

MANAGEMENT OWNERSHIP AND MARKET VALUATION* **An Empirical Analysis**

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We investigate the relationship between management ownership and market valuation of the firm, as measured by Tobin's Q . In a 1980 cross-section of 371 Fortune 500 firms, we find evidence of a significant nonmonotonic relationship. Tobin's Q first increases, then declines, and finally rises slightly as ownership by the board of directors rises. For older firms, there is evidence that Q is lower when the firm is run by a member of the founding family than when it is run by an officer unrelated to the founder.

1. Introduction

Many large American corporations are not run by the people who own them. As stressed by Berle and Means (1932), when managers hold little equity in the firm and shareholders are too dispersed to enforce value maximization, corporate assets may be deployed to benefit managers rather than shareholders. Such managerial benefits can include shirking and perquisite-taking, but also encompass pursuit of such non-value-maximizing objectives as sales growth, empire building, and employee welfare. According to Jensen and Meckling (1976), the costs of deviation from value-maximization decline as management ownership rises. As their stakes rise, managers pay a larger share of these costs and are less likely to squander corporate wealth. According to this convergence-of-interest hypothesis, market value increases with management ownership.

More recently, Demsetz (1983) and Fama and Jensen (1983) have pointed out offsetting costs of significant management ownership. These writers recog-

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nized that, when a manager owns only a small stake, market discipline (e.g., the managerial labor market [Fama (1980)], the product market [Hart (1983)], and the market for corporate control [Jensen and Ruback (1983)]) may still force him toward value maximization. In contrast, a manager who controls a substantial fraction of the firm's equity may have enough voting power or influence more generally to guarantee his employment with the firm at an attractive salary. In fact, Weston (1979) reported that no firm in which insiders owned over 30% had ever been acquired in a hostile takeover. With effective control, the manager may indulge his preference for non-value-maximizing behavior, although perhaps to a more limited extent than if he had effective control but no claim on the firm's cash flows.¹ This entrenchment hypothesis predicts that corporate assets can be less valuable when managed by an individual free from checks on his control.

Whereas the convergence-of-interests hypothesis predicts that larger stakes should be associated with higher market valuation of the corporation, the predictions of the entrenchment hypothesis are much less clearcut. The problem is that entrenchment is not just a consequence of voting power. Some managers, by virtue of their tenure with the firm, status as a founder, or even personality, can be entrenched with relatively small stakes. Other managers in firms with a large outside shareholder or an active group of outside directors may be only weakly attached to the job despite high ownership. Even if we believe that, on average, more ownership allows deeper entrenchment, diminishing returns might set in well before 50% ownership is reached. Further increases in the stake would not then entail a penalty in terms of market valuation.

Theoretical arguments alone cannot unambiguously predict the relationship between management ownership and market valuation of the firm's assets. While the convergence-of-interests hypothesis suggests a uniformly positive relationship, the entrenchment hypothesis suggests that market valuation can be adversely affected for some range of high ownership stakes. In this paper, we study the relationship between management ownership and Tobin's Q – our proxy for market valuation of the firm's assets. Since theory provides relatively little guidance as to what this relationship should be, our paper is as much descriptive data analysis as formal hypothesis testing.

In section 2, we look at the relationship between Tobin's Q and the shareholdings of the board of directors. To capture the possible presence of both the convergence-of-interest and entrenchment effects, we estimate a variety of piecewise linear regressions. The results seem to suggest a positive relation between ownership and Q in the 0% to 5% board ownership range, a

¹Of course, it is often possible for a wealth-constrained management team to retain voting control without owning a proportionate claim to the common stock cash flows. For example, DeAngelo and DeAngelo (1985) find that, among 45 large corporations with dual classes of common stock entitled to identical cash flows but carrying different voting rights, top managers own a median of 56.9% of the votes but only 24% of the common stock cash flows.

negative and less pronounced relation in the 5% to 25% range, and perhaps a further positive relation beyond 25%. One interpretation of these results is that conditions necessary for entrenchment (voting power, control of the board of directors, status as a founder, etc.) are significantly correlated with increased managerial ownership beyond 5%, but that these conditions are not much different for firms with greater than 25% board ownership than they are for those with 20–25% ownership. The convergence-of-interests effect, in contrast, operates throughout the whole range of ownership.

In a related study, Demsetz and Lehn (1985) estimated a simple linear relationship between profit rate and ownership by large shareholders (as opposed to ownership by management only) and found no correlation. For comparison with their study, we estimate our nonlinear specifications using the profit rate in addition to Tobin's Q . The results confirm the conclusion that imposing a simple linear structure on the data is inappropriate.

Section 3 takes a more disaggregated look at the relationship between management ownership and market valuation of the firm's assets. First, we evaluate separately the effect on Q of ownership by top corporate officers and by other members of the board. In part, this is done to address the frequently made claim that outside board members are puppets of top officers. The pattern of coefficients for both the top officers and the outside board is similar to that for the board as a whole, suggesting that perhaps both the officers and the outside board members with equity respond to financial incentives and can become entrenched.

Also in section 3, we evaluate the impact on Tobin's Q of having a member of the founding family as one of the top two officers because we are interested in the possibility that a management team can become entrenched for reasons other than its control of voting rights. The results suggest that, indeed, the presence of the founding family adversely affects Tobin's Q in older firms, where the entrepreneurial talent of the founder might be less valuable.

Section 4 summarizes our findings.

2. Board ownership and market valuation

In this section, we evaluate the relationship between board ownership and market valuation of the firm's assets in a sample of large industrial firms. For this purpose, we use a December 1980 listing of the names and stakes of large shareholders of 456 of the Fortune 500 firms supplied by Corporate Data Exchange (CDE). CDE identifies shareholders who are members of the board of directors, with the exception of those whose stakes are below 0.2%. Although this means that, in large firms, positions worth millions of dollars are not reported, the CDE numbers are still useful for examining corporate control issues, for which percentage ownership is more relevant than the dollar value of the stake.

To measure performance, we rely mainly on average Tobin's Q , equal to the ratio of the firm's market value to the replacement cost of its physical assets. Tobin's Q is high when the firm has valuable intangible assets in addition to physical capital, such as monopoly power [Lindenberg and Ross (1981)], goodwill, a stock of patents, or good managers. Although Q is undoubtedly a very noisy signal of management performance, we believe it is well-suited to our purpose. Because we are interested in the predictable effects of a firm's ownership structure on its value, it seems natural to look at the cross-sectional relationship between ownership and value. An alternate approach might be to study events that represent large unexpected changes in ownership structure for which there is no accompanying news to contaminate the experiment. But large changes in ownership structure are fairly rare, except for those accompanying control contests, where there is clearly much more going on. For this reason, we feel justified in concentrating on a cross-sectional analysis of measures such as Q (and later the profit rate).

