal benefits greater or less than marginal costs.

If the four "internally chosen" mechanisms are selected optimally, there should be no cross-sectional relation between firm performance and the extent to which these mechanisms are used. This is not to say that the mechanisms are ineffective. If a firm alters the use of one of these mechanisms, this will likely lead to a change in managerial behavior and so to a change in the firm's performance. But if these mechanisms are chosen optimally, any cross-sectional variation in their use reflects differences in firms' underlying environments, *not* mistaken choices. As a consequence, no cross-sectional relation should exist between the extent to which these mechanisms are used and firm performance.<sup>9</sup> In contrast,

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<sup>9</sup>If firms were *forced* to alter their use of these mechanisms, performance would worsen. An informative case study is found in Karpoff and Rice (1989). The Alaska Native Claims Settlement Act of 1971 (ANCSA) created a number of regional corporations and made each Native American in Alaska a shareholder (100 shares each) in one of these firms. Moreover, the Act made shares in the ANCSA firms non-transferable. The effect was to eliminate the market for corporate control, blockholding, and institutional shareholding (among our mechanisms) and to provide no opportunity to adjust insider shareholding from minuscule levels. These legislative constraints on the firms' choices of control mechanisms should lead to more severe agency problems between managers and shareholders and to poorer firm performance. Indeed, Karpoff and Rice find that the ANCSA corporations perform much worse than unconstrained firms in a control sample. Interestingly, they also find that the ANCSA firms seem to employ other mechanisms (such as direct communication between managers and shareholders) to replace those that are prohibited. That is, while these firms underperform unconstrained firms, their choice of control mechanisms may well be optimal subject to the constraints imposed by legislation.

variation across firms in the use of the three "externally chosen" mechanisms may reflect both differences in firms' environments *and* non-optimal (not firm value maximizing) choices. So, there may be a cross-sectional relation between firm performance and the extent to which the three "externally chosen" mechanisms are used. Our second task is to test this hypothesis.

## II. Empirical Approach

Because the productivity of one control mechanism may depend on the extent to which others are used, the choice of any of the seven control mechanisms may well depend upon choices of the other six. But the extent to which a mechanism is used depends on other factors as well. These other factors are largely related to the technology of production, the markets in which the firm operates and characteristics of the CEO. We treat these other factors as exogenous.<sup>10</sup>

Consider first insider shareholding. Measured as the percentage of shares owned by officers and directors, POD, we expect this to depend not only on choices of the other control mechanisms but also negatively on the cost of such shareholding (loss from holding

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<sup>10</sup>For several of these other factors, it might be claimed that they too are endogenous. For example, we treat firm size and the variability of returns to shareholders as exogenous. While each of these is largely dependent on outside determinants (economies to scale in production and the stochastic nature of input and output markets), each can also be argued to depend upon decisions made within the firm (well managed firms tend to grow and hedging, insurance, investment, and financing decisions affect the variability of shareholder returns). We treat these other factors as exogenous both because we believe that most of the variability among firms in these factors is exogenous and because this provides a practical way to keep our focus on the endogeneity of the control mechanisms.

an undiversified portfolio), as proxied by the standard deviation of stock returns,  $\sigma_s$ , and firm size, ASSET. Four other variables might also matter. Regulation, REG, may restrict the options open to a manager and so reduce the need for any incentive mechanism (Demsetz and Lehn, 1985). So REG should be negatively related to POD. A longer TENURE as CEO both allows for more accumulation of shares by the top manager and takes the firm closer to the CEO's "end period", where insider shareholding may be most valuable (Dechow and Sloan, 1991) and so should be positively related to POD. A FOUNDER may be inclined to hold shares for non-pecuniary reasons, suggesting a positive relation between FOUNDER and POD. Finally, POD should be positively related to the number of officers and directors, NOD, since the cost of insider shareholdings (resulting from under-diversified portfolios) should be less when these shares are divided among a larger number of insiders. To summarize

(1) POD(Other Mechanisms,  $\sigma_s$ , ASSET, REG, TENURE, FOUNDER, NOD)

Similarly, we expect that shareholdings by outside blockholders, measured as the percentage of shares owned by 5% owners, PFIVE, will be related negatively to  $\sigma_s$ , ASSET, and REG. Further as suggested by Zeckhauser and Pound (1990), as the industry average R & D to asset ratio, RDAI, rises technology becomes more firm-specific, making outside monitoring less effective. So, PFIVE should be negatively related to RDAI.

(2) PFIVE(Other Mechanisms,  $\sigma_s$ , ASSET, REG, RDAI)

Shareholdings by institutions, measured as the percentage of shares owned by them, PINST, should depend positively on ASSET (institutions tend to hold larger stakes in big firms) and negatively on REG (again, because regulation may reduce the extent of the

agency problem between managers and shareholders). But given the size of institutional portfolios, PINST is unlikely to depend on  $\sigma_s$ . PINST should, however, depend positively on the attractiveness of the industry to institutions as measured by the average number of institutional shareholders for firms in the industry, NINSTI, and (for liquidity reasons) listing on the New York Stock Exchange, NYSE.

