

Ownership structure and corporate performance

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Abstract

This paper investigates the relation between the ownership structure and the performance of corporations if ownership is made multi-dimensional and also is treated as an endogenous variable. To our knowledge, no prior study has treated the corporate control problem this way. We find no statistically significant relation between ownership structure and firm performance. This finding is consistent with the view that diffuse ownership, while it may exacerbate some agency problems, also yields compensating advantages that generally offset such problems. Consequently, for data that reflect market-mediated ownership structures, no systematic relation between ownership structure and firm performance is to be expected. © 2001 Elsevier Science B.V. All rights reserved.

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1. Introduction

The connection between ownership structure and performance has been the subject of an important and ongoing debate in the corporate finance literature. The debate goes back to the Berle and Means (1932) thesis, which suggests that an inverse correlation should be observed between the diffuseness of shareholdings and firm performance. Their view has been challenged by Demsetz (1983), who

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argues that the ownership structure of a corporation should be thought of as an endogenous outcome of decisions that reflect the influence of shareholders and of trading on the market for shares. When owners of a privately held company decide to sell shares, and when shareholders of a publicly held corporation agree to a new secondary distribution, they are, in effect, deciding to alter the ownership structure of their firms and, with high probability, to make that structure more diffuse. Subsequent trading of shares will reflect the desire of potential and existing owners to change their ownership stakes in the firm. In the case of a corporate takeover, those who would be owners have a direct and dominating influence on the firm's ownership structure. In these ways, a firm's ownership structure reflects decisions made by those who own or who would own shares. The ownership structure that emerges, whether concentrated or diffuse, ought to be influenced by the profit-maximizing interests of shareholders, so that, as a result, there should be no systematic relation between variations in ownership structure and variations in firm performance.

The empirical studies about the relation between both variables seem to have yielded conflicting results. Demsetz and Lehn (1985) provide evidence of the endogeneity of a firm's ownership structure argued for by Demsetz (1983) and also assess the validity of the Berle and Means thesis: A linear regression of an accounting measure of profit rate on the fraction of shares owned by the five largest shareholding interests (and on a set of control variables), in which ownership structure is treated as an endogenous variable, gives no evidence of a relation between profit rate and ownership concentration. Morck et al. (1988) ignore the endogeneity issue altogether and re-examine the relation between corporate ownership structure and performance. Like Demsetz and Lehn (1985), they find no significant relation in the linear regressions they estimate using Tobin's Q and accounting profit rate as alternative measures of performance. However, they also estimate a piecewise linear regression of Tobin's Q on insider ownership, and this does provide evidence of a non-monotonic relation. The estimated piecewise regression is positive for management holdings of shares between 0% and 5% of outstanding shares, negative for management holdings between 5% and 25%, and positive once more for management holdings greater than 25%.¹

¹ The starting and stopping values of management holdings that define these pieces are not derived from theory but, rather, according to whether they mark changes in the pattern of the data. The plausibility of the different directions taken by the slopes of the adjacent segments in this piecewise regression might be rationalized as a reflection of the changing interests of professional management as its ownership interest moves from insignificant to significant, but the zigzag nature of the segment slopes is not suggestive of the uniformly concave downward or upward relation that might reasonably be expected from this rationalization. Moreover, Morck et al. (1988) also find that the results from this piecewise regression are not robust to a substitution of accounting profit rate for Tobin's Q .

Other articles have followed the Morck et al. (1988) study. Included among these are McConnell and Servaes (1990), Hermalin and Weisbach (1988), Loderer and Martin (1997), Cho (1998), Himmelberg et al. (1999), and Holderness et al. (1999). Summary descriptions of these studies are provided in Appendix A. All rely chiefly on Tobin's Q as a measure of firm performance, although a few also examine accounting profit rate, and all emphasize managerial shareholdings as a measure of ownership structure.

Differences abound across these studies, in measurements and sample used, in estimating technique applied, in whether and how they account for the endogeneity of ownership structure, and in results obtained. Fig. 1 shows the results of all the studies of firm performance and ownership structure that followed Demsetz and Lehn (1985).² We do not judge here which of these articles offer(s) the most reliable guide. However, Fig. 1 suggests that these studies, viewed in totality, do not give strong evidence by which to reject the belief that firm performance and managerial equity ownership are unrelated.

In Section 2, we analyze the conceptual issues surrounding each of the three main aspects that seem to explain the differences in results observed across studies: The measurements of firm performance, the measure of ownership structure used, and whether or not the endogeneity of ownership structure is taken into account in the estimation of the effect of ownership on performance. Our analysis suggests that none of the studies we examine treat ownership structure appropriately. It should be modeled not only as an endogenous variable but also, simultaneously, as an amalgam of shareholdings owned by persons with different interests. In particular, the fractions of shares owned by outside shareholders and by management should be measured separately. To our knowledge, no study to date incorporates both these aspects of ownership structure.³ Hence, a restudy of the ownership–performance relation seems needed.

Our restudy fills this gap. It models ownership structure as an endogenous variable and it examines two dimensions of this structure likely to represent conflicting interests, the fraction of shares owned by management and the fraction of shares owned by the five largest shareholding interests. For the 223 firm sample examined here, the evidence supports the belief that ownership structure is endogenous but not the belief that ownership structure affects firm performance.

² The Demsetz and Lehn results are not shown in Fig. 1 because they are based on different measures of profit and ownership structure than are the results portrayed in Fig. 1.

³ The studies that take the endogeneity of ownership into account to some degree include Demsetz and Lehn (1985), Hermalin and Weisbach (1991), Loderer and Martin (1997), Cho (1998), and Himmelberg et al. (1999). Holderness et al. (1999) confirm the endogeneity of insider ownership but do not account for it in their estimation of the ownership–performance relation. None of these studies consider more than one measure of ownership structure. McConnell and Servaes (1990) consider both insider ownership and block holder ownership; however, they do not treat ownership structure as endogenous.