Our measure of Q was obtained from the Griliches R&D master file [Cummins, Hall, and Laderman (1982)] for 1980. The numerator of Q is the firm's market value, defined as the sum of the actual market value of common stock and estimated market values of preferred stock and debt.² The denominator of Q is the replacement cost of the firm's plant and inventories, A , also taken from the R&D master file. Values of Q are not available for 85 firms, primarily because of the difficulty in obtaining values of long-term debt, and, in some cases, replacement cost A . Although we cannot be sure that such sample selection does not bias our results, the omitted firms do not appear to be different from the included ones in any observable respect.³ Our final sample consists of 371 firms.

² The market value of common stock is taken from Standard and Poor's Compustat tape. The market value of preferred stock is estimated by dividing the preferred stock dividend figure (reported on Compustat) by Moody's preferred dividend rate for median-risk companies. The market value of the firm's debt is taken as the value of its short-term liabilities net of its short-term assets (from Compustat) plus an estimate of the market value of its long-term debt. Estimates of long-term debt for our firms were obtained from the NBER's R&D Master File [see Cummins, Hall, and Laderman (1982)]. These estimates are constructed on the assumption that all long-term debt has an original maturity of 20 years, and using a matrix of bond prices in year t for bonds due in year s from the Moody's corporate BAA bond price series. The age structure of corporate debt is estimated from changes in the firm's book value of long-term debt in each of the 20 previous years on the Compustat tape. Using this age structure estimate and the bond price matrix, Cummins et al. (1982) calculate the value of each firm's long-term debt.

³ We have calculated some descriptive statistics for the sample of 85 firms for which we have ownership data, but do not have market-value-based measures of Q (omitted firms). The mean board stake for these firms is 12.0% (it is 10.6% for the sample of 371 firms we study). Among omitted firms, 25% are run by founding families; among included firms, this number is 24%. From the viewpoint of ownership, therefore, omitted firms do not appear exceptional. As a further check that omission from the sample is not systematic, we calculated the ratio of the replacement cost of the omitted firm to the mean replacement cost in its (three-digit) SIC industry. The average of this ratio among omitted firms is 0.95. Finally, we calculated the ratio of the book-value-based Q of the omitted firm to the mean book-value-based Q in its (three-digit SIC) industry. The mean of

Table 1

Mean values of Tobin's Q for 371 Fortune 500 firms in 1980, grouped by level of equity ownership of the board of directors.

Board's stake	Number of firms	Mean Tobin's Q	Standard error of mean Q
Negligible ^a	46	0.710	0.0566
0-5%	171	0.879	0.0601
5-10%	38	0.997	0.0948
10-15%	27	0.888	0.129
15-20%	15	0.990	0.205
20-25%	22	0.756	0.0804
25-30%	9	0.588	0.0895
30-35%	6	0.658	0.0990
35-40%	11	1.06	0.243
40-45%	6	0.778	0.243
45-50%	6	0.538	0.0991
50-55%	4	0.440	0.0837
55-60%	3	0.428	0.162
60-65%	3	1.46	0.568
65-70%	1	0.283	—
70-75%	2	0.489	0.198
75-80%	1	0.937	—

^a Negligible board stake means that no single member of the board of directors owned more than 0.2% of the firm's common stock.

In this sample, the mean combined stake of all board members (*BOARD*) is 10.6%. The median stake, however, is only 3.4%, suggesting that the distribution is skewed. Indeed, in 103 firms (28% of the sample), total board holdings added to no more than 1% of outstanding equity, and in 46 of our firms (12% of the sample), no board member owned more than 0.2% of the firm. Nonetheless, in 31% of our sample the board owned more than 10% of the firm and in 20% of the sample the board owned more than 20% of the firm. These numbers accord with the findings of Lewellyn (1971) and Demsetz and Lehn (1985), who also document the prevalence of significant management ownership in the United States. These results also corroborate the hypothesis of Fama and Jensen (1983) that firms in which management owns over 50% of the equity (and thus has complete control) should have a hard time surviving as organizations. In fact, there are only 14 such firms in our sample.⁴

Table 1 presents means of Q for different levels of the board percentage ownership (the mean Q in the sample is 0.85 with a standard deviation of

this number for the 51 omitted firms that we can calculate it for is 0.98. Again, omitted firms do not appear exceptional.

⁴ Virtually all Fortune 500 firms are listed on the New York Stock exchange, where listing rules require sufficiently dispersed ownership. This might explain why very few firms in our sample are more than 50% owned by management.

0.67). Looking at the grouped raw data, it is difficult to discern a clear pattern, partly because the number of observations in some cells is fairly low. Also, outliers strongly affect average Q in some cells. In particular, the 35–40% ownership cell includes Hewlett–Packard with $Q = 3.21$ and Searle with $Q = 1.72$, which together account for the mean Q in that cell being 1.06. Similarly, Dow–Jones alone with $Q = 2.58$ accounts for the mean Q of 1.46 in the 60–65% cell. Although table 1 suggests that the relation between ownership and Q might be nonlinear, it also highlights the need for controlling for some sources of heterogeneity across firms, particularly industry.

To obtain interpretable results, we limit ourselves to fairly tightly parametrized specifications. Specifically, we estimate piecewise linear regressions allowing for two changes in the slope coefficient on board ownership. In previous drafts of this paper, we used dummy variables to estimate conditional means of Tobin's Q in various board ownership cells. The results with piecewise linear specifications are much stronger, suggesting that the data prefer the particular parametrizations we now use. To make sure that our results are robust, however, we estimate a wide variety of specifications allowing for slopes to change at different points. To repeat, the main objective here is to find a relatively parsimonious way to describe the patterns in the data.

We use the following variables to estimate and report our piecewise linear regressions:

BRD.0to5 = board ownership if board ownership < 0.05,
= 0.05 if board ownership ≥ 0.05;

BRD.5to25 = 0 if board ownership < 0.05,
= board ownership minus 0.05 if $0.05 \leq$ board ownership < 0.25,
= 0.20 if board ownership ≥ 0.25;

BRD.OVER25 = 0 if board ownership < 0.25,
= board ownership minus 0.25 if board ownership ≥ 0.25.

