Externalities and Corporate Objectives in a World with Diversified Shareholder/Consumers

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Abstract

If shareholders own diversified portfolios, and if companies impose externalities on one another, shareholders do not want value maximization to be corporate policy. Instead, shareholders want companies to maximize portfolio values. This occurs when firms internalize between-firm externalities. Any kind of externality, pecuniary or nonpecuniary, vertical or horizontal, suffices. What matters is simply that one company's actions affect another's value. Thus, besides the traditional benefit of risk reduction, portfolio diversification offers additional benefits to shareholders through helping internalize externalities. This paper documents the extent of diversification and cross-ownership of stocks among companies where these externalities are likely to be large and provides a capital market test of how merger offers vary with the extent of cross-ownership.

I. Introduction

It is well known that shareholder unanimity for share value maximization depends upon the existence of competitive markets.[1] Given the widespread acceptance by financial economists that value maximization should be all firms' goal,

[1] For a classic statement of the unanimity theorem, see Hirshleifer and Riley ((1992), p. 144). For a sampling of the literature, see Friedman (1970), DeAngelo (1981), Ekern and Wilson (1974), Jensen and Long (1972), Grossman and Stiglitz (1977), Long (1972), Merton and Subrahmanyam (1974), and Radner (1974). Grossman and Stiglitz (1977) reexamine much of the previous spanning literature that argued that shareholders would be unanimous in preferring value maximization as a corporate objective. They show that in markets where trading occurs, another assumption—what they call "competitivity"—

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the caveat on competitivity has been laid to rest, presumably by assuming that markets are indeed perfectly competitive. While this assumption may be reasonable in *capital markets,* the modern literature in industrial organization makes it clear that *product markets* are not perfectly competitive (e.g., Klein, Crawford, and Alchian (1978), p. 299 and Tirole (1988)). Yet, competitive product markets are just as necessary for unanimity over value maximization as competitive capital markets.

In this paper, we review how product market imperfections, in conjunction with portfolio diversification on the part of investors, lead to the rejection by shareholders of value maximization as a corporate policy. More importantly, we also show what corporate objectives shareholders would want under such conditions. Our focus is on externalities between firms. In such an environment, diversified shareholders would desire a policy of portfolio value maximization, or more specifically, a policy of internalization of between-firm externalities. Firms that pursue portfolio value maximization should behave differently from value maximizers. This observation leads to a broad set of testable implications. We use auction theory and data from corporate acquisitions to test one implication: that publicly owned firms will bid higher for other publicly owned firms than they would bid for privately held firms. Our evidence supports this hypothesis and helps explain the well-known phenomenon of negative returns for acquiring firms.

Another set of potentially testable implications arises from what we term the "reemergence of the free-rider problem." In brief, firms that pursue portfolio value maximization are subject to takeover by an undiversified shareholder. Since such takeovers would destroy value—by eliminating internalization of externalities—we should see development of rules and institutions that prevent their occurrence. We will discuss certain evidence that is consistent with this idea, especially in regard to the Japanese economy.

In brief, this paper makes three main points:

1. Because diversification helps internalize externalities, it offers potential benefits over and beyond the reduction of risk. Internalization of externalities implies testable predictions about firms' behavior.
2. However, this potential to internalize externalities also creates a potential free-riding problem and produces a greater private incentive than previously understood for individuals to deviate from holding a diversified portfolio.
3. Given the gains to internalizing externalities, mechanisms will at times arise to correct this new free-riding problem.

The discussion is organized as follows. Section II.A presents the general argument for portfolio value maximization while Section II.B presents evidence supporting the core assumptions of our theory—that externalities exist and that

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is needed to supplement spanning before unanimity over the value maximization objective obtains. Grossman and Stiglitz ((1977), p. 399) reject the joint assumptions of spanning and competitivity, not out of unreasonableness ("...this may seem like a minor additional assumption..."), but because they do not believe that the empirical evidence supports value maximization. Unlike Grossman and Stiglitz, our focus will be on externalities as the source for the breakdown over unanimity on value maximization. While lack of spanning provides a reason for the breakdown, the spanning arguments do not lead to straightforward predictions over what will emerge as the desired corporate objective, as does a focus on externalities.

shareholders are well diversified. Section II.C develops a model of heterogeneous shareholders and Section II.D briefly discusses the implications of shareholders who are also consumers and/or employees of the firm. Section III discusses the incentives shareholders have to deviate from holding a well-diversified portfolio. Section IV presents an empirical test based upon corporate mergers. We conclude with a brief summary.