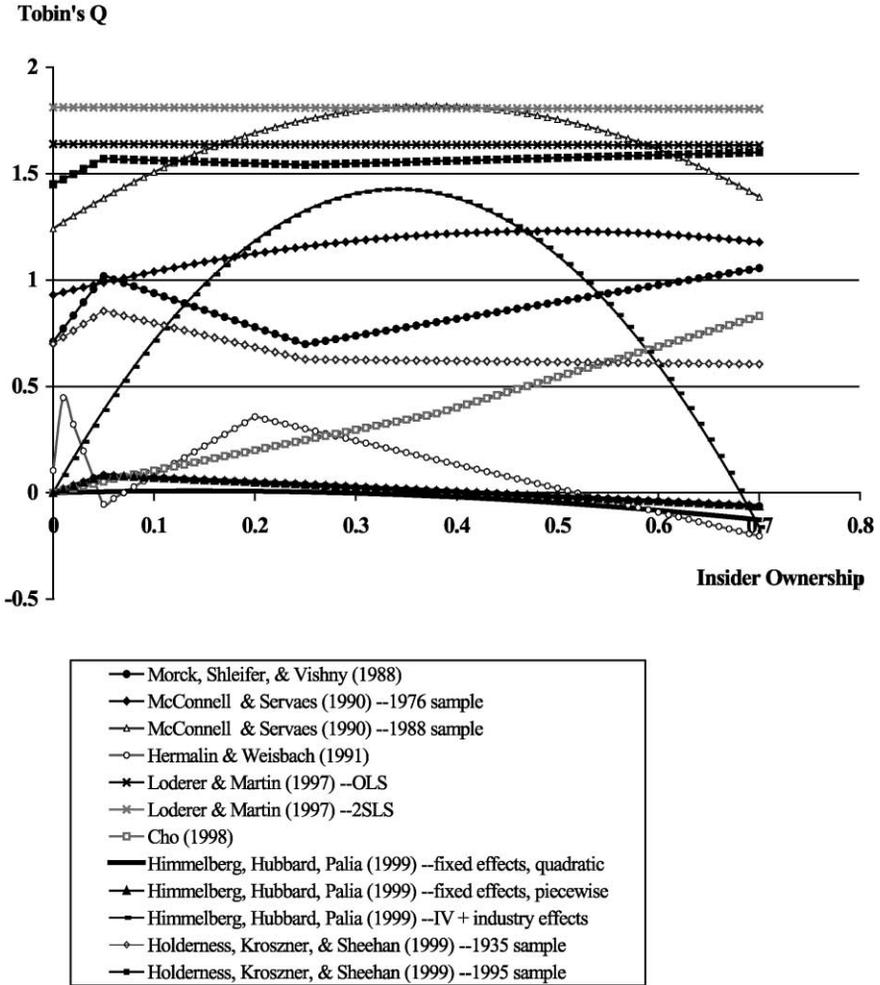


Fig. 1. Results of empirical studies of the relation between Tobin's Q and insider ownership.

These findings are consistent with the view that ownership structures, whether diffuse or concentrated, that maximize shareholder expected returns are those that emerge from the interplay of market forces.

The following section discusses some of the conceptual issues that arise from an attempt to determine whether there is a relation between ownership structure and firm performance. Section 3 describes the data and variables we use in our empirical analysis. Section 4 reports and discusses our findings. Section 5 concludes.

2. Conceptual issues in estimating the ownership–performance relation

2.1. Firm performance

The Demsetz and Lehn study used accounting profit rate to measure firm performance. All of the studies that followed used Tobin's Q . There are two important respects in which these two measures differ. One is in time perspective, backward-looking for accounting profit rate and forward-looking for Q . In attempting to assess the effect of ownership structure on firm performance, is it more sensible to look at an estimate of what management *has* accomplished or at an estimate of what management *will* accomplish? The second difference is in who is actually measuring performance. For the accounting profit rate, this is the accountant constrained by standards set by his profession. For Q , this is primarily the community of investors constrained by their acumen, optimism, or pessimism. The proclivity of economists, most of whom have a better understanding of market constraints than of accounting constraints, is to favor Q . But caution is needed here. Accounting profit rate is not affected by the psychology of investors, and it only partially involves estimates of future events, mainly in the valuations it places on goodwill and depreciation. Tobin's Q , however, is buffeted by investor psychology pertaining to forecasts of a multitude of world events that include the outcomes of present business strategies.

It is true that accounting profit rates are affected by accounting practices, such as the different methods applied to valuations of tangible and intangible capital, but Tobin's Q also suffers from accounting artifact problems, and perhaps more severely. In fact, for the sample of firms we study here, variations in Q are better explained by variables that control for accounting artifacts than are variations in accounting profit rate. The numerator of Q , being the market value of the firm, partly reflects the value investors assign to a firm's intangible assets, yet the denominator of Q , the estimated replacement cost of the firm's tangible assets, does not include investments the firm has made in intangible assets. The firm's future revenue stream is treated as if it can be generated from investments made only in tangible capital. This distorts performance comparisons of firms that rely in differing degrees on intangible capital (Telser, 1969; Weiss, 1969; Demsetz, 1979). Moreover, recent studies that use Tobin's Q do not attempt to measure the replacement cost of tangible capital when calculating the denominator of Q . Instead, they use the depreciated book value of tangible capital, as we do in our restudy. This incorporates into Q a goodly portion of the accounting problems that make accounting profit rate calculations suspect, for many of these problems have to do with whether the depreciated value of intangible capital, as this is calculated by accountants, accords with the true economic rate of depreciation of capital.

The numerator of Q , to some significant degree surely, reflects accounting profit rates. Investors do not ignore the past in their attempts to determine reasonable expectations for the future profitability of firms. High accounting profit

rates are usually accompanied by high stock prices, whereas the denominator of Q , when this is measured by the book value of tangible assets rather than by replacement cost, is much like that used by accountants when estimating the firm's capital investment. Hence, we can expect accounting profit rate and Tobin's Q to be correlated. In our sample, the simple correlation between Q and profit rate is about 0.60. It is not our intent to argue for or against one of these measures of performance. Each carries its own bag of advantages and disadvantages. We simply note that Q 's bag is far from empty, and that accounting profit rates have been ignored presumptuously in favor of Q in the studies that followed the Demsetz and Lehn study.

2.2. *Ownership structure*

All the measures of ownership structure used by Demsetz and Lehn are based on the fraction of shares owned by a firm's most significant shareholders, with most attention being given by them to the fraction owned by the five largest shareholders.⁴ The studies that came after the Demsetz and Lehn article focus on the fraction of shares owned by a firm's management. Management holdings include shares owned by members of the corporate board, the CEO, and top management. Exclusive reliance on this measure to track the severity of the agency problems suggests that all shareholders classified as management have a common interest. This is not likely to be true. A board member, for example, may have a position on the board because he has, or represents someone who has, large holdings of the company's stock. Board members like this do not have interests identical to those of professional management. More likely, their interests are more closely aligned with those of outside investors. Insider board members that really are, or that really represent, outside investor interests may not be rare. For the sample of firms in our study, the correlation between the fraction of shares owned by important shareholding families and the fraction owned by management is 0.67. This positive correlation suggests that important shareholding families do have representation on corporate boards. These family board members, or their representatives, cannot be thought of as having interests in common with those of "pure" management personnel. A high level of management shareholdings, therefore, is not so reliable an index of the strength of professional management's representation in the firm's operations as most studies using this measure assume it to be.

⁴ Demsetz and Lehn also use a Herfindahl index of the concentration of shareholdings and the fraction of shares owned by the 20 largest shareholders. The estimates derived from using these various measures of ownership concentration are mutually supportive. However, although the Demsetz and Lehn study did use the fraction of shares owned by institutional investors in one part of their study, their study tended to ignore differences between investor types.

An analogous potential problem is associated with the measure of ownership structure in the Demsetz and Lehn study. The fraction of shares owned by a corporation's largest shareholders is not a reliable measure of the degree to which investors are protected from abuse by management if professional management often holds enough shares to put them in this category of shareholders. However, this is less likely to be so serious a problem as that which arises from the use of the fraction of shares held by management. The empirical reality is that a person who is a professional member of the management team hardly ever holds enough shares to make him one of the five most important shareholders of a corporation. For 138 of the 223 firms in the sample to be used in the restudy presented below, the fraction of shares owned by management as a group is less than 3%. For 195 firms, the fraction of shares owned by management as a group is less than 10%. If this fraction is large, the reason usually is the presence on the board or in a high level of management of a member of a family that owns a large fraction of the firm's shares. Hence, not many "pure" professional management people are found among the five largest shareholders.