For example, when board ownership is equal to 0.27, we would have $BRD.0to5 = 0.05$, $BRD.5to25 = 0.20$, and $BRD.OVER25 = 0.02$. For regressions using other turning points (reported in table 3) we define the variables analogously. The piecewise linear regressions we estimate are linear regressions with the above variables as regressors.

The starting point of the analysis is the piecewise linear regression of Tobin's Q on ownership, allowing for slopes to change at 5% and 25%. The theoretical justification for these particular numbers is not very strong. The 5% ownership level is used, for example, by Herman (1981) as a focal stake beyond which ownership is no longer negligible and by the SEC as a point of

mandatory public disclosure of ownership. The breakpoint at 25% is in part motivated by Weston (1979) who suggests 20–30% as the ownership range beyond which a hostile bid for the firm cannot succeed. Since no tight rules are used in choosing this specification, we later report results for several others. We focus on this specification mostly because, in the family of piecewise linear regressions with two breakpoints that we have estimated, it has the lowest sum of squared errors.

To deal with the possibility that a variety of factors can jointly affect board ownership and Q , and thus induce a spurious correlation between them, we control for additional variables in the regression. Our first set of controls are observable measures of intangible assets that affect Q . These are⁵ (divided by A , to make them compatible with Q):

RD/A = 1980 R&D expenditures (Compustat),

ADV/A = 1980 advertising expenditures (Compustat).⁶

In addition to observed assets, we consider several variables that might be correlated with unobserved intangible assets as well as with board ownership:

D/A = the ratio of the calculated market value of the firm's long-term debt to A . This variable may in part capture the value of corporate tax shields. Alternatively, according to the pecking order theory, debt is negatively correlated with the profitability of the firm, and hence with Q . Managers of the more leveraged firms might hold a higher fraction of equity, on average, for the same Q .

A = replacement cost of assets. A measures size, and unobservable intangible assets of a firm might be correlated with size. Also, it is hard to own a large part of a bigger firm, raising the possibility that a large board stake serves as a proxy for small firm size.

$SIC3(I)$ = three-digit SIC code dummies, used to control for possible spurious correlation between ownership and Q operating through industry effects [Demsetz and Lehn (1985)]. Since each industry gets its own intercept, no common intercept is included in the regressions.

The estimated coefficients and their heteroskedasticity-consistent standard errors are shown in the second column of table 2 and presented graphically in

⁵In an earlier draft, we also included the value of the firm's unfunded vested pension liabilities. This substantially reduced the sample because of missing data. Upon closer scrutiny, it turned out that the pensions variable was systematically missing for newer, high Q , relatively high board ownership firms, and therefore we conducted the analysis without the pensions variable.

⁶For 17 observations, data were not available for the firm's advertising expense either for 1980 or for adjacent years. In those cases, we took the firm's advertising to asset ratio to be the (three-digit SIC) industry average.

Table 2

Piecewise linear ordinary least squares regressions of 1980 Tobin's *Q* and profit rate on board ownership and other firm characteristics for 371 Fortune 500 firms.^a

	Dependent variable			
	Tobin's <i>Q</i>	Tobin's <i>Q</i>	Profit rate ^b	Profit rate
Research and development per dollar of assets	—	8.40 ^f (2.23)	—	0.263 ^e (0.115)
Advertising expenses per dollar of assets	—	0.176 (0.816)	—	−0.0264 (0.0759)
Long-term debt per dollar of assets	—	−0.800 ^e (0.365)	—	−0.0664 ^e (0.0298)
Replacement cost (dollar value of assets)	—	−0.0000022 (0.0000038)	—	0.0000004 (0.00000033)
<i>BRD.0to5</i> ^c	5.74 ^e (2.41)	6.17 ^f (2.04)	0.298 ^e (0.131)	0.328 ^e (0.153)
<i>BRD.5to25</i> ^c	−1.40 ^d (0.727)	−1.60 ^e (0.638)	−0.0582 (0.0398)	−0.0558 (0.0479)
<i>BRD.OVER25</i> ^c	−0.0494 (0.458)	0.794 ^d (0.405)	−0.0100 (0.0442)	−0.00153 (0.0442)
Industry dummies for three-digit SIC codes	No	Yes	No	Yes
Number of firms in regression	371	371	315	315
<i>R</i> ²	0.0196	0.595	0.0186	0.429

^aNumbers in parentheses are consistent standard errors calculated according to White (1980).

^bThe profit rate is defined as the ratio of the firm's net cash flows (less the inflation adjusted value of depreciation) to the replacement cost of the firm's tangible assets.

^c*BRD.0to5* = board ownership if board ownership < 0.05, = 0.05 if board ownership ≥ 0.05. *BRD.5to25* = 0 if board ownership < 0.05, = board ownership minus 0.05 if 0.05 ≤ board ownership < 0.25, = 0.20 if board ownership ≥ 0.25. *BRD.OVER25* = 0 if board ownership < 0.25, = board ownership minus 0.25 if board ownership ≥ 0.25.

^dSignificant at 90% confidence level.

^eSignificant at 95% confidence level.

^fSignificant at 99% confidence level.

fig. 1. (For comparison, the first column presents the regression without control variables.) For each 1% increase in ownership between 0% and 5%, *Q* rises by an average 0.062 (*t* = 3.02), so that *Q* for firms with 5% ownership exceeds that for firms with negligible ownership by over 0.3. For each 1% increase in ownership from 5% to 25%, *Q* declines by 0.016 (*t* = −2.51). This suggests that the *Q* of companies with 25% ownership is approximately equal to that of companies with negligible ownership. As ownership rises beyond 25%, we detect an increase in *Q*, but at the slower rate of 0.008 for each 1% increase in ownership (*t* = 1.96). The measured sensitivity of *Q* to ownership