II.   The Theory

A.   The Model with Nonconsuming Shareholders

The general argument against maximizing individual share value and in favor of portfolio value maximization can be made using a simple model where owners of firms do not consume their firm's output. Let there be two firms and denote their market values by v_1 and v_2. Suppose further that there is some decision variable under each firm's control; Firm 1 will choose x_1 and Firm 2 will choose x_2. These decision variables should be thought of as covering strategic issues such as outputs, prices, marketing, R&D budgets, etc. We assume that the two firms are competitively interdependent, so that

(1) $$v_1 = v_1(x_1, x_2),$$

(2) $$\text{and} \quad v_2 = v_2(x_1, x_2).$$

Thus, each firm's value depends upon its *competitor's* actions as well as on its own actions. Alternatively, externalities exist: one firm's action will affect the other firm's value. This model is general enough to encompass a wide range of externalities. Firms 1 and 2 might be competitors—a standard oligopoly model— or in a vertical relationship, e.g., customer and supplier.

Next consider three different ownership structures for the two firms:

Ownership Structure 1: "Single owner"—one agent owns both firms.

Ownership Structure 2: "Separate owners"—one agent or set of agents owns Firm 1 and a separate agent or set of agents owns Firm 2.

Ownership Structure 3: "Diversified shareholders ownership"—Firms 1 and 2 are owned by one set of agents (equal proportion of each firm is owned by each agent).

Since our focus is on what owners want, we will assume that the firms are, in all cases, run by managers who act entirely in the interests of owners—that is, we ignore any agency problem between managers and owners. In a world where (marginal) transaction costs are less than the (marginal) gains from trade, the Coase Theorem implies that firms' behavior will be the same across all three ownership structures. To see this, begin by noting that a single owner (Ownership Structure 1) would choose x_1 and x_2 such that

(3) $$\frac{\partial v_1(x_1, x_2)}{\partial x_1} + \frac{\partial v_2(x_1, x_2)}{\partial x_1} = 0,$$

(4) $$\text{and} \quad \frac{\partial v_1(x_1, x_2)}{\partial x_2} + \frac{\partial v_2(x_1, x_2)}{\partial x_2} = 0.$$

These equations represent the first-order conditions for maximizing the total value of the two firms $(v_1 + v_2)$, which clearly is what a single owner would want to maximize. The diversified shareholders under Ownership Structure 3 also want $(v_1 + v_2)$ maximized, for any one of them holds equal proportions of each firm. One might think that under Ownership Structure 2, the separate owner(s) of Firm 1 would instead want to choose x_1 such that

$$(5) \qquad \frac{\partial v_1 (x_1, x_2)}{\partial x_1} = 0,$$

so as to maximize $v_1(x_1, x_2)$. (Choosing x_1 in this way generally would mean that $(v_1 + v_2)$ is not maximized.) But when (marginal) transaction costs are less than the (marginal) gains from trade, the separate owner(s) of Firm 2 would negotiate side payments with Firm 1's owner(s) to get them to internalize the full effect of their choice of x_1 consistent with (3) and (4).

In contrast, if transaction costs are significant, behavior should depend upon ownership structure. Obviously a single owner will still want joint value maximization and faces no bargaining difficulties in achieving that. With separate owners (Structure 2), there is still the potential for greater value for all owners with coordinated actions, but transaction costs can be expected to block many actions that would be necessary to achieve joint value maximization. This is especially true if monitoring costs are positive, for example, when x_1 is not costlessly observable by Firm 2. Firm 2 might desire to pay Firm 1 to choose the joint value-maximizing x_1, but Firm 1's owners have an economic incentive under Ownership Structure 2 to unilaterally defect from such an agreement and choose x_1 to maximize v_1 alone. By so doing, they could potentially reap the side payments from Firm 2 as well as the benefits from maximizing their own value.