In summary, the fraction of shares owned by the five largest shareholding interests is more likely to be representative of the ability of shareholders, as this term is ordinarily understood, to control professional management than the fraction of shares owned by management is likely to be representative of the ability of professional management to ignore shareholders. The variation in the importance of these two types of owners, the five largest shareholders and the management, correlate positively across the firms in our sample, but not so much so as to allow a claim that one of these measures is redundant if the other is used. In our sample, the correlation between them is 0.47. Therefore, other things being equal, a study that uses both measures to account for the complexity of interests represented by a given ownership structure should give a more accurate picture of the ownership–performance relation than those that rely on only one of the two measures.

2.3. Endogenous ownership

As argued by Demsetz (1983) and shown by Demsetz and Lehn (1985) and some of the subsequent studies, ownership structure is endogenous. Persistent diffuseness of a firm's ownership structure plausibly serves the firm's shareholders better than would a concentrated ownership structure, even if more diffuseness of ownership does allow professional management to divert more of the firm's resources to serve its own narrow interests. We have no doubt that management is self-serving to the degree that imperfect monitoring allows it to be, but this is largely irrelevant. Owners of a corporation would like all inputs to come without problems and, if possible, without cost. The central issue is whether professional management and diffuse ownership structure bring special advantages to firms that are sufficient to offset the special disadvantages they may also bring. If there are compensating advantages, there should be no systematic relation between manage-

rial shareholdings and firm performance. If the advantages are not fully compensating, there should be a systematic relation, but then there arises a question: Why do diffuse ownership structures survive? There are costs to changing a non-optimal ownership structure, but these are not likely to insulate a clearly improper structure over periods as long as many diffuse ownership structures persist.

Moreover, due to considerations such as insider information and performance-based compensation, firm performance is at least as likely to affect ownership structure as ownership structure is to affect performance. The possible divergence between insider and market-based expectations for firm performance creates an incentive for management to vary its holdings of stock in accord with its expectation regarding future performance. A leveraged buyout of non-management shares by management is an extreme example of how expected performance can cause ownership structure to change. Management compensation in the form of stock options offers another possibility for a “reverse” causation in which firm performance affects ownership structure.

The finding that ownership structure is endogenous and plausibly determined, among other factors, by firm performance itself, implies that this endogeneity must be taken into account when seeking to ascertain the relation between ownership and performance. Failing to do so is bound to yield biased regression estimates. The Demsetz and Lehn study, which takes as its primary task the investigation of how ownership structure responds to aspects of the firm and of its environment, necessarily treats ownership structure as endogenous to determine whether it affects firm performance. Their two-stage least squares regression shows that ownership fails to explain variations in firm performance.⁵ Those of the follow-on studies referred to in Appendix A that treat ownership as endogenous in one way or another arrive at a similar conclusion (Hermalin and Weisbach, 1988; Loderer and Martin, 1997; Cho, 1998). On the other hand, Morck et al. (1988) and other studies fail to account for the endogeneity of ownership structure. These are the studies that have yielded “evidence” of a statistically significant effect of ownership structure on performance.

Thus, we have follow-on studies that do not treat managerial holdings as endogenous, and studies that do treat it as such but take no note of shareholdings

⁵ The possibility that ownership structure might in turn be affected by firm performance is not examined in the Demsetz and Lehn article, and, unfortunately, much of the data on which their original study rested is now inaccessible. However, background work for the Demsetz and Lehn study, does report the results of a more complete treatment of the endogeneity problem in which accounting rate of return, along with other variables, is considered as a possible source of variation in ownership structure. A simultaneous equation model is estimated in which ownership structure is the dependent variable in one of the two equations and firm performance is the dependent variable in the second equation. The 431 mining and manufacturing firms contained in their data base are used to estimate regression coefficients. The estimates show that firm performance does affect ownership structure but not that ownership structure affects firm performance.

by investors who are not part of the firm's management. To our knowledge, no study has both treated the endogeneity issue with the fullness that it deserves and, at the same time, examined the roles played by different types of shareholders. The restudy of the ownership and control problem described in the following sections does both.

3. Data

3.1. Sample

The sample used in this study is a 223-firm random subsample of the sample in the original Demsetz and Lehn study. The latter included 511 firms from all sectors of the US economy for which there were data about ownership (from the 1980 Corporate Data Exchange (CDE) and 1981 Fortune 500 directories), accounting variables (from Compustat), and security prices (from the Center for Research on Security Prices, CRSP), for the period 1976–1980. The Demsetz and Lehn database no longer exists in its entirety, but it has been possible to re-construct the subset that is used here. Three advantages are offered by this data subset. The first is that the ownership variables are measured much more finely than is possible from data sources yielding more recent data. This is because the source of data for ownership structure in the Demsetz and Lehn sample comes from the 1980 Corporate Data Exchange, a source that discontinued its tabulation after that year. The second advantage is that a full complement of other relevant variables, fully scrutinized for errors, is contained in the Demsetz and Lehn data set. The third advantage is that Morck et al. used the Demsetz and Lehn data set to produce the results that they claimed refuted the findings of Demsetz and Lehn in regard to the relationship between ownership structure and performance. The disadvantage in using this subset is that by modern standards of financial research, it is small. Yet, the sample is large enough to detect strong relationships between the variables examined. Moreover, its size disadvantage is at least partially offset by the closeness between the means and variances of the variables to those in the original 511 firm Demsetz and Lehn sample; the subset sample is highly representative of the full Demsetz and Lehn sample.

This subset includes data on managerial ownership for the years 1976 and 1980, a variable not used by Demsetz and Lehn in their study. We also added to the database other variables that were not used in Demsetz and Lehn (1985), such as Tobin's Q , leverage, and fixed assets relative to sales. We construct these new variables using Compustat data on active and inactive ("research") companies.

Our sample includes regulated firms (utilities and financial institutions) as well as non-regulated. Two subsamples are also examined; one, with 186 firms, excludes the regulated sector; the other, with 135 firms, includes only firms from

the non-regulated sector of the economy for which we have been able to calculate concentration ratios for the segments of the markets in which they operate.

Table 1 reports the mean values, standard deviations, maxima and minima of variables in the 223 firm sample. These can be compared with those of the original Demsetz and Lehn data, summary statistics of which appear in their article. The correspondence is very close. A description of these variables is provided in the Section 3.2 and summarized in Table 2.

3.2. Variables and model specification

Our econometric model has two equations. The first has firm performance as the dependent variable. The second has fraction of shares owned by management as the dependent variable. In the symbolic representations that follow, “Av...” often begins the notation. This indicates that the variables being referred to are calculated as averages of 5 years of annual data, from 1976 to 1980. The two equations are the following.

3.2.1. Eq. (1)

The dependent variable: Firm performance. This is measured by Tobin's Q , which is denoted AvQ .

The explanatory variables:

- (a) Percentage of shares owned by management, $AvMH$.
- (b) Percentage of shares owned by the five largest shareholders, $A5$.