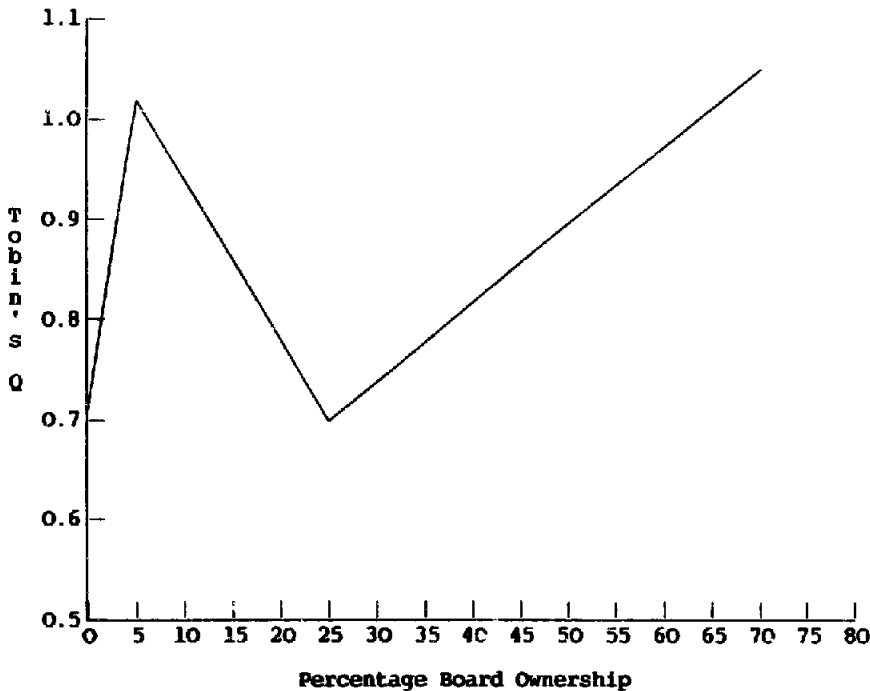


Fig. 1. The relationship between board ownership and Tobin's Q implied by the piecewise linear ordinary least squares regression of 1980 Tobin's Q on board ownership and other firm characteristics for 371 Fortune 500 firms presented in table 2, column 2.

at these very large stakes is only an eighth of what it is at low ownership levels. Other things being equal, Q s of firms with 5% and 65% ownership are approximately the same.

Although each of the board ownership variables taken by itself enters significantly in the above regression, it is interesting to gauge the joint importance of these variables. The F -statistic for the joint hypothesis that all three of the board ownership coefficients are zero is $F(3, 285) = 3.77$, while the 5% and 1% critical values are about 2.64 and 3.86, respectively. This provides support for the joint importance of the ownership variables.

Before examining the robustness of these results to alternate specifications, we suggest a way to interpret them that is consistent with both the convergence-of-interests and entrenchment effects. The initial rise in Q as ownership rises might reflect managers' greater incentives to maximize value as their stakes rise. Beyond the 5% ownership level, however, increases in managerial ownership may be associated with conditions conducive to the entrenchment of incumbent management such as status as a founder, increased voting power, increased tenure with and attachment to the firm, lower employment of professional managers, and dominance of inside over outside directors on the board. Voting power is very unlikely to be the whole source of entrenchment, since a 5–10% stake is probably not enough to win proxy contests or to

singlehandedly elect directors. Whatever its exact source, some form of entrenchment might explain the declining valuation of corporate assets as board ownership rises from 5% to 25%. Throughout this range, the incentive effect can still be operative; it is just dominated by the entrenchment effect. As board ownership reaches the neighborhood of 25%, managements with even higher board ownership might not be significantly more entrenched than those with 25% ownership. With 25–30% ownership, the board may be effectively free to reject any outside challenge. The increase in Q for the very highest ownership levels then might reflect a pure convergence-of-interests effect.

Some potential difficulties with the above regressions concern 1) the arbitrariness of the specification, 2) the stability of results over time, 3) the effect of wealth constraints on management ownership, and 4) the omission of a measure of growth opportunities to explain Q . We address these issues now.

As we discussed above, our choice of turning points is arbitrary. Accordingly, table 3 presents a variety of alternate specifications with different turning points. The results suggest an increase in Q as ownership rises from 0% to the neighborhood of 5% (in terms of the sum of squared errors, the specification with a turning point at 2.5% does very badly, and the specification with a turning point at 7.5% does somewhat worse than the one reported in table 2). The results also suggest a decline in Q as ownership rises beyond 5%. This decline does not appear to be completely monotonic, and in particular there seems to be a statistically insignificant increase in average Q between 15% and 20% board ownership. A finer grid (also presented in table 3, panel A) shows sharp drops in the 5–10% and 20–25% ranges. Although these nonmonotonicities are apparent in table 1, small ownership cells do not allow for statistically significant results (except for the 20% to 25% decline). When we estimate slopes over wider ownership ranges, however, the specifications that allow a decline until 25–30% ownership fit better than those with a final turning point of 15% or 20%. After the 25–30% range, Tobin's Q seems to rise. Table 3 also reveals that, for specifications with two turning points, R^2 of the regression with 5% and 25% as turning points is higher than that of the other specifications we estimated.

Because we have ownership data only for 1980, the stability of our results over time is in question. As a crude test of stability, we obtained 1979 and 1981 Q s for firms in our 1980 sample and ran the regression in the second column of table 2 with Q for 1979 and with Q for 1981 as the dependent variables, but with 1980 values of all the independent variables. Because ownership is relatively stable over time, these regressions should be at least suggestive of the stability of our results over time. The results presented in table 3, panels B and C, are quite similar to those for 1980 Q , although the coefficient on *BOARD.OVER25* for 1981 is not statistically significant.

The next issue is the effect of wealth constraints on management ownership. A wealth-constrained management team is better able to afford a given

Table 3

Alternative piecewise linear specifications of 1979, 1980, and 1981 Tobin's Q on board ownership and other firm characteristics for 371 Fortune 500 firms in 1980.^a