(3) PINST(Other Mechanisms, ASSET, REG, NINSTI, NYSE)

The extent of outsider membership on the board, measured as the percentage of board seats held by non-officers, OBOARD, should depend positively on ASSET (since the greater visibility of large firms may induce more board seats devoted to representatives of the public, for example consumer or environmental interests), and negatively on REG and FOUNDER (presuming founders tend to be autocratic). Additionally, as a firm is more diversified (as measured by the number of lines of business in which it is engaged, LOB3), outsiders each with knowledge of a particular line may comprise a larger share of the board seats.

(4) OBOARD(Other Mechanisms, ASSET, REG, FOUNDER, LOB3)

We measure a firm's reliance on the market for managers inversely by the length of time the CEO has been employed by the firm (not just as CEO). This variable is intended to indicate a manager's firm-specific human capital, FSHC. We expect FSHC to depend on the extent to which other control mechanisms are used. It should also depend positively on the AGE of the CEO and on REG (since regulation reduces the agency problem and FSHC is an inverse measure of reliance on the market for managers). The effect of FOUNDER on FSHC is ambiguous. Founders will have been with their firms longer than non-founders,



but FSHC may be shorter for founders because their firms are likely to be younger. In addition, the number of other firms in the same (three-digit SIC) industry provides a measure of outside job opportunities available to a manager, JOBS3, that should be positively related to a firm's use of the external market for managers and so negatively related to FSHC.

(5) FSHC(Other Mechanisms, FOUNDER, AGE, REG, JOBS3)

A firm's use of debt measured by the debt to firm value ratio, D/V, should depend positively upon firm size, ASSET, as the (expected bankruptcy) costs of debt should be smaller for large firms. D/V should also depend negatively on both REG (regulation reduces the agency problem) and the firm's cash-flow return, CR, since the availability of internal funds provides an alternative to debt financing.<sup>11</sup>

(6) D/V(Other Mechanisms, ASSET, REG, CR)

Finally, we measure activity in the market for corporate control, PACQ, by the fraction of firms acquired over the preceding seven years within the same two-digit SIC

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<sup>11</sup>Prior studies have examined other potential determinants of observed corporate debt ratios with mixed results. For example, Titman and Wessels (1988) considered the collateral value of assets, non-debt tax shields, growth opportunities, and cash flow volatility. They found each to have an insignificant effect on debt ratios (see their Table IV, Panel 1, LT/MVE). Likewise, while Bradley, Jarrell and Kim (1984) found non-debt tax shields to be positively related to debt ratios, Long and Malitz (1985) found them to be negatively related. We also considered a more extensive list of explanatory variables for equation (6). This list included the collateral value of assets, growth opportunities (measured by capital expenditures), non-debt tax shields (all three variables normalized by total assets), and the volatility of cash flow along with those variables specified in (6). In this expanded specification, the collateral value of assets, non-debt tax shields, and capital expenditure always proved insignificant and the volatility of cash flow, when significant, entered with the wrong (positive) sign. Because these additional variables seemed primarily to add noise to the system, we adopted the more spare specification given in (6).

industry. We include this variable as one of the Other Mechanisms in equations (1)-(6), but since it is an industry measure, we do not seek to explain PACQ, itself.

Each of the control mechanisms depends upon all of the others as specified in equations (1)-(6). To empirically estimate these relationships, we adopt a simultaneous equations framework and employ the two-stage least squares (2SLS) procedure.

Our second task is to examine the cross-sectional effect of the control mechanisms on firm performance. To do this, we employ Tobin's Q as a measure of firm performance. While the extent to which the control mechanisms are used may affect firm performance, other variables will too. Following Morck, Shleifer and Vishny (1988a), we control for expenditure on R&D and expenditure on advertising, each measured relative to ASSET (RDA and ADVA). Both are observable measures of intangible assets, which should be positively related to Q. Finally, we control for firm size, measured by ASSET, since growth opportunities, and therefore Q, should be less for larger firms. So we have

$$(7) \quad Q(\text{All Mechanisms, RDA, ADVA, ASSET})$$

We estimate (7) two ways. First, we use OLS. This allows us to examine the effect of all the control mechanisms together but treats each as exogenous. Second, we include (7) along with (1)-(6) in a simultaneous system (with Q also included as an independent variable in (1)-(6)) and use two-stage least squares (2SLS) to estimate the system. This treats Q as endogenous along with the control mechanisms allowing each of the mechanisms to affect Q but also allowing Q to affect the choice of each mechanism.

### III. Sample and Data

Our sample begins with the set of "Forbes 800" firms. These are firms that appear in any of the four lists, made by Forbes magazine, of the 500 largest U.S. firms as measured by sales, total assets, market value of equity or profits. For each firm, we obtain the following data for 1987 (or for the end of 1987 in the case of stock items) from Forbes magazine's annual survey of top executive compensation: the CEO's age (AGE), tenure as CEO (TENURE), number of years with the firm (FSHC), and whether he is the founder of the firm (FOUNDER = 1, if founder; 0, otherwise). Data on the ownership structure of each firm, viz., the percentage of outstanding equity owned by officers and directors (POD), institutions (PINST), and five percent owners (i.e., owners of 5% or more of the outstanding equity)(PFIVE), as well as the number of officers and directors (NOD) and the number of institutional owners (NINSTI is the industry average of this measure at the 3-digit SIC level) is obtained from DISCLOSURE CD-ROM, which compiles this data from corporate proxy statements.<sup>12</sup>