Table 1
Descriptive statistics

Variable	<i>N</i>	Mean	SD	Min
AvQ	222	1.129	0.371	0.616
$Av(prate)$	223	0.075	0.045	-0.023
$Av(ad/s)$	223	0.011	0.020	0
$Av(rd/s)$	223	0.012	0.019	0
$Av(fix/s)$	223	0.496	0.704	0
Mktr	223	1.096	0.444	0.235
Se	223	0.069	0.030	0.036
LA5	223	-1.284	0.889	-3.907
LavMH	223	-4.173	1.843	-8.805
Avasset	223	2920	7137	48
$Av(debt/a)$	222	0.190	0.123	0
CR4	136	41	20	4

The variables are the following: Tobin's Q (AvQ), profit rate ($Av(prate)$), advertising-to-sales ratio ($Av(ad/s)$), R&D-to-sales ratio ($Av(rd/s)$), fixed assets-to-sales ratio ($Av(fix/s)$), market risk (Mktr), firm-specific risk (Se), ownership concentration (LA5), managerial shareholdings (LAVMH), assets (Avasset), debt-to-assets ratio ($Av(debt/a)$), industry concentration (CR4). Variable definitions and sources are provided in Table 2.

Table 2
Variables, definitions, and sources

Variable	Definition	Source
LA5	$\log[A5/(100 - A5)]$, where A5 denotes the fraction of shares owned by the five largest shareholders in 1980	CDE Stock Ownership Directories
LavMH	$\log[AvMH/(100 - AvMH)]$, where AvMH denotes the average fraction of shares owned by the top management, the CEO, and board members each of whom own at least 0.02% of outstanding shares. The average is of the years 1976 and 1980	CDE Stock Ownership Directories
Av Q	Average Tobin's Q . The average is of annual values for the 5 years 1976–1980. The numerator of Q is the year-end market value of common stock, and the book value of preferred stock and debt. The denominator is year-end book value of its total assets	Compustat
Avprate	Average accounting profit rate (net income to book value of equity). The average is of annual observations for the 5 years 1976–1980. This variable is shown in Table 3, so that the correlation between an accounting measure of profit and Tobin's Q can be seen. However, this variable is not used in regression equations comprising the present study	Compustat
Av(ad/s)	Annual advertising expenditures to annual sales. Averages are for 1976–1980	Compustat
Av(rd/s)	Annual research and development expenditures to annual sales. Averages are for 1976–1980	Compustat
Av(fix/s)	Annual expenditures on plant and equipment to annual sales. Averages are for 1976–1980	Compustat
Av(debt/a)	Annual average, over 1976–1980, debt to book value of total assets	Compustat
CR4	Four-firm concentration ratio of the firm's principal industry in 1977	US Census of Manufacturers
Mktr	Market risk measured by a regression of the monthly return on a stock on a value-weighted market portfolio over the 1976–1980 time period	CRSP
Se	Standard error of estimate from a regression of the monthly return on a stock on a value-weighted market portfolio calculated for the 1976–1980 time period	CRSP
Avasset	Average book value of total assets in millions of dollars. The average is of annual values for the years 1976–1980	Compustat
U	Utility indicator variable that is 1 if a firm is a utility, 0 otherwise	Compustat
Med	Media indicator variable that is 1 if a firm is in a media industry, 0 otherwise	Compustat
F	Financial firm indicator variable that is 1 if a firm is in a financial industry, 0 otherwise	Compustat

CDE denotes the Corporate Data Exchange Stock Ownership Directories. CRSP denotes the Center for Research on Security Prices database.

- (c) Advertising expenditures as a fraction of sales revenues, $Av(ad/s)$.
- (d) Research and development expenditures as a fraction of sales revenues, $Av(rd/s)$.
- (e) Expenditures on fixed plant and equipment as a fraction of sales revenues, $Av(fix/s)$.
- (f) The value of debt as a fraction of the book value of assets $Av(debt/a)$.
- (g) For some regressions, the four-firm market concentration ratio, CR4.
- (h) For some regressions, indicator variables for utilities industries, U , media industries, M , and finance industries, F .

3.2.2. Eq. (2)

The dependent variable: Fraction of shares owned by management, $AvMH$.

The explanatory variables:

- (a') Firm performance, AvQ .
- (b') Market risk of stock, $Mktr$.
- (c') Firm-specific risk, Se .
- (d') Firm size as measured by book value of assets, $Avassets$.
- (e') The value of debt as a fraction of the book value of assets.
- (f') For some regressions, indicator variables for utilities industries, U , media industries, M , and finance industries, F .

Sources and descriptions of all variables are given in Table 2.

The distributions of the raw data for the two variables that measure ownership structure, $AvMH$ and $A5$, are very skewed. To obtain symmetric distributions of these measures of ownership structure, the raw data are converted to log values using the following transformations: $LAvMH = \log[AvMH/(100 - AvMH)]$ and $LA5 = \log[A5/(100 - A5)]$. $LAvMH$ and $LA5$ are used throughout the analysis of the data.

As has been noted already, the fraction of shares owned by management is less than 3% for 138 firms of the 223 firm sample used here. The fraction is less than 10% for 195 of these firms. Management holdings are not sufficiently high for most firms in this sample to give management unfettered control. This is especially true because $A5$ is not similarly constrained to low levels. The fraction of shares owned by the five largest shareholders equals or exceeds 20% in 52% of the firms included in our total sample; and the fraction owned exceeds 20% in 60% of the firms in the sub-sample that excludes the regulated sector. These facts are important. They raise doubts about basing an explanation of differences in firm performance on differences in degree of management entrenchment. Degree of management entrenchment depends not only on whether management owns a slightly smaller or larger fraction of shares, it depends to a greater degree on just how large this fraction is. A doubling of the fraction of shares owned by

management when the initial fraction constitutes less than 5% of outstanding shares is unlikely to signify as large an increase in the degree of management entrenchment as would be expected if the initial fraction constitutes more than own 20% of outstanding shares.

Nonetheless, in concept at least, the roles of these two dimensions of ownership structure in the control problem plausibly differ. The greater is the degree to which shares are concentrated in the hands of outside shareholders, the more effectively management behavior should be monitored and disciplined. The consequences of an increase in shareholdings by management are less clear, since this may make management act more like an outside shareholder or more like a manager possessed of an entrenched position. The reader is reminded that these behavior patterns, more like an outside shareholder or more like an entrenched manager, do not necessarily translate into systematic differences in firm performance. The central objective here is to discover if these variables do systematically relate to firm performance. Hence, they appear as explanatory variables in the firm performance equation.

AvQ appears as an explanatory variable in Eq. (2), because, as we have argued in Section 2.3., compensation plans, insider trading possibilities, and corporate takeovers suggest that firm performance may influence ownership structure as well as be influenced by it. It is the possibility of these reverse causations that reduces the usefulness of results obtained from single equation models of the effect of management shareholdings on firm performance.

Variables $Av(ad/s)$, $Av(rd/s)$, and $Av(fix/s)$ are used in Eq. (1) to measure the extent to which firms invest in intangible capital, and, therefore, the extent to which the performance measure AvQ may be distorted because its denominator omits the value of intangible assets. They serve not to explain variations across firms in correct values of Q but to explain differences in measurements of Q that are caused by accounting artifacts. Accounting distortions also can arise from the time-based rates at which fixed assets are depreciated. $Av(fix/s)$ is used to control for this in Eq. (1).