With Ownership Structure 3, the diversified shareholders again will see the potential for greater total value through joint value maximization. However, significant differences exist between diversified share ownership and separate owners in that diversified shareholders do not care which firm actually accrues the value: so long as a shareholder owns both firms in equal proportion, he will want to maximize $(v_1 + v_2)$. Thus, many of the transaction costs associated with Coasian bargaining can be avoided and joint value maximization will be more likely. First, side payments are not necessary. Firm 1 could, for instance, forsake some of its own value in return for a greater increase in Firm 2's value, and its owners will agree with that policy without side payments. Second, no incentives exist for either firm to unilaterally defect from joint value-maximizing policies, for by so doing, shareholders are made worse off.

In summary, either a single owner or perfectly diversified owners want the firms that they own to maximize joint value and internalize the impact that the firms have on other firms in the portfolio. With separate owners and significant transaction costs, the usual policy prescription of "solo" value maximization holds. Separate owners would like their firm to negotiate with other firms to internalize externalities, but they will accept joint value maximization only if that also means higher value for the firm they own.

B.   The Core Assumptions: Externalities and Shareholder Diversification

There are numerous economic settings where one firm's actions affect other firms' values. In terms of vertical relationships, there are numerous actions that a supplier can take, such as withholding shipments after customers have made sunk investments dependent on those shipments, that will affect its customers' operations and, hence, values (e.g., Klein, Crawford, and Alchian (1978)). Horizontal relationships also offer a myriad of possible externalities. Classic oligopoly is one: in traditional models, cooperative outcomes are unstable because unilateral defection yields the defector a greater gain. With owners diversified across all members of the oligopoly, the effects of unilateral defection will be different—and less destabilizing for cooperative outcomes—since the defector's owners will bear some of the losses of other members. Patent and R&D races are other instances where externalities are assumed by the literature, yet firms in those settings are traditionally assumed to maximize their own value (Hirshleifer and Riley (1992), Ch. 7).

Takeovers obviously present many externalities, ranging from the impact of the acquirer's bid on the target firm's value to impacts on the acquirer of defensive actions by the target to possible effects on other firms (e.g., suppliers and customers). Easterbrook and Fischel ((1982), p. 713) present an argument similar to ours when they say that a target firm should act to maximize the joint value of its and the acquirer's shares:

> An investor holding a diversified portfolio with stock in both corporations is concerned with the total gain from the transaction, not with how the gain is allocated.

We will be examining the Easterbrook and Fischel argument further in Section IV, where we present a simple empirical test of it.

Inter-firm legal litigation poses another obvious example of externalities. Texaco and Pennzoil, for example, were locked for some time in litigation that would have simply transferred wealth from one firm to the other—and again, diversified owners would have only been concerned about the "leakage" going to lawyers (who are not part of publicly owned firms). During a December 2, 1992, talk at the Wharton School, Albert J. Wilson, Vice President and Secretary for TIAA-CREF, stated that the large pension fund was actively involved in applying pressure to ensure that the Pennzoil v. Texaco and Apple v. Microsoft conflicts were resolved, and he claimed that this pressure resulted in Pennzoil and Texaco settling their suit much sooner than they would have otherwise.[2]

The other core assumption of our theory is that shareholders are perfectly diversified. We recognize that this extreme assumption does not hold, but, as we will document, it is true that U.S. companies are held by well-diversified shareholders. There is a large degree of diversification not only across but also within industries. And in Section II.C, we apply public choice theory to show how our main results will continue to hold, albeit in a limited way, in a world where shareholders are not perfectly diversified.

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[2]This does not exclude the fact that there may have been other investors who also saw the return to internalizing these externalities (e.g., Carl Icahn).

The extent of shareholder diversification has been increased greatly by two well-known factors: the increase in institutional ownership of shares and the increase in indexing (or passive investing) as a portfolio strategy. In 1989, institutions—pension funds, mutual funds, insurance companies, bank trusts, and foundation/endowments—held about 50 percent of all corporate equity (Sametz and Bicksler (1991), p. 18). Many analysts have noted the increase in institutional ownership over the recent past and given reasons for why this trend can be expected to continue, such as economies of scale in managing indexed portfolios (e.g., Prowse (1992) and Sametz and Bicksler (1991)). Some of these institutions approach perfect diversification in that they hold market portfolios. One large investor, the California Public Employees' Retirement System with over $85 billion in total assets (Szep (1994)), was reported to be increasing the percent of its assets under passive management from 60 to 85 percent in 1991 (Sametz and Bicksler (1991), p. 186). By the end of 1993, the College Retirement Equities Fund (CREF) Stock Account invested over $55 billion in some 3,300 companies traded on U.S. and foreign stock exchanges, with over 80 percent of that total in U.S. stocks (PR Newswire (March 14, 1994)).