<i>Panel A: The dependent variable is 1980 Tobin's Q</i>		
(1) $Q = \text{Control variables} +$	$8.75 \cdot \text{BRD.0to2.5}$	$- 0.800 \cdot \text{BRD.2.5to25} + 0.594 \cdot \text{BRD.OVER25}$
	(3.65)	(0.513) (0.396)
$R^2 = 0.588, N = 371$		
(2) $Q = \text{Control variables} +$	$3.78 \cdot \text{BRD.0to7.5}$	$- 1.93 \cdot \text{BRD.7.5to25} + 0.852 \cdot \text{BRD.OVER25}$
	(1.33)	(0.672) (0.402)
$R^2 = 0.593, N = 371$		
(3) $Q = \text{Control variables} +$	$6.67 \cdot \text{BRD.0to5}$	$- 2.82 \cdot \text{BRD.5to15} + 0.371 \cdot \text{BRD.OVER15}$
	(2.48)	(1.63) (0.353)
$R^2 = 0.593, N = 371$		
(4) $Q = \text{Control variables} +$	$6.27 \cdot \text{BRD.0to5}$	$- 1.94 \cdot \text{BRD.5to20} + 0.541 \cdot \text{BRD.OVER20}$
	(2.18)	(0.919) (0.372)
$R^2 = 0.593, N = 371$		
(5) $Q = \text{Control variables} +$	$5.81 \cdot \text{BRD.0to5}$	$- 1.27 \cdot \text{BRD.5to30} + 0.992 \cdot \text{BRD.OVER30}$
	(1.96)	(0.529) (0.482)
$R^2 = 0.594, N = 371$		
(6) $Q = \text{Control variables} +$	$6.99 \cdot \text{BRD.0to5}$	$- 3.80 \cdot \text{BRD.5to10} - 0.868 \cdot \text{BRD.10to15}$
	(2.92)	(3.58) (5.36)
	$+ 4.83 \cdot \text{BRD.15to20} - 10.71 \cdot \text{BRD.20to25} + 5.53 \cdot \text{BRD.25to30}$	
	(6.24)	(3.78) (4.78)
	$- 0.220 \cdot \text{BRD.30to35} + 0.672 \cdot \text{BRD.OVER35}$	
	(4.73)	(0.623)
$R^2 = 0.599, N = 371$		
<i>Panel B: The dependent variable is 1979 Tobin's Q</i>		
$Q = \text{Control variables} +$	$5.56 \cdot \text{BRD.0to5}$	$- 1.37 \cdot \text{BRD.5to25} + 0.702 \cdot \text{BRD.OVER25}$
	(1.64)	(0.532) (0.302)
$R^2 = 0.637, N = 371$		
<i>Panel C: The dependent variable is 1981 Tobin's Q</i>		
$Q = \text{Control variables} +$	$4.43 \cdot \text{BRD.0to5}$	$- 1.21 \cdot \text{BRD.5to25} + 0.665 \cdot \text{BRD.OVER25}$
	(1.54)	(0.547) (0.455)
$R^2 = 0.567, N = 370$		

^aNumbers in parentheses are consistent standard errors calculated according to White (1980).

percentage of the equity when the value of the equity is low. The value of the equity can be low for three reasons: high leverage, few assets, or low-valued assets. That is, all other things being equal, managers might be able to afford a large percentage stake only in a firm with low-valued assets. Since this argument predicts a spurious negative correlation between the proportion of equity owned by the board and Q , it might help explain the observed decline of Q as board ownership rises from 5% to 25%. On the other hand, this wealth-constraint effect cannot explain our finding a positive relation between Q and board ownership in the 0–5% ownership range. We should therefore be

Table 4

Measures of firm size for a 1980 sample of 371 Fortune 500 firms, grouped according to fractional equity ownership of the board of directors.^a

Board's equity stake	Number of firms	Mean replacement cost of assets (in millions)	Mean market value of the firm (in millions)	Mean market value of equity outstanding (in millions)
Negligible ^b	46	\$9134 (1798)	\$6795 (1417)	\$5654 (1284)
0-5%	171	2194 (246)	1705 (195)	1407 (176)
5-10%	38	992 (163)	918 (143)	779 (142)
10-15%	27	2088 (884)	1374 (456)	1141 (369)
15-20%	15	1215 (393)	1043 (341)	878 (277)
20-25%	22	1693 (422)	1287 (334)	1005 (247)
25-30%	9	564 (116)	345 (83)	290 (74)
30-35%	6	3323 (1825)	2177 (1046)	1842 (958)
35-40%	11	1697 (1029)	1741 (886)	1409 (647)
40-45%	6	4815 (3737)	2297 (1334)	1136 (402)
45-50%	6	798 (220)	506 (185)	469 (183)
> 50%	14	458 (118)	296 (96)	257 (87)

^aNumbers in parentheses are standard errors of the means.

^bThe board's equity stake is negligible when no board member is included by Corporate Data Exchange (CDE) in its list of shareholders. That list typically excludes shareholders with less than 0.2% of the firm.

concerned about the effects of managerial wealth constraints on our results only to the extent that they explain the dispersion in management ownership at higher levels of ownership.

To subject this issue to some empirical scrutiny, consider the relation between board ownership and the replacement cost of the firm, A . Holding leverage constant, market value can be lower either because Q is low or because the firm has fewer assets, i.e., A is low. If lower market value facilitates larger board ownership, we should see a negative correlation between replacement cost and the fraction of equity owned by the board. Table 4 presents the values of A at various levels of board ownership. Although there

is some evidence of a negative correlation between A and board ownership, this finding is almost completely driven by the presence of some very large firms with negligible board ownership. Recall that we are concerned only with the correlation for higher ownership levels. In fact, for firms in which board ownership is at least 5%, the correlation between board ownership and A is only -0.02 . This correlation points against the view that size is a strong deterrent to management ownership in the relevant range.

One issue raised in the above discussion is the presence in our sample of a group of extremely large firms (as measured by replacement cost of assets) with negligible board ownership. Although we do control for size in the regressions in table 2, we want to make sure that the positive slope we estimate in the 0–5% range of board ownership is not merely a consequence of poor performance among this group of negligible board ownership firms. One might attribute poor performance of these firms more to their sheer size and consequent invulnerability to external checks than to insufficient management ownership. To investigate this possibility, we run the regression in the second column of table 2 omitting the 46 firms with negligible (measured) board ownership. The results are:

$$Q = \text{Control variables} + 5.11 \cdot \text{BRD.0to5} - 1.49 \cdot \text{BRD.5to25} \\ (2.39) \quad (0.668) \\ + 0.773 \cdot \text{BRD.OVER25}, \quad R^2 = 0.602, \quad N = 325. \\ (0.422)$$

Although the sensitivity of Q to ownership declines somewhat, it is still both statistically and substantively significant. The positive relation between ownership and Q for low ownership levels does not appear to be driven by negligible-ownership firms.⁷

Our omission of measures of firm growth rates from Q equations also raises some important issues. A high Q can in part reflect the value of future growth opportunities of the firm. If managers own larger stakes in younger, faster-growing firms that tend to have high Q s, the positive association between board ownership and Q that we observe might be spurious. On the other hand, given that fast growth itself is an important component of performance that depends on the actions of management, we are probably understating the effect of management ownership on performance if we focus only on the effect of management ownership on Q holding growth constant. That is, much of the

⁷Michael Jensen suggested that we also run our 1980 regression omitting oil firms, to check for the possibility that these firms drive our results. When we remove 23 firms that are in SIC 291 (oil and refining), the coefficients slightly rise in absolute value and significance, as does R^2 :

$$Q = \text{Control variables} + 7.28 \cdot \text{BRD.0to5} - 1.73 \cdot \text{BRD.5to25} + 0.814 \cdot \text{BRD.OVER25}, \\ (2.09) \quad (0.668) \quad (0.415) \\ R^2 = 0.609, \quad N = 348.$$

variation in Q across different board ownership structures might be due to the differing values of growth prospects that are achieved by managements with different incentives to maximize value. With this reservation in mind, we include the growth rate of the firm's labor force, GL ,⁸ in the regression. The result is as follows:

$$Q = \text{Control variables} + 2.63 \cdot GL + 5.02 \cdot BRD.0to5$$

$$(0.776) \quad (1.92)$$

$$- 1.46 \cdot BRD.5to25 + 0.783 \cdot BRD.OVER25,$$

$$(0.617) \quad (0.406)$$

$$R^2 = 0.608, \quad N = 368.$$

GL enters significantly into the regression and slightly reduces the size and statistical significance of the other estimated coefficients. The basic nonlinear pattern of Q 's behavior as ownership rises is nonetheless preserved, as is the significance of the slope estimates.