Variable $Av(debt/a)$ serves in Eq. (1) to capture the value enhancing or value reducing effects of the differences that might exist between the interest obligations incurred when borrowing took place and the interest rates that prevailed during the 1976–1980 period. Debt sold during an earlier period imposes a risk of interest payment obligations that will be paid back with (a) more valuable money than was borrowed if there has been a relative deflation during the 1976–1980 period and with (b) a less valuable money if there has been a relative inflation. In Eq. (2), $Av(debt/a)$ serves to reflect the possibility that creditors provide some of the monitoring of management that otherwise would have come from equity holders. Hence, larger values of $Av(debt/a)$ should be associated with lower fractions of shares owned by the five largest shareholding interests. If creditors do add to the monitoring capability of a firm, their presence may also discourage attempts by management to entrench itself more strongly through share ownership.

CR4 is used to account for the variation in AvQ across firms that is due to a difference in pricing power that emerges from the structure of the market. The expectation that comes from past industrial organization studies is that the coefficient of CR4 is positive, but our data do not support this expectation.⁶

Mktr and Se measure the risks inherent in stock ownership; Se is an especially relevant measure of the risk of putting a large part of an investors wealth in the stock of a single company. Hence, variation in risk plausibly causes variation on ownership structure. But these variables also index the profit potential inherent in inside information. A stock whose price, and, therefore, whose Tobin's Q value, changes very little through time is one that offers management little opportunity to buy low and sell high before others do. Higher values of Mktr and Se indicate better prospects to profit from the use of inside information, and, therefore, a stronger causation effect that runs from variations in (expected) firm performance to variations in management shareholdings. These risk variables also relate positively to the profit that outside owners can realize if they supervise management closely. Greater instability in the firm's environment, which these variables measure, necessitates more attention from shareholders to make sure professional management is staying "on top" of rapidly changing conditions. Providing this attention requires greater concentration in outside investor shareholdings. It seems likely that these complex consequences of risk influence ownership structure, but the complexity of this influence makes it difficult to pre-sign regression coefficients.

Avasset is a measure of firm size. The larger the firm size, the larger is the capital sum that investors require to own a given share of a firm. Larger firm size requires more investment from an owner of a given fraction of equity, and, hence, that more of this owner's "eggs" be put "in one basket," Avasset is expected to have a negative coefficient in Eq. (2).

A few words about the indicator variables U , Med , and F are also called for. These indicators come from the Demsetz and Lehn study. U and F are included because they separate out firms in the more regulated parts of our economy, and, as Demsetz and Lehn argue, regulation severely circumscribes what management and outside investors can do with the assets owned by firms. This alters the advantages to taking a concentrated ownership position in firms as compared to firms in the non-regulated sectors of the economy.

The media industry is given attention in the Demsetz and Lehn paper because the industry's output would seem to be imbued with what they call amenity potential. Amenity potential refers to a characteristic of the good produced by the

⁶ There is a question of how one should interpret CR4 with respect to management performance. CR4 can be thought of as a dimension of markets over which management has no control, or it can be thought of as a dimension of markets that has been brought about through the efforts of management. The present management of the firm will have had little to do with creating high market concentration, but it may play a role in maintaining the level of market concentration.

firm that allows for the creation of non-profit related utility for owners of the firm. Not many firms exhibit this characteristics, but some plausibly do, firms in the media and sports industries, for example. These amenity objectives will not be those of independent owners of small numbers of shares, who hold these shares mainly for their profit potential, and firms will not be used to produce these amenities for owners if the ownership structure is very diffuse. Therefore, for those special firms that exhibit high amenity potential, we expect ownership structure to be more concentrated for given values of other variables that influence ownership structure. The Demsetz and Lehn study showed that the ownership structures of media firms, for given values of other variables, are more highly concentrated than for manufacturing, financial, and utility firms. The historic pattern, now changing, in which newspapers and radio stations tended to be family-owned rather than diffusely owned, is consistent with the presence of high amenity potential. Because of this, we use an indicator variable for firms in the media industries (Med). Med has no prescribed directional role to play in the firm performance equation, and it is used in this equation much as would be any industry indicator variable. However, amenity purchases made by owners should result in reduced profit.

4. Re-examining the relation between ownership structure and performance

4.1. Correlations

Table 3 shows the correlation matrix for the sample used here. The correlations that should be noted are the 0.61 correlation between AvQ and $Avprate$, the two alternative measures of performance, one based on Tobin's Q and the other based on accounting profit rates. We report $Avprate$ simply to show its correlation with AvQ , but we present no regression results using $Avprate$ here (but see discussion below). The 0.48 correlation between $Avrdds$ and Avq , hints at accounting problems with intangible capital. The 0.55 correlation between risk variables Se and $Mktr$ is 0.55, and that between ownership structure variables $A5$ and $AvMH$ is 0.47. The correlation between $Av(debt/a)$ and $Av(fix/s)$ is 0.63. None of the remaining variables are correlated to an extent that merits noting.

4.2. Regression results

We now discuss the central finding of the study we present here. Table 4 uses the smaller 135 firm sample comprised of firms for which CR4 can be calculated. It compares OLS estimates to 2SLS estimates. Tables 5 and 6 drop the CR4 variable, thereby bringing larger sample sizes into play in our estimation of the performance and ownership equations. The 186 firm sample contains non-regulated firms only and the 223 sample contains both regulated and non-regulated

Table 3
Correlation matrix

	Av Q	Av(prate)	Av(ad/s)	Av(rd/s)	Av(fix/s)	Mktr	Se	LA5	LAvMH	Avasset	Av(debt/a)
Av Q	1										
Av(prate)	0.61	1									
Av(ad/s)	0.22	0.17	1								
Av(rd/s)	0.48	0.23	0.21	1							
Av(fix/s)	−0.10	−0.08	−0.21	−0.20	1						
Mktr	−0.10	−0.13	−0.06	0.10	−0.41	1					
Se	−0.13	−0.18	0.20	0.04	−0.26	0.55	1				
LA5	−0.02	0.02	0.01	0.03	−0.48	0.27	0.25	1			
LAvMH	0.10	0.10	0.03	−0.03	−0.50	0.41	0.24	0.52	1		
Avasset	−0.07	−0.20	−0.09	−0.08	0.04	−0.17	−0.08	−0.16	−0.25	1	
Av(debt/a)	−0.32	−0.23	−0.14	−0.23	0.63	−0.13	−0.03	−0.27	−0.32	−0.12	1
CR4	−0.20	−0.11	−0.08	0.06	−0.04	0.05	0.05	−0.08	−0.20	0.24	0.042

The variables are the following: Tobin's Q (Av Q), profit rate (Av(prate)), advertising-to-sales ratio (Av(ad/s)), R&D-to-sales ratio (Av(rd/s)), fixed assets-to-sales ratio (Av(fix/s)), market risk (Mktr), firm-specific risk (Se), ownership concentration (LA5), managerial shareholdings (LAvMH), assets (Avasset), debt-to-assets ratio (Av(debt/a)), industry concentration (CR4). Variable definitions and sources are provided in Table 2.