More generally, government pension funds in 1993 had $181 billion invested in equity, and $162 billion (89.5 percent) of that amount was indexed (Directory of Pension Funds and their Investment Managers (1994)). For corporate pension funds overall, $222 billion was invested in equities and $78 billion was indexed (35 percent). Out of the top 200 pension funds in the U.S., 179 use equity index funds to some extent (Pensions and Investments, January 24, 1994, p. 17). The use of equity indexing grew by 19 percent a year from 1985 through 1993 among corporate plan sponsors and an even higher 25 percent among government sponsors (Lappen (1994)).[3]

While mutual funds are smaller than pension funds, we have some evidence on the extent of their diversification. The Morningstar report (July 1994) that we used provides detailed investment information on 2400 mutual funds during the period from Fall 1993 to Spring 1994. There were 415 funds (381 for which data were available) where more than 95 percent of the fund's assets were in common stocks. The average of these funds held 121 stocks. When the group is further restricted to those funds with assets of more than $100 million, the 240 funds (233 for which data were available) held on average 197 stocks.

Data from Control Data Advisors (CDA)/Spectrum document the holdings of institutions with more than $100 million in assets and allow us to examine particular industries to see the extent to which funds combine the ownership of related firms.[4] We chose to examine the computer and automobile industries in

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[3]Passive portfolio managers have typically not taken an active role in corporate governance so corporate managers may have felt little pressure to pursue the interests of these well-diversified shareholders. See our discussion in Section II.C for the impact of such passivity within a public choice model. However, Gilson and Kraakman ((1991), p. 188) argue that "A corporate governance strategy for passive portfolio managers follows from the insight that efforts to increase the value of the portfolio must operate on the entire portfolio." If passive portfolio managers follow this advice and become more active in corporate governance, then our public choice model predicts that corporate actions will change to reflect the internalization of externalities.

[4]The data discussed in Tables 1 and 2 were collected using CDA/Spectrum's on-line service. Control Data Advisors (CDA) Investment Technologies, Inc.'s Spectrum 3/4 provides the institutional ownership data, based on information obtained from quarterly institutional form 13f filings with the

depth, as these are industries where casual review of industrial structure suggests a prevalence of externalities. The evidence, summarized in Table 1, indicates substantial cross-ownership of some stocks. For example, the table indicates that slightly over 77 percent of Intel and 71 percent of Compaq are owned by institutions that have holdings in at least one of the other five computer industry companies listed. Fully 56 percent of Chrysler is held by institutions that simultaneously hold shares in Ford and/or General Motors.

TABLE 1

Cross-Ownership of Stocks by Institutions and Domestic Mutual Funds

	Investments by Organizations Holding Stocks in Two or More of the Following Companies (in millions) (1)	Investments by Organizations Holding Stocks in Only One of the Following Companies (in millions) (2)	Market Value of Firms (in millions) (3)	Column (1)/ Market Value (%) (4)	Column (2)/ Total Fund Investments in Following Firms (%) (5)
Computer Industry: Institutions with Assets of More Than $100 Million					
Apple	$2,273	$106	$4,676	48.6	4.4
Compaq	7,270	287	10,207	71.2	3.8
IBM	16,499	3,010	43,157	38.2	15.4
Intel	20,497	961	26,468	77.4	4.4
Microsoft	12,985	426	35,595	36.5	3.2
Motorola	21,735	1,782	34,003	63.9	7.6
Total	81,258	6,572	154,106		
All Domestic Mutual Funds					
Apple	$594	$194		12.7	24.6
Compaq	3,168	53		31.0	2.4
IBM	3,734	1,266		8.7	25.3
Intel	4,310	559		16.3	11.5
Microsoft	2,398	477		6.7	16.6
Motorola	4,587	172		13.5	3.6
Total	17,790	2,720			
Automobile Industry: Institutions with Assets of More Than $100 Million					
GM	11,308	2,666	31,744	35.6	19.1
Ford	11,292	2,733	30,325	37.2	19.5
Chrysler	9,732	606.6	17,369	56.0	5.9
Total	32,332	6,005	79,438		
All Domestic Mutual Funds					
GM	2,427	657		7.6	21.2
Ford	2,426	334		8.0	12.1
Chrysler	2,576	126		14.8	4.7
Total	7,430	1,117			

The data are from CDA/Spectrum, where the data for institutional holdings are for the date ending on Dec. 31, 1994, and the data for domestic mutual funds were collected as of Jan. 18, 1995. The investment totals for domestic mutual funds cannot be added to those for institutions since mutual funds with assets of more than $100 million are included in the total for institutions.