We obtain the following items of data from the Standard and Poor's Register of Corporations, Directors and Executives: the number of members of the board of directors, the number of outside (non-employee) directors (the percentage of outside directors is

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<sup>12</sup>Unfortunately, DISCLOSURE does not report the number of officers and directors. We proxy this number as the number of insiders as defined by the SEC (i.e., officers, directors and 10% owners) minus the number of five percent owners, both of which are reported by DISCLOSURE. Thus, our proxy for the number of officers and directors is an underestimate. However, the magnitude of this bias is not large. The number of owners who hold between 5% and 10% of equity is small in our sample, given that the median number of owners of 5% or more of the equity is 1 (first quartile = 0, third quartile = 3).

OBOARD), and the number of different lines of business in which a firm operates (LOB3).<sup>13</sup> Next, the following data items are obtained from COMPUSTAT annual files (Industrial, Industrial Research, OTC and OTC Research): Total assets (ASSET), Tobin's Q, cash flow return (CR) and the ratios of debt to firm value (D/V), R & D expenses to total assets (RDA; RDAI is the average of this measure for the 3-digit SIC industry of the firm), and advertising expenses to total assets (ADVA). Tobin's Q is defined as the simple Q measure,  $Q_s$ , in Perfect and Wiles (1994):

$$Q = \frac{V}{ASSET}$$

where:

$$V = EQUITY + LTD + STD + PFD + CV$$

EQUITY = Market value of equity,

LTD = Book value of long-term debt,

STD = Book value of short-term debt,

PFD = Preferred stock at liquidating value,

CV = Book value of convertible debt and convertible preferred stock,

ASSET = Book value of total assets.<sup>14</sup>

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<sup>13</sup>The S & P Register reports up to 20 different 4-digit SIC industry codes for a firm. We estimate the number of lines of businesses of a firm as the number of different 3-digit SIC industries in which it operates.

<sup>14</sup>If any of the variables R & D, ADVTG, LTD, STD, PFD, or CASHS is missing for a firm on COMPUSTAT, but its ASSET is reported, we replace it with the firm's ASSET multiplied by the average ratio of R&D/ASSET, ADVTG/ASSET, etc. for all firms on COMPUSTAT files in the 3-digit SIC industry of the firm. For a few variables in a few industries, where an average ratio for a certain variable cannot be computed at the 3-digit level, we compute it at the 2-digit level. This approach is borrowed from Morck, Shleifer and Vishny (1988a, fn.6).

Perfect and Wiles report that this measure of Q has a correlation of .93 with that estimated using the Lindenberg and Ross (1981) approach. We adopt the simple measure of Q because of this high correlation, its ease of computation and to maximize the availability of data.

Following Healy, Palepu, and Ruback (1992), we define the operating cash flow return on market value of assets as:

$$CR = \frac{OCF}{V}$$

and the debt to firm value ratio as:

$$D/V = \frac{LTD + STD + PFD - CASHS}{V}$$

where:

OCF = Sales - Cost of goods sold - Selling and Administrative expenses +  
Depreciation

CASHS = Cash and marketable securities.

We calculate the standard deviation of stock returns ( $\sigma_s$ ) of each firm using the 60 monthly observations on rate of return from January 1983 to December 1987 from CRSP files.<sup>15</sup> We estimate the probability of acquisition for a firm (PACQ) as the relative frequency of acquisitions of NYSE firms in its 2-digit SIC industry over the seven year period preceding December 31, 1987. This procedure is based on Palepu's (1986) evidence that the industry of a firm is an important determinant of its probability of acquisition. The exact procedure we use is as follows. We obtain a list of all firms that were listed on NYSE

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<sup>15</sup>Where some observations are missing, we require a minimum of five return observations to compute  $\sigma_s$ .

as of December 31, 1980 from CRSP files. Out of these firms, we next identify all firms that were delisted over the next seven years due to a merger or reorganization. We then compute an industry-specific probability of acquisition over this period using the 2-digit SIC code.<sup>16</sup> Next, we compute the job opportunities for CEOs of these firms as the number of NYSE firms in their 3-digit SIC industries (JOBS3). Finally, we define a firm to be regulated (REG = 1), if its primary SIC code indicates that it is a railroad, public utility, banking, finance, or insurance firm (two-digit SICs 40, 48, 49, 60, 61, or 63); otherwise, REG = 0.

Table 1 presents summary statistics of these variables. Sample size ranges from 549 to 770 firms for the various variables, depending upon data availability. The average equity ownership of officers and directors in our sample is 7.4% (median = 2.2%). Institutions and 5% owners hold a median of 45.5% and 10.4% of the outstanding equity, respectively. The median firm in our sample has 18 officers and directors and 127 institutional owners.