Table 4

135 firm subsample for which the four-firm market concentration ratio could be calculated

	Av Q (OLS)	Av Q (2SLS)	LAvMH (OLS)	LAvMH (2SLS)
LAvMH (t)	0.0320 (1.63)	-0.0064 (-0.09)		
LA5 (t)	-0.0981 (-2.58)	-0.0616 (-1.05)		
Av(ad/s) (t)	2.6304 (2.04)	2.8632 (1.62)		
Av(rd/s) (t)	9.6032 (6.08)	5.7306 (1.96)		
Av(fix/s) (t)	0.5036 (3.32)	0.8339 (2.67)		
Av(debt/a) (t)	-1.1326 (-3.51)	-3.1658 (-2.30)	0.5008 (0.37)	-1.3081 (-0.45)
Med (t)	0.3130 (2.18)	0.1371 (0.56)	1.9054 (3.19)	2.1309 (3.25)
Av Q (t)			-0.0115 (-0.04)	-1.2841 (-2.14)
Mktr (t)			0.9494 (2.43)	0.7690 (1.82)
Se (t)			-3.9016 (-0.93)	-4.0605 (-0.91)
Avasset (t)			-0.0002 (-4.08)	-0.0002 (-3.57)
CR4 (t)	-0.0030 (-2.16)	-0.0031 (-1.72)		
Const (t)	1.1345 (10.03)	1.3676 (4.46)	-4.6067 (-6.75)	-2.6236 (-2.29)
Adj. R-sq.	0.44	***	0.20	***

Ordinary and two-stage least squares regressions of Tobin's Q (Av Q) and managerial shareholdings (LAvMH) on ownership concentration (LA5), advertising-to-sales (Av(ad/s)), R&D-to-sales (Av(rd/s)), fixed assets-to-sales (Av(fix/s)), debt-to-assets (Av(debt/a)), a media firm dummy (Med), market risk (Mktr), firm-specific risk (Se), assets (Avasset), and industry concentration (CR4). Variable definitions and sources are provided in Table 2. t -statistics are in parentheses.

Table 5

186 firm subsample containing only unregulated firms

	Av Q (OLS)	Av Q (2SLS)	LAvMH (OLS)	LAvMH (2SLS)
LAvMH (t)	0.0350 (2.22)	0.0073 (0.16)		
LA5 (t)	-0.0655 (-2.07)	-0.0622 (-1.28)		
Av(ad/s) (t)	2.1127 (1.82)	1.8055 (1.26)		
Av(rd/s) (t)	8.5672 (6.76)	5.4971 (2.46)		
Av(fix/s) (t)	0.4536 (4.60)	0.7587 (3.26)		
Av(debt/a) (t)	-1.4147 (-5.35)	-3.8104 (-2.68)	-1.1744 (-1.00)	-4.6745 (-1.78)
Med (t)	0.2974 (2.61)	0.1519 (0.83)	1.3999 (2.74)	1.6016 (2.72)
Av Q (t)			0.0793 (0.27)	-1.8225 (-2.91)
Mktr (t)			1.0497 (3.06)	0.7982 (2.05)
Se (t)			-3.3485 (-0.80)	-4.1092 (-0.87)
Avasset (t)			-0.0002 (-5.07)	-0.0002 (-4.45)
Const (t)	1.1656 (14.93)	1.4528 (5.42)	-4.4383 (-7.00)	-1.2599 (-1.09)
Adj. R-sq.	0.38	***	0.21	***

Ordinary and two-stage least squares regressions of Tobin's Q (Av Q) and managerial shareholdings (LAvMH) on ownership concentration (LA5), advertising-to-sales (Av(ad/s)), R&D-to-sales (Av(rd/s)), fixed assets-to-sales (Av(fix/s)), debt-to-assets (Av(debt/a)), a media firm dummy (Med), market risk (Mktr), firm-specific risk (Se), and assets (Avasset). Variable definitions and sources are provided in Table 2. t -statistics are in parentheses.

Table 6

Full 223 firm sample containing regulated and unregulated firms

	AvQ (OLS)	AvQ (2SLS)	LAvMH (OLS)	LAvMH (2SLS)
LavMH (t)	0.0298 (2.14)	0.0287 (0.47)		
LA5 (t)	-0.0566 (-1.98)	-0.0721 (-1.24)		
Av(ad/s) (t)	1.6224 (1.50)	1.3664 (1.02)		
Av(rd/s) (t)	8.3584 (7.02)	5.4177 (2.48)		
Av(fix/s) (t)	0.1939 (3.12)	0.3859 (2.36)		
Av(debt/a) (t)	-1.1526 (-5.00)	-3.4777 (-2.26)	-1.5029 (-1.35)	-7.6297 (-2.48)
U (t)	-0.1987 (-1.38)	-0.1745 (-0.89)	-2.0911 (-4.45)	-1.3307 (-1.66)
Med (t)	0.2871 (2.66)	0.0955 (0.43)	1.5369 (2.99)	1.6944 (2.69)
F (t)	-0.1739 (-2.01)	-0.5091 (-2.10)	0.4196 (0.93)	-0.8175 (-1.17)
AvQ (t)			0.1093 (0.37)	-2.3916 (-3.21)
Mktr (t)			0.9919 (3.42)	0.8146 (2.37)
Se (t)			1.2138 (0.30)	0.2465 (0.05)
Avasset (t)			-0.0001 (-3.53)	-0.0001 (-3.16)
Const (t)	1.2048 (17.24)	1.5993 (4.08)	-4.9355 (-8.33)	-0.6393 (-0.47)
Adj. R-sq.	0.36	***	0.36	***

Ordinary and two-stage least squares regressions of Tobin's Q (AvQ) and managerial shareholdings (LAvMH) on ownership concentration (LA5), advertising-to-sales (Av(ad/s)), R&D-to-sales (Av(rd/s)), fixed assets-to-sales (Av(fix/s)), debt-to-assets (Av(debt/a)), utility dummy (U), media firm dummy (Med), financial firm dummy (F), market risk (Mktr), firm-specific risk (Se), and assets (Avasset). Variable definitions and sources are provided in Table 2. t -statistics are in parentheses.

firms. Table 7 examines the differences that emerge in our estimates if, alternatively, LAvMH or LA5 is treated as the endogenous ownership structure variable; discussion of Table 7 is postponed.

Some results are consistent across Tables 4, 5 and 6. Focusing first on OLS estimates for the firm performance equation, we see that performance, AvQ, is always statistically dependent on at least one measure of ownership concentration, and sometimes on both measures, but the signs of the coefficients linking these two measures of ownership structure to firm performance are different. The linkage is positive for LavMH and negative for LA5 despite the fact that the simple correlation between these variables is about 0.50. These OLS equation estimates are consistent with other studies, such as the Morck et al. study, that show an ownership structure effect on firm performance. There is cause to suspect these findings because the signs taken by LA5 and LavMH are the reverse of what one would expect if greater ownership concentration by outside investors does lead to superior firm performance and greater shareholdings by insiders does lead to a more entrenched management.

However, the results shown in these tables for the 2SLS estimates of the coefficients of LA5 and LAvMH cast considerable doubt on this asserted affect of ownership structure on firm performance. None of the 2SLS estimates of the two ownership coefficients is statistically significant in the performance equations.