Substantial cross-ownership exists even when the comparisons are restricted to institutions that simultaneously hold stocks in all of the companies listed for an industry. For the computer industry, 162 institutions held shares in all six of the computer companies we examined, with the total value of these investments representing 15 percent of the firms' combined market value (investments of $23.6

SEC. All institutions with investment control of over $100 million must report quarterly to the SEC equity holdings above 10,000 shares and with a market value above $200,000.

billion, total value of $154 billion).[5] This even ignores cross-ownership that arises from firms directly holding stock in each other. For example, IBM owns a 20-percent stake in Intel (Electronic News, January 10, 1994). For the automobile industry, 298 institutions invested simultaneously a total of $27.4 billion in all three major American automobile manufactures (34 percent of their total market value).

The last column in Table 1 shows the percentage of all institutional invest-ments in an industry that are made by institutions that hold the stock of only one of the companies in an industry. The data show that for these institutions, such "focused" investing is much less prevalent than a policy of within-industry di-versification. For only three of the nine companies does the stock ownership of these narrowly focused institutions exceed 15 percent of all fund investments in a company. Even in the two cases where this percentage is the greatest (General Motors and Ford) over four-fifths of the shares are held by funds that own stock in other firms in the automobile industry.

Breaking down institutional cross-ownership in the computer industry by whether cross-ownership involves horizontally or vertically related firms in Table 2 yields additional insights. For example, 534 institutions owned shares in the same two head-to-head competitors, Intel and Motorola. For these institutions, $13.4 billion was invested in Intel (50.6 percent of Intel's market value) and $16 billion in Motorola (47 percent of its market value). Concerning vertically related firms, 326 funds simultaneously held stakes in Compaq and Intel, with a $5.8 billion ownership stake in Compaq (57 percent of its market value) and $11.8 billion in Intel (45 percent of its market value). Intel, of course, is the major supplier of Compaq's microprocessors. Also, 294 funds invested in two producers whose output could be classified as complements, Compaq and Microsoft. These 294 funds had $5.4 billion (52.7 percent of its market value) invested in Compaq and $9.3 billion in Microsoft (26 percent of its market value). These levels of cross-ownership clearly indicate that large numbers of important shareholders would benefit from having the firms they own internalize externalities imposed on other firms.

C.   The Impact of Less Than Perfect Diversification

The very strong result that shareholders will unanimously desire joint value maximization depends upon all shareholders being perfectly diversified. If all shareholders are not perfectly diversified, there will be disagreements over the extent to which externalities should be internalized. Public choice theory suggests two ways of modeling divergent interests: support maximization and median voter models. For our purposes, Peltzman's (1976) support maximization approach seems the most relevant since there is probably some gain to obtaining more than

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[5]The Morningstar report (July 1994) indicates that 11 mutual funds invested in all six companies and accounted for $744.7 million of the $12 billion. Fifty-one more funds invested in five companies and accounted for $1,764 million. Sixty-two more funds invested in four companies and accounted for $2,783 million.

TABLE 2

Separating Institutional Cross-Ownership of Computer Industry Stocks by Horizontally and Vertically
Related Sets of Firms: Institutions with Greater than $100 Million in Assets