The typical (median) CEO of our sample firms is 57 years old, has been with the firm for a total of 25 years and has served as CEO for the last six years. About 7.3% of these CEOs are also founders of their firms. Approximately three-fourths of the board members of the typical firm are outsiders (non-employees). About 30% of the NYSE firms in the 2-digit SIC industry of the typical firm were acquired over the seven year period 1981-87. The

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<sup>16</sup>We did not use 3- or 4-digit SIC industry codes for this purpose, in order to avoid forcing the probability of acquisition to equal zero due to the small number of firms in some industries using these narrower industry definitions. We chose the NYSE firms for this purpose because they are large firms, similar to the Forbes 800 population.

median firm in our sample operates two lines of business (at the 3-digit SIC level). About 24% have just one line of business, and 30% are in 5 or more industries.

The average firm in our sample had assets totaling \$7.9 billion (median = \$3.2 billion) at the end of 1987. Average Tobin's Q of our sample firms is 0.97 (median = 0.81). The median cash-flow return (CR) of our sample firms is 15% and the median financial leverage ratio (D/V) is 14%. The median firm annually spends about 0.2% of its assets on research and development and 0.1% of assets on advertising. The standard deviation of monthly stock returns of the typical firm is 8.9%. About three-fourths of the firms in our sample are listed on the NYSE, and about 41% are in regulated industries.

#### **IV. Empirical Findings**

Our first task is to examine relationships among the alternative control mechanisms. To begin, consider the correlation matrix presented in Table 2. Significant correlations exist between eight control mechanism pairs, suggesting that decisions to use these mechanisms are interdependent. But simple correlations may be deceptive.

To more carefully assess the relationships among the control mechanisms, we estimate the functions described in (1)-(6) as a system of linear equations using 2SLS. Except for PACQ, for which we do not have firm level data, each of the control mechanisms appears on the left hand side of one equation and the right hand side of each of the others. For this estimation as well as all subsequent ones, we restrict the sample to firms for which

we have observations on all variables. This reduces the size of our sample to 383 firms.<sup>17</sup>

Results of the 2SLS estimation are presented in Table 3.<sup>18,19</sup>

First, look at the coefficients on the exogenous variables. These coefficients generally have the predicted sign but are often statistically insignificant. This suggests that the coefficient estimates for the endogenous (control mechanism) variables may be noisy. Despite this, there is an interesting pattern of interdependence among several of the control mechanisms. A more active market for corporate control (PACQ) leads to greater shareholding by blockholders (PFIVE) and by institutions (PINST) suggesting complementarity between large outside shareholders and the market for corporate control.<sup>20</sup> Further, shareholding by blockholders and by institutions appear to be alternative avenues for outsider activism (more of either leads to less of the other). Firm-specific human capital of the CEO (FSHC) affects none of the other mechanisms, but is itself reduced by outside blockholding and institutional shareholding. Apparently, active outside shareholders create pressure to rely more on the labor market in order to evaluate

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<sup>17</sup>In most regards, this smaller sample is quite similar to that described in Table 1. The one noteworthy difference is that the smaller sample contains a much smaller fraction of regulated firms. In Table 1, 41% of firms were regulated; of the 383 firms for which we have data on all variables, only 23% are regulated.

<sup>18</sup>Identification of the system of equations requires exclusion restrictions. These restrictions appear to hold in the data. Using Basmann's (1960) test, we find that the null hypothesis of overidentification can not be rejected at the 5% level for any of the equations.

<sup>19</sup>In these estimates as well as those subsequently reported in Tables 4 and 5, we normalize the distribution of firm size (ASSET) by using its natural log, LASSET.

<sup>20</sup>Since we cannot estimate an equation with PACQ on the left hand side, our evidence is only that a more active market for corporate control promotes large outside shareholding. We cannot say whether or not large outside shareholding also promotes takeovers.



managers. Finally, none of the other mechanisms affect either insider shareholding (POD) or the use of outsiders on the board of directors (OBOARD), but an increase in each of these leads to greater use of debt (D/V). This suggests that the discipline implied by more scrutiny from lenders is most effective when coupled with greater internal monitoring (either by inside shareholders or outside members of the board).

Because Table 3 offers some, but not extensive, evidence of interdependence among the control mechanisms, we proceed along two paths in examining the relation between the mechanisms and firm performance. The first ignores any endogeneity of the control mechanisms and estimates (7) using OLS. The second allows for endogeneity and estimates (7) as part of a system along with (1)-(6). Before doing either, however, we first estimate regressions where firm performance depends upon only a single control mechanism. Variants of these estimations are typical in the literature and ignore both the availability of alternative mechanisms to improve performance and the possible endogeneity of these mechanisms. In Table 4, we present results from these OLS estimations where firm performance as measured by Tobin's Q is regressed on individual control mechanisms along with the other determinants of performance described in (7). We also include a binary variable, FIN, which takes the value one for financial firms. Our rationale is that the definition of assets for financial firms causes their Q to be systematically different from that for other firms.<sup>21</sup> The first seven columns in Table 4 display these results for each of the seven control mechanisms. The last column allows for the non-linear effect of insider

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<sup>21</sup>Demsetz and Lehn (1985) include a dummy variable for such firms. McConnell and Servaes (1990) exclude financial firms from their sample. Excluding financial firms has little qualitative effect on our results.

shareholding on firm performance first documented by Morck, Shleifer and Vishny (1988a). Outside representation on the board of directors, more debt financing, and a more active market for corporate control all lead to poorer firm performance. Greater insider shareholding leads to better firm performance, at least when the effect is allowed to be non-linear, although our evidence here is weaker than that found by others.<sup>22</sup> The results in Table 4 suggest that insider shareholding, outside representation on the board, firm debt, and activity in the market for corporate control have not been chosen to maximize firm performance. Insider shareholding tends to be too small, and outside representation on the board, debt financing, and activity in the market for corporate control all tend to be too great.