Finally, we look at the profit rate as an alternate measure of management performance. The profit rate is defined as the ratio of the firm's net cash flows less the inflation-adjusted value of depreciation to the previously defined replacement cost of its capital stock, A . The board ownership regressions that parallel those for Tobin's Q are presented in the right panel of table 2. Except for the apparent absence of an increase in profitability as ownership rises beyond 25%, the qualitative pattern of estimated coefficients is the same as in the Q regressions. The statistical significance of the estimates is, however, much lower, and only the positive slope in the 0% to 5% range is significant at the 5% level. According to this estimate, firms with 5% board ownership have a profit rate 0.016 higher than firms with negligible ownership. To gauge the magnitude of these effects, note that the mean profit rate in the sample is 0.055 with a standard deviation of 0.035.

The above results appear at odds with the finding of Demsetz and Lehn (1985) of no association between large shareholder ownership and the profit rate. The important differences between our procedures seem to be twofold. First, we focus only on the equity stakes of the boards of directors, whereas Demsetz and Lehn measure concentration of ownership, weighting ownership by members of the board and by other large shareholders equally. If large shareholders without board seats represent competing management teams,

⁸ The growth rate in the firm's labor force is a geometric mean of the percent change in its labor force from one year to the next from 1970 to 1980. For 62 firms, this calculation could not be made. For 59 of those, we set GL equal to the mean rate of growth in the firm's three-digit SIC industry. Three firms are omitted from the regression because GL could not be imputed in this way.

they will be attracted to firms with poorly performing incumbent management. This selection effect would tend to reduce the observed correlation between ownership concentration and the profit rate.

Second, Demsetz and Lehn estimate a linear relationship between ownership concentration and the profit rate. When we estimate a simple linear relationship between the profit rate and our board stake variable, we get:

$$\Pi = 0.055 - 0.005 \cdot \text{BOARD},$$

(0.002) (0.014)

which is consistent with their result. Even controlling for SIC codes and other factors in this regression does not yield a significant estimated coefficient on the board stake variable. We conclude that the failure of Demsetz and Lehn to find a relationship between ownership concentration and profitability is probably due to their use of a linear specification that does not capture an important nonmonotonicity.

3. The composition of the board

So far we have assumed that the impact of the board's ownership stake on market valuation is independent of who owns that stake. This might not always be appropriate, for at least two reasons. First, ownership by officers and by outside directors might have different effects. Second, at any given level of ownership, some board members might have greater influence on corporate decision making than others. For example, leadership by the firm's founders or by their descendants might have different effects on performance than leadership by officers who are not related to the founders. In this section, we examine these two possibilities.

The distinction between officers and outside board members can be important for several reasons. Although it is the fiduciary duty of all directors to represent the interests of shareholders, outside directors in particular must oversee the performance of the firm's officers. But monitoring the performance of top officers requires time and effort. In addition, an outside director serving on a board dominated by officers with more expertise and influence over votes risks losing his position if he objects to those officers' choices. Without a personal financial interest in the firm or control over a large block of votes, an outside director will be more reluctant to second-guess poor corporate decisions. Presumably, the extent of outside directors' role in disciplining officers is positively related to their equity stakes.

For officers, the ownership stake is only a partial indicator of their interest in the financial success of the firm. Unlike outside directors, officers also get significant salaries, bonuses, and incentive plans [Murphy (1985)] and are subject to the discipline of the managerial labor market [Fama (1980)]. For these reasons, officers will also be more attached to their jobs than outside

directors, and hence be more entrenched for the same ownership position. These considerations suggest that the equity holdings of officers and outside board members might have different effects on Tobin's Q .

Our analysis here parallels that in the previous section. By examining the 1980 annual reports of our 371 firms, we identify the two senior corporate officers of each firm. Returning to the CDE listing of stockholdings, we construct a variable (*OFFICER*) giving the combined holding of these top officers, who are usually the chairman and the president.⁹ The holdings of the remainder of the board are denoted *OUTBOARD*. Although *OUTBOARD* includes the holdings of junior officers such as vice presidents, this classification is unlikely to make much difference because junior officers generally own very little stock.

The two top officers own 6.3% of their firms, on average. In 117 firms (32% of our sample), however, their stake is negligible; and their median stake is approximately 0.5%. In 60 firms (16% of our sample) their holdings are in excess of 10%, and in 43 firms (12% of our sample) their stakes exceed 20%. In only nine firms in the sample do the top two officers own more than half the shares.

The mean value of the *OUTBOARD* variable is 4.4%, with only 97 firms (26% of the total) having negligible outside board ownership. The median for *OUTBOARD* is just under 1%, which is greater than that for the *OFFICER* variable. In 50 firms (13% of the sample) the outside board's holdings exceed 10%, and in 24 firms (6% of the sample) its stake surpasses 20%. In three firms the stake of the outside board exceeds 50%.

Table 5 presents the piecewise linear regressions of Q on *OUTBOARD* and *OFFICER* variables separately, allowing for the coefficients to change as either variable crosses the 5% and 25% points. Quite strikingly, the relationship between Q and each of the two ownership variables is similar to that between Q and the combined board stake. Q rises as *OFFICER* rises from 0% to 5%, falls as *OFFICER* rises to 25%, and then appears to rise afterwards, although the last estimated slope is not statistically different from zero. Q also rises as *OUTBOARD* increases to 5%, falls in the 5% to 25% range, and then rises after 25%. The slope coefficients on the *OFFICER* variable are comparable to those on the *OUTBOARD* variable, except that Q seems to be less sensitive to officer ownership than to outside board ownership at very high ownership levels. The parameter estimates are also comparable to those obtained for the board as a whole.