Table 7

For the full 223 firm sample, a comparison of management shareholdings and outside investor shareholdings in the role of endogenous ownership variable

	AvMH endogenous		A5 endogenous	
	AvQ	LAvmH	AvQ	LA5
LavMH (t)	0.0287 (0.47)		0.0162 (0.44)	
LA5 (t)	−0.0721 (−1.24)		−0.0163 (−0.08)	
Av(ad/s) (t)	1.3664 (1.02)		1.5746 (1.01)	
Av(rd/s) (t)	5.4177 (2.48)		5.3961 (2.55)	
Av(fix/s) (t)	0.3859 (2.36)		0.4138 (2.36)	
Av(debt/a) (t)	−3.4777 (−2.26)	−7.6297 (−2.48)	−3.5608 (−2.72)	−5.0658 (−3.34)
U (t)	−0.1745 (−0.89)	−1.3307 (−1.66)	−0.1707 (−0.94)	−0.3804 (−0.98)
Med (t)	0.0955 (0.43)	1.6944 (2.69)	0.0889 (0.51)	0.2370 (0.79)
F (t)	−0.5091 (−2.10)	−0.8175 (−1.17)	−0.4854 (−2.34)	−1.2758 (−3.75)
AvQ (t)		−2.3916 (−3.21)		−0.8576 (−2.40)
Mktr (t)		0.8146 (2.37)		0.0343 (0.21)
Se (t)		0.2465 (0.05)		5.1164 (2.24)
Avasset (t)		−0.0001 (−3.16)		0.0000 (−0.91)
Const (t)	1.2048 (17.24)	−0.6393 (−0.47)	1.6170 (6.42)	0.4081 (0.62)

Comparison of endogenous management shareholdings and endogenous outside investor shareholdings in two-stage least squares regressions of Tobin's Q (AvQ) and managerial shareholdings (LAvmH) on ownership concentration (LA5), advertising-to-sales (Av(ad/s)), R&D-to-sales (Av(rd/s)), fixed assets-to-sales (Av(fix/s)), debt-to-assets (Av(debt/a)), utility dummy (U), media firm dummy (Med), financial firm dummy (F), market risk (Mktr), firm-specific risk (Se), and assets (Avasset). Variable definitions and sources are provided in Table 2. t -statistics are in parentheses. $N = 223$.

These results are consistent with the view that ownership structure is chosen so as maximize firm performance, and that greater diffuseness in ownership, although it makes the agency problem more severe, conveys compensating advantages on firms that choose to rely on a diffuse ownership structure.

Other findings shown in all three tables are the positive effects that Av(rd/s), Av(ad/s), and Av(fix/s) have on LAvmH. The first two of these effects we attribute to the distortions that occur in the denominator of Q because accounting practices do not treat intangible and tangible capital similarly. The third effect may be attributed to differences between accounting and true depreciation rates in the valuation of assets, such differences affecting profit estimates more if fixed assets are more important in the firm's asset structure.

Av(debt/a) consistently relates negatively to firm performance. We do not interpret this as a stable, predictable relation that offers management a sure way to raise share prices, but, rather, as a reflection of the comparative strengths of inflationary forces at work during the 1976–1980 interval as compared to some earlier interval during which many firms sold much of their debt. The media indicator variable, M , which is significant and positive in the least-square performance equation becomes insignificant in the 2SLS performance equation. The

negative effect of CR4 on LA_{VQ} in Table 4 is somewhat surprising, since the usual finding in industrial organization research is that market concentration and profit rate are positively correlated. However, much of this research fails to take intangible capital accounting problems into account.

The equations purporting to explain variations in LA_{VMH} uniformly show that management holds smaller shares of equity in larger firms. A glaring difference in the statistical relevance of AvQ emerges from a comparison of OLS estimates of LA_{VMH} and 2SLS estimates. AvQ is statistically insignificant in the OLS equations, but strongly negatively significant in the 2SLS equations. One might have expected that high AvQ leads management to acquire more shares, and, therefore, causes LA_{VMH} to be greater. Instead, there is a suggestion that management choose to hold fewer shares when firms seem to be doing well, perhaps selling shares during good times in the expectation that today's good performance will be followed by poorer performance.

There is some support for the notion that management chooses not to hold as many shares if creditors are important to the monitoring of management behavior. This is seen in the coefficient of $Av(\text{debt}/a)$ in the ownership equation of Table 6. However, this variable shows no significant relation to management shareholdings in Tables 4 and 5.

Finally, for the OLS and 2SLS estimates of the ownership equation, we call attention to the role of risk in explaining variations in ownership structure. In all three tables market risk, $Mktr$, has a positive effect on the fraction of shares held by management, but firm-specific risk, Se , has no significant effect. We have no convincing explanations for this. It may be that firms that exhibit higher market risk are more insistent that their management have a stake in the firm, but theory does not offer a compelling reason for this. As to firm-specific risk, it would seem reasonable, since management already has specific human capital in the firm, that management, if risk averse, would invest less in high firm-specific risk firms than in low firm-specific risk firm. So, the coefficients of the risk variables in the management shareholdings equation present puzzles rather than support for a plausible theoretical proposition.

A question relevant to this study has not been asked openly, but we bring it forward now. Which of the two components of ownership structure examined, $A5$ or $AvMH$, is likely to be the more strongly endogenous? Based on known relations between management shareholdings and equity-based compensation plans, and on the greater accessibility of management to insider information, we have presumed that management shareholdings will be more strongly affected by firm performance, although the direction of the linkage is unclear. The left half of Table 7 calculates coefficients for the 2SLS model under the assumption that it is better to treat $AvMH$ as the endogenous component of the ownership structure. The right half of Table 7 treats $A5$ as the endogenous variable. Both halves of the table, in the AvQ equations, show no effect of ownership structure on AvQ . However, AvQ has a much stronger affect on LA_{VMH} than it does on $LA5$ in the ownership

structure equations. The decision to make AvMH the endogenous variable seems to have been correct.

However, there are two other differences worth noting. Whereas, Mktr has a significant effect on LA5, it does not have a significant effect on LA5, and, whereas Se has no significant effect on LA5, it does have a significant positive effect on LA5. What does this interesting difference suggest?

We are not sure, but the Demsetz and Lehn paper explains the positive correlation between LA5 and Se by the greater “control potential” that is offered by high firm-specific risk firms. Control potential refers to the expected profit gain that results from close monitoring of management. A firm whose economic environment is very unstable requires frequent, quick, decisions from its management. This increases the gain to be had from better monitoring, and it leads to higher levels of LA5. The strongly positive coefficient of Se in the LA5 equation is consistent with this. It also may be that high Se firms are those that offer better opportunities to profit from insider trading. Since important shareholders have access to insider information, they are more likely to be found in high Se firms than in low Se firms. This would be reflected in higher values of LA5. Something like this is needed to rationalize the positive relation between LA5 and Se because a firm with high Se places the investments of large shareholders at more risk. This would tend to reduce LA5. To bear this risk and to supply the more effective monitoring, dominant shareholders must be rewarded. Access to insider information can be an important source of this reward. (For a discussion of this and for evidence bearing on it, see Demsetz, 1986.) The strong positive correlation between LavMh and market risk, Mktr, remains a puzzle.

4.3. *Robustness of the results*

Variations on the models just examined are not presented here because they do not have results that would make us question the central findings in this study.⁷ We estimated these models using Avprate, the average accounting rate of return, as the measure of firm performance, in place of AvQ. The coefficients that link our indexes of accounting artifacts to firm performance are weaker as compared to the estimates presented below with AvQ used to measure firm performance. This difference indicates that Tobin’s Q is more susceptible to biases arising from accounting artifacts than is Avprate. We also found that market concentration, CR4, is more weakly related to Avprate than it is to AvQ. We estimated models in which some of the variables have squared values, particularly the risk variables and the ownership structure variables. Results obtained give no reason to alter the conclusions we reach below about the relation between ownership and control. We

⁷ The results of any of the model variations discussed in this subsection are nonetheless available from the authors upon request.

included our measure of firm size, *Avasset*, in the firm performance equation, but it was not significantly related to firm performance nor did it alter coefficients on other variables in ways that require commentary.