But each of these findings ignores the existence and possible interdependence of the other control mechanisms and so may be misleading. To explore this possibility, the first column in Table 5 presents results for an OLS regression similar to those in Table 4 except that, here, firm performance is regressed on all of the control mechanisms together. This regression does not allow for any interdependence in the choices to use control mechanisms, but it does allow for the availability of alternative control mechanisms.<sup>23</sup> Compared to the

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<sup>22</sup>McConnell and Servaes (1990) calculate turning points where increased insider shareholdings cease to improve firm performance and begin to reduce it. The range of their turning points is 35% to 70%. Based on column eight of Table 4, the turning point in our sample is 60%.

<sup>23</sup>As an intermediary step between Table 4 and Table 5, we also estimated regressions similar to those in McConnell and Servaes (1990) that examine the effect of ownership structure on firm performance, where ownership structure is defined more broadly (not just insider shareholding). To do this, we first added institutional shareholding (PINST) to insider shareholding (POD and POD<sup>2</sup>) as mechanisms explaining firm performance and then also added shareholding by blockholders (PFIVE). Unlike McConnell and Servaes who find a positive effect of each of these additional ownership variables on firm performance, we found no effects. Adding these control mechanisms to the regression, however, did not

regression in column 8 of Table 4, the effect of insider shareholding weakens considerably (the coefficient on POD shrinks and becomes statistically insignificant) when all of the mechanisms are included in the regression, but the other effects identified in Table 4 persist. More outsiders on the board of directors, more debt financing, and more activity in the market for corporate control all still appear to reduce firm performance (coefficients on OBOARD, D/V, and PACQ have values and significance levels very similar to those in Table 4).

The regression reported in the second column of Table 5 allows not only for the availability of alternative control mechanisms but also for their interdependence. This regression is estimated (using 2SLS) as part of a simultaneous system like that in Table 3 but expanded to include not only equations (1)-(6), the control mechanisms, but also (7), firm performance.<sup>24,25</sup> This system treats firm performance as well as choices of the control mechanisms as endogenous and allows each to affect the others. In the 2SLS estimate, the coefficient on insider shareholding becomes negative but statistically insignificant. Similarly, the coefficient on firm debt becomes positive and loses its statistical significance. The coefficient on activity in the market for corporate control retains its value

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change the estimated relation between insider shareholding and firm performance we found in column 8 of Table 4.

<sup>24</sup>We also add FIN to (7) and an interaction variable Q\*FIN to (1)-(6) for the same reason that we added FIN to the regressions reported in Table 4: the definition of assets makes Q systematically different for financial firms.

<sup>25</sup>We do not show a separate table for the control mechanism equations similar to those in Table 3. These results for the system that includes Q are very similar to those reported in Table 3. Introducing Q on the right hand side of the mechanism regressions matters only for firm debt. Greater Q reduces D/V.

in the 2SLS estimate but loses its statistical significance. Finally, the negative coefficient on outsiders on the board of directors is larger and equally significant in the 2SLS estimate.<sup>26</sup>

The evidence in Table 5 is consistent with optimal choice of all of the mechanisms except for board composition.<sup>27</sup> The persistent effect of board composition on firm performance, however, presents a puzzle. The fraction of outsiders on the board of directors is an internal decision, and so we expect it to be made to maximize firm value. Our results indicate otherwise. The negative effect of outsiders on the board on firm performance suggests that firms tend to select too many outsiders. While we do not have a ready explanation for this finding, reverse causality is not the answer. In the system for which the Q regression is reported in the second column of Table 5, we also estimated a regression with OBOARD as the dependent variable and Q as an independent variable. In this regression, Q had no effect on OBOARD. So the negative relation runs from OBOARD to Q, not the reverse. More outsiders on the board reduce firm performance. One possible explanation is that outsiders are sometimes added to the board for "political" reasons (e.g., to include politicians, environmentalists or consumer activists) and that these

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<sup>26</sup>Again, the null hypothesis of overidentification cannot be rejected at the 5% level using Basmann's (1960) test.

<sup>27</sup>Another interpretation is that the positive effect of insider shareholding on firm performance and the negative effects of debt and activity in the market for corporate control found in Table 4 are masked by noise in the simultaneous system estimations of column 2 in Table 5. However, this interpretation does not seem plausible for the effect of insider shareholding, since this effect disappears in the expanded OLS regression in column 1 of Table 5 as well.

outsiders either directly reduce firm performance or proxy for the performance reducing political constraints that led to their receiving board seats.<sup>28</sup>

## V. Conclusions

Alternative mechanisms can be employed to provide incentives to a firm's managers and so alleviate the agency problems between managers and shareholders. We have considered seven "control mechanisms": insider (officers and directors) shareholding, institutional shareholdings, shareholdings by blockholders (5% owners), the use of outsiders on the board of directors, debt financing, the external labor market for managers, and the market for corporate control. Because alternatives exist for each mechanism and because the choice of the level of one mechanism may depend upon the choice of others, empirical estimates of the effect that single control mechanisms have on firm performance will likely be misleading.