To the extent that our findings capture behavioral relationships, the similarity of results for officer and outside board holdings is quite informative. It suggests that outside board members, like officers, respond to financial incen-

⁹In a few cases, either only one of the positions of chairman and president existed for the firm, or the same person occupied both positions. In those cases, the *OFFICER* variable is the stake of the one top officer.

Table 5

Piecewise linear ordinary least squares regressions of 1980 Tobin's Q on officer and outside board ownership and other firm characteristics.^a

	Dependent variable	
	Tobin's Q	Tobin's Q
Research and development per dollar of assets	—	8.25 ^f (2.27)
Advertising expenses per dollar of assets	—	0.0858 (0.834)
Long-term debt per dollar of assets	—	-0.912 ^e (0.390)
Replacement cost (dollar value of assets)	—	-0.0000031 (0.0000039)
<i>OFF.0to5</i> ^b	3.37 (2.85)	3.98 ^d (2.29)
<i>OFF.5to25</i> ^b	-0.896 (0.933)	-1.56 ^e (0.758)
<i>OFF.OVER25</i> ^b	-0.442 (0.354)	0.775 ^e (0.324)
<i>OUT.0to5</i> ^c	3.26 (2.19)	4.34 ^d (2.29)
<i>OUT.5to25</i> ^c	-2.03 ^e (0.858)	-1.42 ^d (0.779)
<i>OUT.OVER25</i> ^c	1.84 (1.38)	1.69 (1.04)
Industry dummies for three-digit SIC codes	No	Yes
Number of observations	371	371
R^2	0.0215	0.597

^a Numbers in parentheses are consistent standard errors calculated according to White (1980).

^b *OFF.0to5* = combined ownership of top two officers if combined ownership < 0.05, = 0.05 if combined ownership ≥ 0.05. *OFF.5to25* = 0 if combined ownership < 0.05, = combined ownership minus 0.05 if 0.05 ≤ combined ownership < 0.25, = 0.20 if combined ownership ≥ 0.25. *OFF.OVER25* = 0 if combined ownership < 0.25, = combined ownership minus 0.25 if combined ownership ≥ 0.25.

^c Defined for combined ownership of the directors who are not top officers analogously to the officer variables.

^d Significant at 90% confidence level.

^e Significant at 95% confidence level.

^f Significant at 99% confidence level.

tives and contribute more to corporate wealth as their ownership stakes rise. In addition, the results suggest that outside board members are capable of becoming entrenched. Since outside board members are less likely than top officers to enjoy corporate perks, such entrenchment perhaps takes the form of unchecked deployment of corporate wealth into projects that the board, but not necessarily the market, considers desirable. Finally, this interpretation

suggests that for outside board members, as well as for top officers, the convergence-of-interests effect again dominates at very high ownership levels.

In the previous discussion, while exploring share ownership as an indicator of managerial entrenchment we have recognized that pure voting power is probably not the main mechanism by which managers retain control. It is more likely that ownership is also positively correlated with status as a founder, tenure with the firm, preponderance of inside directors, ability to persuade shareholders, and other conditions that facilitate management control. To begin examining these possibilities empirically, we consider firms in which the founder or a member of the founding family is a top officer. Since founders presumably have a special claim to control of their firms, they might be instrumental in selecting the board of directors or otherwise become entrenched even with small stakes. At the same time, the entrepreneurial ability of the founder can be a valuable asset, at least early in the life of the firm.

To discriminate between firms in which the founding family supplies entrepreneurial talent and firms in which such families only reduce corporate wealth, we estimate different founder effects for old and young firms. To this end, we define three dummy variables: *FOUNDER*, equal to one if a member of the founding family is among the top two officers;¹⁰ *INC50*, equal to one if the firm was incorporated in 1950 or later;¹¹ and *FOUNDER50*, equal to one if both *FOUNDER* and *INC50* are equal to one. The firms for which all three dummies are equal to zero are the firms incorporated before 1950 in which top officers are not related to the founding family. In the regression presented below, these firms are the omitted group.

The piecewise linear regression from table 2 that now also includes founder and incorporation variables yields:

$$Q = \text{Control variables} + 6.68 \cdot \text{BRD.0to5} - 1.44 \cdot \text{BRD.5to25} \\ (2.22) \qquad (0.604)$$

$$+ 0.759 \cdot \text{BRD.OVER25} - 0.147 \cdot \text{FOUNDER} \\ (0.407) \qquad (0.0768)$$

$$+ 0.614 \cdot \text{FOUNDER50} - 0.286 \cdot \text{INC50}, \\ (0.237) \qquad (0.184)$$

$$R^2 = 0.606, \quad N = 371.$$

¹⁰ We identified the founders and their families using a history of annual reports dating back to either the incorporation of the firm or the turn of the century, whichever was more recent.

¹¹ Year of incorporation is in most cases taken to be the year of the first incorporation of the firm obtained from Moody's Industrial Manuals. In a few cases, Moody's noted a large discrepancy between the year the business was established and the year of first incorporation. The establishment year was used in those cases.

By adding subsets of coefficients on the founder and incorporation variables, we can gauge differences between firms. Among old firms (i.e., those incorporated before 1950), the presence of the founding family reduces Q on average by 0.147 ($t = -1.91$). In contrast, among new firms (i.e., those incorporated after 1950), the presence of the founding family raises Q on average by $-0.147 + 0.614 = 0.467$ ($t = 2.02$). One explanation for this contrast is that in young firms founders play an important entrepreneurial role, whereas in older firms they or especially their descendants thwart value maximization and are too entrenched to be removed. Consistent with the entrenchment possibility, Johnson et al. (1985) find that sudden deaths of chief executives are accompanied by price increases in their firms' stocks when those executives are founders, but not otherwise. And Morck, Shleifer, and Vishny (1988) find that a firm run by the founding family is much less likely than an average firm to be acquired in a hostile takeover.