Finally, we used our sample to investigate the break points found by Morck et al. when estimating a segmented linear regression of firm performance on managerial shareholdings. Our results for the three segments they identified were opposite in sign from theirs, and only one of these segments, the third, bordered on statistical significance. This suggests, as do some of the studies described in Appendix A, that the segments uncovered by Morck et al. are more likely an accidental occurrence than an enduring aspect of the performance–ownership structure relation.

5. Conclusion

The results from our study and from some of the studies preceding it yield unequivocal evidence for the endogeneity of ownership structure. It follows from this that the coefficients of single equation models of the effect of ownership structure on performance are biased. Bias is also likely to result from studies that fail to take account of the complexity of interests that are involved in an ownership structure. Our study examines the roles played by two aspects of ownership structure, the fraction of shares owned by the five largest shareholding interests and the fraction of shares owned by management, and it models these (but primarily does so for management shareholdings) as endogenous. An adequate study of the corporate control problem may call for more than is provided here, but the estimates of the two equation model we use give no evidence to support the notion that variations across firms in observed ownership structures result in systematic variations in observed firm performances.

This is consistent with the notion that ownership structures most suit the conditions under which firms operate are those that we tend to observe. The market for corporate control involves much more than hostile takeovers or management buyouts. It also involves the acquisition and sale of shares in ordinary exchange transactions. In all these facets, the market responds to forces that create suitable ownership structures for firms, and this removes any predictable relation between empirically observed ownership structures and firm rates of return.

The contrary belief that there should be a predictable relation, arises with surprising frequency. It certainly is an important part of the Berle and Means thesis and it is reflected in the way contemporary authors explain evidence of it in their studies. For reasons already discussed, this evidence is biased, but the explanation given for it rests on a confusion. The pedagogically useful classroom discussion of the relation between ownership structure and the resolution of agency problems, which ignores endogenous adjustment of ownership structure, is confused with the “market mediated” observed relation between ownership struc-

ture and firm performance. Our findings support the view that the market succeeds in bringing forth ownership structures, whether these be diffuse or concentrated, that are of approximate appropriateness for the firms they serve. These structures differ across firms because of differences in the circumstances facing firms, particularly in regard to scale economies, regulation, and the stability of the environment in which they operate. If these structures were the outcomes of perfect markets for control, they would eliminate any systematic relation between firm performance and ownership structure. While we make no claim that the market in which ownership structures are formed is perfect, our evidence shows that it is not so imperfect as to create a systematic relation that is left undisturbed by investors who seek to maximize the returns they earn.

Appendix A. Summaries of post-1985 studies of the effect of ownership structure on firm performance

Morck et al. (1988) look at the relation between managerial ownership and performance in a 1980 cross-section of 371 Fortune 500 firms. They measure performance primarily by Tobin's Q , and managerial ownership as the combined shareholdings of all board members who have a minimum stake of 0.2%. They estimate a piecewise linear regression and find a significant non-monotonic relation (increasing between 0% and 5%, decreasing between 5% and 25%, and increasing beyond 25%). The relation is fairly robust to (1) alternative specifications (with different breakpoints), (2) the inclusion of several control variables (R&D and advertising ratios, leverage, size, growth of labor force, and industry dummies), (3) the exclusion of large firms with negligible board ownership, and (4) the split in the board ownership measure between managers and outside directors. It is not robust, however, to the use of profit rates as an alternative performance measure.

McConnell and Servaes (1990) examine the relation between Tobin's Q and insider and blockholder ownership in two different cross-sectional samples, one for 1976 and the other for 1986, using slightly more than 1000 Compustat firms. Q is regressed on different variations and combinations of measures of insider and blockholder importance in the ownership structure of the firm. They find a positive relation for insider ownership, but diminishingly so as ownership becomes more important, and a positive but insignificant relation for blockholders. The relation between Q and insider ownership slopes upward until insider ownership reaches 40% to 50% and then slopes slightly downward. Their results are robust to the inclusion of the same control variables used by Morck et al. and to the use of accounting profit rate as an alternative performance measure. After adjusting their sample to make it more comparable to the sample used by Morck et al., they attempt to replicate Morck et al.'s piecewise linear regression, but they cannot.

They find a significantly positive relation for insider ownership between 0% and 5%, but fail to confirm the findings of Morck et al. for insider ownership beyond 5%. No significant relation is found beyond 5%. Ownership structure is not endogenized.

Hermalin and Weisbach (1988) estimate the effect of managerial ownership and board composition on Q . Managerial ownership is measured by the fraction of shares held by the present CEO and all former CEOs still on the board. Board composition is measured by the fraction of the firm's directors who are outsiders. They treat ownership and composition as endogenous, using their lagged values as instruments; panel data for 5 years are used. They find no relation between board composition and performance, but find a significant non-monotonic relation between managerial ownership and performance, a positive relation between 0% and 1%, a decreasing relation between 1% and 5%, an increasing relation between 5% and 20%, and decreasing beyond 20%.

Loderer and Martin (1997) use acquisition data to estimate a simultaneous equation model in which Q and insider holdings are endogenous. Q , log of sales, daily standard deviation of the firm's stock returns, and daily variance of the firm's stock returns are used to explain insider holdings. Insider holdings, log of sales, and a dummy for whether the acquisition is financed with stock are used to explain Q . Insider ownership fails to predict Q , but Q is a (negative) predictor of insider ownership.

Cho (1998), using cross-sectional data and ownership information from value line, first replicates Morck et al.'s study and finds a similar non-monotonic relation between Q and management share holdings. However, he then estimates a system of three equations in which insider ownership depends on Q , investment, and a set of control variables, Q depends on insider ownership, investment and a set of control variables, and investment depends on insider ownership, Q , and a set of control variables. His estimates for this system of equations indicates that Q affects ownership structure but not vice-versa.

Himmelberg et al. (1999) extend the Demsetz and Lehn study by adding new variables to explain the variation in ownership structure. They also use a fixed effects panel data model and instrumental variables to control for various possible unobserved heterogeneities. Ownership structure is measured by shareholdings of insiders (officers plus directors) secured from proxy statements. Their performance measure is Q although they claim that similar results are produced if return on assets is the measure of performance. They fit both the quadratic and linear piecewise forms that had been adopted in previous studies for the performance equation. They find that insider ownership is negatively related to the capital-to-sales and R&D-to-sales ratios, but positively related to the advertising-to-sales and operating income to sales ratios. Controlling for these variables and fixed firm effects, they find that changes in ownership holdings have no significant impact on performance. When they control for endogeneity of ownership by using instrumental variables, they find a quadratic form of the effect of ownership on performance.

Holderness et al. (1999) replicate for 1935 and 1995 central aspects of the Morck et al. study and the Demsetz and Lehn study. As in Morck et al., they find a significant positive relation between firm performance and managerial ownership with the 0–5% range of managerial shareholdings but, unlike Morck et al. they do not find a statistically significant relation beyond 5% managerial shareholdings. They also confirm the endogeneity of managerial shareholdings, which they find depends negatively on firm size, performance volatility, volatility squared, regulation, and leverage.

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