To examine this issue empirically, we constructed a data set containing approximately 400 large firms. Using this data set, we first estimated a simultaneous equations system and found evidence of interdependence in the choices of control mechanisms. We then

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<sup>28</sup>An examination of the boards of two auto manufacturers and one computer firm in our sample for the year 1987 provides anecdotal evidence consistent with this hypothesis. Together, these three firms had 17 inside directors and 40 outside directors. Of the outside directors, 11 had no business experience. These included two former high ranking officials in the Reagan-Bush election campaign, five former U.S. cabinet members, two college presidents, one chair of an environmental group, and a clergyman. It is plausible that the choice of these board members reflected political constraints faced by the firms. Data sources: S&P Register of Corporations, Directors and Executives, Who's Who in America, and Who's Who in Finance and Industry.

compared cross-sectional OLS estimates in which firm performance, measured by Tobin's Q, was regressed on individual control mechanisms to similar estimates in which firm performance was regressed on the entire set of control mechanisms and to estimates in which firm performance and all of the mechanisms are included in a simultaneous equations system. In the initial one-at-a-time OLS regressions, we found statistically significant effects of insider ownership, outside representation on the board of directors, debt financing, and activity in the takeover market. Greater insider ownership positively (but perhaps nonlinearly) affected performance, while more outsiders on the board, more debt financing, and greater activity in the takeover market reduced performance. In the expanded OLS regression, the effect of insider shareholding on firm performance disappeared but nothing else changed. In the simultaneous equations estimation, the effects of insider shareholding, firm debt, and activity in the market for corporate control all were statistically insignificant. Only the effect of outsiders on the board of directors persisted.

Except for board composition, our results are consistent with optimal use of the control mechanisms (as argued by Demsetz and Lehn (1985) for ownership structure). The persistent negative effect on firm performance of more outsiders on the board of directors is a puzzle. One possible rationale is that boards are expanded for political reasons (to include politicians, environmental activists or consumer representatives, for example) and that these additional outside directors either reduce firm performance or proxy for the underlying political constraints which led to their receiving board seats.

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TABLE 1

## Descriptive Statistics

	Mean	Median	Standard Dev.	First Quartile	Third Quartile	Sample Size
Ownership Structure: % Ownership of:						
Officers & Directors (POD)	7.4	2.2	12.4	0.7	8.0	680
Institutions (PINST)	44.1	45.5	18.7	31.0	58.5	766
5% Owners (PFIVE)	18.5	10.4	22.9	0.0	25.8	770
Numbers of:						
Officers & Directors (NOD)	20.4	18.0	14.1	10.0	27.0	714
Institutions	155.4	127.0	121.8	62.0	210.5	769
CEO Characteristics:						
Age (AGE)	56.4	57.0	7.0	52.0	61.0	765
Firm-specific human capital (FSHC) in years <sup>a</sup>	23.6	25.0	12.3	13.0	33.0	770
Tenure as CEO in years (TENURE)	8.4	6.0	8.0	3.0	12.0	770
Founder dummy (FOUNDER) <sup>b</sup>	.073	.0	.26	.0	.0	770
Board Composition:						
Percentage of Outsiders (OBOARD) <sup>c</sup>	74	77	15	69	85	766
Probability of Acquisition <sup>d</sup> (PACQ)	.29	0.30	.13	.21	.36	769
Number of lines of business at 3-digit SIC level (LOB3) <sup>e</sup>	4.0	2.0	4.0	2.0	5.0	770
Firm Size:						
Total Assets (\$M.) (ASSET)	7887.5	3238.9	15137.5	1425.2	7606.1	682
Firm Performance:						
Tobin's Q (Q) <sup>f</sup>	.97	.81	.88	.42	1.24	682
Cash-Flow Return (CR) <sup>g</sup>	.16	.15	.10	.11	.18	549
Financial Leverage:						
$\frac{\text{Debt}}{\text{Firm Value}}$ (D/V) <sup>h</sup>	.10	.14	.39	-.04	.35	682
Growth Opportunities:						
$\frac{\text{R \& D}}{\text{ASSET}}$ (RDA) <sup>i</sup>	.02	.002	.03	.00	.02	646
$\frac{\text{ADVTG}}{\text{ASSET}}$ (ADVA) <sup>j</sup>	.02	.001	.04	.00	.02	682
Standard Deviation of stock returns ( $\sigma_s$ ) <sup>k</sup>	.095	.089	.003	.075	.107	587
Job opportunities in the industry (JOBS3) <sup>l</sup>	16.9	14.0	16.9	5.0	22.0	770
NYSE dummy (NYSE) <sup>m</sup>	.745	1	.436	0	1	770
Regulated firm dummy (REG) <sup>n</sup>	.41	0	.492	0	1	770

TABLE 1 (cont.)

<sup>a</sup>Number of years the CEO has been with the firm.

<sup>b</sup>FOUNDER = 1, if the CEO founded the company; 0 otherwise.