For completeness, we include the regression in which holdings of officers and outside board members are segregated, even though *OFFICER* and *FOUNDER* variables are highly colinear. Although standard errors of the estimates rise, the general pattern of coefficients is consistent with our earlier findings:

$$\begin{aligned}
 Q = & \text{Control variables} + 5.00 \cdot \text{OFF.0to5} - 1.49 \cdot \text{OFF.5to25} \\
 & \quad (3.15) \quad (0.717) \\
 & + 0.679 \cdot \text{OFF.OVER25} + 3.90 \cdot \text{OUT.0to5} - 1.32 \cdot \text{OUT.5to25} \\
 & \quad (0.338) \quad (2.33) \quad (0.789) \\
 & + 1.73 \cdot \text{OUT.OVER25} - 0.125 \cdot \text{FOUNDER} \\
 & \quad (1.01) \quad (0.109) \\
 & + 0.595 \cdot \text{FOUNDER50} - 0.287 \cdot \text{INC50}, \\
 & \quad (0.234) \quad (0.183)
 \end{aligned}$$

$$R^2 = 0.606, \quad N = 371.$$

4. Conclusion

In this paper, we examine the reduced-form relationship between management ownership of the firm's equity and the market valuation of its tangible assets. In a cross-section of 371 1980 Fortune 500 firms, Tobin's Q rises as board ownership increases from 0% to 5%, falls as ownership rises further to 25%, and then continues to rise, although much more slowly, as board ownership rises beyond 25%. These results also apply individually to the ownership by the firm's top officers and its outside board members. One interpretation of these findings is that the increases of Tobin's Q with

ownership reflect the convergence of interests between managers and shareholders, while the decline reflects entrenchment of the management team.

For a number of reasons, this interpretation is not entirely satisfactory. First, as ownership rises from 0% to 5%, average Tobin's Q increases by 0.3, which is an extremely large magnitude. This raises the possibility that the result does not come only from the convergence-of-interests effect of ownership on Q , but also reflects the fact that managers of high Q firms just end up with more stock. There is good reason to believe this possibility, especially in the 0% to 5% range where stock positions are likely to come from remuneration. For example, firms that do very well (and therefore have high Q s) are more likely to give managers stock bonuses or have managers exercise their stock options. Similarly, if the entrepreneurial ability or a money-making idea of top management is rewarded with a higher equity stake in the firm, firms with a lot of such intangible assets will simultaneously have higher Tobin's Q s and management ownership. Alternatively, firms with a lot of intangible assets, for which our measured Q will be high, might require greater management ownership to ensure proper management of their assets, as discussed by Demsetz and Lehn (1985). These effects can induce a positive correlation between management ownership and Tobin's Q even in the absence of important incentive effects, and they are likely to be especially important in the 0–5% range.¹² At the same time, we are encouraged by the positive association of ownership and Q for stakes exceeding 25%, since the magnitude of the effect we estimated is more reasonable, and it also seems plausible to believe that beyond the 25–30% range additional entrenchment effects are likely to be minimal.

The second aspect of the results we found surprising is that average Tobin's Q starts to decline in the neighborhood of 5% ownership, although our statistical confidence in this being the turning point is not great. As we stressed in the paper, this probably does not reflect entrenchment resulting directly from management's control of voting rights. More plausibly, the decline in Q reflects the positive correlation between ownership and managerial and firm attributes that facilitate entrenchment. Consistent with this possibility, the presence of a founding family in an older firm has a negative impact on Tobin's Q , even after ownership is controlled for.

These findings that both higher board ownership and the founding family's presence have a negative effect on Q are not evidence of an inefficiency, since

¹²The positive association between ownership and Q can be explained in other ways. For example, managers expecting high future profits might retain higher stakes. Retention of a higher stake by management then conveys a positive signal to the market and results in a higher stock price [Leland and Fyle (1977)]. Alternatively, firms with a younger capital stock might have a higher measured Q than older firms, and might also have higher management ownership, since less time has passed for initial stakes to get dissipated. Both of these factors would seem to be more important for ownership levels above 5%.

they might just reflect the optimal tradeoff between profits and private benefits to the management from non-value-maximizing behavior. For example, if shareholders can make side payments to management (obviously including contingent compensation such as stock options), the firm's operating strategy can still be efficient even though top management has effective control of the firm. Although our evidence suggests that non-value-maximizing behavior is more prevalent in firms in which management has greater effective control, these might also be the firms in which management's private benefits of control are the greatest. The higher level of non-value-maximizing behavior in these firms then simply reflects the fact that management values such behavior more and therefore the efficient level of such behavior is higher. On the other hand, there are probably severe limitations on executive pay and the degree to which management can be bribed to take particular actions. Without side payments, corporate decisions will not necessarily maximize the sum of cash flows and private benefits to management, because the party with effective control will just make corporate decisions according to his own preferences. For example, when management has effective control and there are limitations on side payments from shareholders, the level of non-value-maximizing behavior is likely to be inefficiently high [Shleifer and Vishny (1988)]. Even in this case, however, the allocation of control rights to management may be efficient in the sense that, when a founder who initially owns 100% of the firm sells part of it to the public, he would rather obtain lower proceeds from outside investors than leave himself open to a takeover or a proxy fight at some future date.

The results of this study are related to several findings in the economic analysis of takeovers. For example, Walkling and Long (1984) find that the larger the officers' financial gain from a takeover, the less likely they are to resist a bid. Morck, Shleifer, and Vishny (1988) offer evidence that firms in which one of the top two officers is a member of the founding family are less likely to be acquired in a hostile tender offer than firms in which the top two officers are unrelated to the founder. Stulz (1988) offers a theory of the relationship between management ownership and Tobin's Q that focuses on the takeover process. In his theory, management's preference for control and consequent refusal to tender its shares forces acquirers to pay higher premiums to gain control when management's stake is higher, and sometimes leads to an increase in the target firm's ex ante value. When management's stake is so large that no takeover can be profitable, however, the ex ante firm value includes no takeover premium, and is therefore low. Stulz's theory differs from Jensen and Meckling (1976) at the lower end of management ownership, since increased shareholder welfare from higher management ownership results from more effective opposition to takeovers and not from better alignment of management and shareholder interests. But Stulz's theory is closely related to the entrenchment hypothesis at the higher end, as high management ownership effectively precludes a takeover.

Because of the nature of our data, this paper has not dealt with several important issues that might fruitfully be pursued in future research. First, we have focused on very large (and therefore usually older) corporations. In newer, faster growing firms, managerial holdings probably play a more important signalling or compensation role than they do in our firms. Moreover, as our results have suggested, founders in younger firms might have an important leadership role to play. Research on ownership structure can doubtless benefit from considering smaller firms as well. Second, a better analysis of the impact of officers' stakes on performance would incorporate other compensation data. Important work in this area is Murphy (1985). Finally, on both a theoretical and an empirical level, it is very important to learn how members of boards of directors with different individual ownership positions interact, and how the distribution of ownership among board members affects performance. Our work essentially assumes a good deal of homogeneity on the board; a more complex story is surely appropriate.

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