<sup>c</sup>OBOARD =  $\frac{\text{No. of outside (i.e., non-employee) directors}}{\text{Total no. of directors}}$

<sup>d</sup>Relative frequency of acquisitions in the 2-digit SIC industry of a firm during 1981-87. An industry consists of all firms in the same 2-digit SIC industry that were listed on NYSE as of December 31, 1980.

<sup>e</sup>This variable is based on all the different SIC industry codes in which a firm operates, as reported by the S & P Register.

<sup>f</sup>Tobin's Q =  $\frac{V}{\text{ASSET}}$

where  $V = \text{EQUITY} + \text{LTD} + \text{STD} + \text{PFD} + \text{CV}$ ,

EQUITY = Market value of equity at the year-end,

LTD = Book value of long-term debt,

STD = Book value of short-term debt,

PFD = Preferred stock at liquidating value,

CV = Book value of convertible debt and convertible preferred stock,

ASSET = Book value of total assets.

<sup>g</sup>Cash-flow return, CR =  $\frac{\text{OCF}}{V}$

where OCF = Sales - Cost of goods sold - Selling and Administrative Expenses + Depreciation

<sup>h</sup>Debt to firm value ratio,

$$\frac{D}{V} = \frac{\text{LTD} + \text{STD} + \text{PFD} - \text{CASHS}}{V}$$

where CASHS = Cash and marketable securities. This ratio can be negative.

<sup>i</sup>R & D = Research & Development expenditures

<sup>j</sup>ADVTG = Advertising expenditures

<sup>k</sup>Estimated from 60 monthly stock returns from Jan. 1983 to Dec. 1987.

<sup>l</sup>Number of firms on NYSE in a firm's industry defined using its 3-digit SIC code.

<sup>m</sup>NYSE = 1, if the firm is traded on the NYSE; 0 otherwise.

<sup>n</sup>REG = 1, if the firm is in a regulated industry (i.e., public utility, railroad, banking, finance or insurance); 0 otherwise.

TABLE 2

Correlations among measures of Ownership Structure, Board Composition, Firm Specific Human Capital of the CEO and Probability of Acquisition.

	PINST	PFIVE	OBOARD	D/V	FSHC	PACQ
POD	-.30 <sup>a</sup>	.41 <sup>a</sup>	-.25 <sup>a</sup>	-.08	-.05	.07
PINST		-.15 <sup>a</sup>	.01	.03	.03	.06
PFIVE			-.18 <sup>a</sup>	-.03	-.14 <sup>a</sup>	.08 <sup>b</sup>
OBOARD				-.07	-.04	.00
D/V					-.00	-.19 <sup>a</sup>
FSHC						-.01

<sup>a</sup> Significant at .01 level

<sup>b</sup> Significant at .05 level

The sample size varies from 598 to 770 for the various pairs depending on data availability. Variables are defined in Table 1.

TABLE 3

## 2SLS Estimates of the Choice of Control Mechanisms

INDEPENDENT VARIABLES	DEPENDENT VARIABLE					
	POD	PINST	PFIVE	OBOARD	FSHC	D/V
CONSTANT	-3.11 (-.05)	10.99 (.22)	36.19 (.57)	75.33 <sup>a</sup> (6.07)	45.87 (.68)	-1.38 <sup>b</sup> (-2.17)
POD		.21 (.34)	.23 (.28)	-.06 (-.15)	.92 (1.32)	.02 <sup>c</sup> (1.88)
PINST	.32 (.52)		-1.20 <sup>a</sup> (-3.34)	-.02 (-.06)	-.85 <sup>c</sup> (-1.80)	-.006 (-.78)
PFIVE	.50 (.82)	-.32 <sup>c</sup> (-1.73)		-.11 (-.55)	-.90 <sup>b</sup> (-2.50)	.0002 (.04)
OBOARD	-.04 (-.06)	.12 (.19)	.14 (.18)		-.68 (-.76)	.02 <sup>b</sup> (2.47)
FSHC	-.26 (-.89)	-.03 (-.18)	.13 (.45)	-.12 (-.88)		-.003 (-1.00)
D/V	-6.09 (-28)	13.07 (.67)	18.83 (.62)	7.95 (.62)	25.75 (1.16)	
PACQ	-38.65 (-58)	98.93 <sup>a</sup> (3.59)	122.92 <sup>a</sup> (2.93)	-11.06 (-.37)	89.81 (1.25)	-.33 (-.45)
$\sigma_s$	-39.74 (-.37)		159.49 (1.60)			
LASSET	.58 (.28)	-1.21 (-.74)	-3.08 (-1.21)	.42 (.34)		.07 <sup>a</sup> (3.10)
REG	2.58 (.32)	-7.07 (-1.61)	-11.94 <sup>c</sup> (-1.69)	.38 (.10)	-13.29 <sup>c</sup> (-1.89)	.03 (.31)
TENURE	.41 <sup>c</sup> (1.87)					
FOUNDER	3.46 (.53)			-7.87 <sup>c</sup> (-1.82)	-13.95 (-1.38)	
NOD1	.03 (.22)					
NYSE		12.76 <sup>c</sup> (1.70)				
NINSTI		.02 (.92)				
RDAI			-9.67 (-.12)			
LOB3				.31 (1.45)		
AGE					.90 <sup>a</sup> (4.32)	

TABLE 3 (cont.)

INDEPENDENT VARIABLES	DEPENDENT VARIABLE					
	POD	PINST	PFIVE	OBOARD	FSHC	D/V
JOBS3					.10 (.45)	
CR						-.52 <sup>b</sup> (-2.40)
Adjusted R <sup>2</sup>	.11	.13	.08	.05	.05	.12
p-value of F-test	<.001	<.001	<.001	<.001	<.001	<.001

<sup>a</sup> Significant at .01 level<sup>b</sup> Significant at .05 level<sup>c</sup> Significant at .10 level

The sample size is 383 firms. Variables are defined in Table 1.

TABLE 4

OLS Regressions of Firm Performance on Individual Control Mechanisms

INDEPENDENT VARIABLES	DEPENDENT VARIABLE = Q (t-statistics)							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
CONSTANT	2.86 <sup>a</sup> (10.98)	3.03 <sup>a</sup> (11.56)	2.94 <sup>a</sup> (11.27)	3.37 <sup>a</sup> (12.14)	2.97 <sup>a</sup> (12.05)	2.97 <sup>a</sup> (12.27)	3.19 <sup>a</sup> (12.41)	2.77 <sup>a</sup> (10.36)
POD	.004 (1.50)							.012 <sup>c</sup> (1.89)
POD <sup>2</sup>								-.0001 (-1.35)
PINST		-.0008 (-.42)						
PFIVE			.0008 (.55)					
OBOARD				-.007 <sup>a</sup> (-2.87)				
FSHC					.003 (.93)			
D/V						-.55 <sup>a</sup> (-3.76)		
PACQ							-.64 <sup>b</sup> (-2.51)	
RDA	5.09 <sup>a</sup> (5.18)	5.14 <sup>a</sup> (5.02)	5.08 <sup>a</sup> (5.13)	4.88 <sup>a</sup> (5.00)	5.05 <sup>a</sup> (5.13)	3.80 <sup>a</sup> (3.72)	5.35 <sup>a</sup> (5.42)	5.02 <sup>a</sup> (5.10)
ADVA	4.26 <sup>a</sup> (5.16)	4.29 <sup>a</sup> (5.19)	4.25 <sup>a</sup> (5.11)	4.32 <sup>a</sup> (5.27)	4.24 <sup>a</sup> (5.12)	3.68 <sup>a</sup> (4.45)	4.53 <sup>a</sup> (5.48)	4.27 <sup>a</sup> (5.18)
LASSET	-.24 <sup>a</sup> (-7.75)	-.26 <sup>a</sup> (-8.47)	-.25 <sup>a</sup> (-8.07)	-.24 <sup>a</sup> (-8.02)	-.26 <sup>a</sup> (-8.48)	-.23 <sup>a</sup> (-7.74)	-.26 <sup>a</sup> (-8.67)	-.23 <sup>a</sup> (-7.37)
FIN	-.29 <sup>c</sup> (-1.84)	-.26 <sup>c</sup> (-1.65)	-.27 <sup>c</sup> (-1.72)	-.27 <sup>c</sup> (-1.75)	-.23 (-1.45)	-.23 (-1.50)	-.22 (-1.43)	-.32 <sup>b</sup> (-2.00)
Adjusted R <sup>2</sup>	.31	.30	.30	.32	.31	.33	.32	.31
p-value of F-test	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001

<sup>a</sup> Significant at .01 level<sup>b</sup> Significant at .05 level<sup>c</sup> Significant at .10 level

The sample size is 383 firms. Variables are defined in Table 1.



TABLE 5

OLS and 2SLS Estimates of Q

	OLS Estimates	2SLS Estimates
INDEPENDENT VARIABLES	(1)	(2)
CONSTANT	3.40 <sup>a</sup> (9.99)	10.14 <sup>a</sup> (3.07)
POD	.007 (1.05)	-.04 (-.65)
POD <sup>2</sup>	-.00009 (-.84)	-.0005 (-.28)
PINST	-.0001 (-.07)	.02 (.71)
PFIVE	.0003 (.20)	-.006 (-.24)
OBOARD	-.006 <sup>b</sup> (-2.32)	-.10 <sup>b</sup> (-2.35)
FSHC	.0008 (.29)	.007 (.49)
D/V	-.54 <sup>a</sup> (-3.60)	2.21 (1.46)
PACQ	-.79 <sup>a</sup> (-3.06)	-.98 (-.23)
RDA	4.13 <sup>a</sup> (3.98)	3.31 (.81)
ADVA	3.98 <sup>a</sup> (4.81)	8.09 <sup>a</sup> (2.81)
LASSET	-.22 <sup>a</sup> (-6.69)	-.38 <sup>a</sup> (-2.85)
FIN	-.23 (-1.44)	.10 (.20)
Adjusted R <sup>2</sup>	.35	.05
p-value of F-test	<.001	<.001

<sup>a</sup> Significant at .01 level    <sup>b</sup> Significant at .05 level    <sup>c</sup> Significant at .10 level

The sample size is 383 firms. Variables are defined in Table 1.