	Percent of Stock held by Institutions that are Simultaneously Holding Stock in All the Two or Three Companies in a Group (in percent)	Market Value of Stock Held by Institutions that are Simultaneously Holding Stock in All the Two or Three Companies in a Group (in billions)	Number of Overlapping Institutions Simultaneously Holding All the Stocks in the Group
Horizontally Related Sets of Firms			
1) Intel-Motorola			
Intel	50.6%	$13.4	534
Motorola	47.0	15.98	
2) Apple-Compaq-IBM			
Apple	31.6	$1.5	184
Compaq	34.3	3.5	
IBM	36.3	11.1	
Vertically Related Sets of Firms			
3) Apple-Motorola			
Apple	34.2	1.6	220
Motorola	30.5	10.4	
4) Compaq-Intel			
Compaq	57.0	5.8	326
Intel	44.6	11.8	
5) IBM-Intel			
IBM	32.6	14.1	501
Intel	50.2	13.3	
Sets of Firms Producing Complementary Products			
6) Apple-Microsoft			
Apple	29.3	1.4	205
Microsoft	20.1	7.1	
7) Compaq-Microsoft			
Compaq	52.7	5.4	294
Microsoft	26.2	9.3	
8) IBM-Microsoft			
IBM	30.1	13.0	432
Microsoft	26.0	9.2	

The data are from CDA/Spectrum, where the data for institutional holdings are for the period ending on
Dec. 31, 1994.

a bare majority (e.g., a position that wins with 90 percent of the vote is less likely
to be challenged in the future).[6]

Let us focus on how Firm 1 chooses x_1. If Firm 1 were to maximize its own
value, it would choose one value of x_1, say x_1^u (for "unilateral value maximization");
if it were to choose x_1 to maximize the joint value of Firm 1 and Firm 2, it would
choose a different value, call it x_1^j (for "joint value maximization"). The question
before us is what value of x_1 will be chosen when shareholders have different
objective functions.

A simple support maximization model yields the intuitively plausible result
that with heterogeneous shareholders, an x_1 will be chosen that lies between x_1^u
and x_1^j. Thus, the support-maximizing firm internalizes externalities to some ex-
tent, but not perfectly. To see this formally, let Firm 1 be owned by only two

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[6]For a survey on the empirical and theoretical problems with the median voter approach, see Jung,
Kenny, and Lott (1994).

kinds of shareholders. Type 1 shareholders, who represent a proportion p of all shareholders, own stock solely in Firm 1. Their wealth depends only on v_1,

$$(6) \qquad\qquad W_1 \;=\; a_1 v_1 (x_1, x_2),$$

where W_1 is the aggregate wealth of Type 1 shareholders and a_1 is a parameter indicating the proportion of Firm 1 held by Type 1 shareholders. Type 2 shareholders, constituting $(1 - p)$ of all Firm 1's shareholders, are perfectly diversified across both firms, so their wealth varies with $(v_1 + v_2)$,

$$(7) \qquad\qquad W_2 \;=\; a_2 (v_1 (x_1, x_2) + v_2 (x_1, x_2)).$$

Following Peltzman, we assume that the total support from Type 1 shareholders is $f(W_1)$, with $df/dW_1 < 0$ and $d^2 f/dW_1^2 < 0$, so that support is increasing with the group's wealth, though at a decreasing rate. Similarly, support from Type 2 shareholders is $g(W_2)$, with $dg/dW_2 < 0$ and $d^2 g/dW_2^2 < 0$. To put more institutional context to our setting, one can envision managers who are the agents trying to maximize support. The functions f and g can then be thought of as describing probabilities of voting for management through shareholder ballots.

The support function for Firm 1 managers is then

$$(8) \qquad S \;=\; pf(W_1) + (1 - p)g(W_2)$$
$$\;=\; pf(a_1 v_1) + (1 - p)g(a_2(v_1 + v_2)).$$

This support function is maximized by setting x_1 so that

$$(9) \qquad \frac{\partial S}{\partial x_1} \;=\; p\frac{df}{dW_1}a_1\frac{\partial v_1}{\partial x_1} + (1 - p)\frac{dg}{dW_2}a_2\left(\frac{\partial v_1}{\partial x_1} + \frac{\partial v_2}{\partial x_1}\right) \;=\; 0.$$

Note that if $p = 1$ (no diversified shareholders), this requires $\partial v_1/\partial x_1 = 0$, which is the first-order condition for unilateral maximization of v_1 that we described earlier. If $p = 0$ (so all shareholders are perfectly diversified), (9) likewise reduces to the earlier stated first-order condition for maximizing the joint value of Firms 1 and 2.

For the case where $0 < p < 1$, suppose that x_1 imposes a positive externality on Firm 2, so that $\partial v_2/\partial x_1 > 0$. Then at x_1^u, the value for x_1 that maximizes Firm 1's value, it will be the case that $(\partial v_1/\partial x_1 + \partial v_2/\partial x_1)$ is greater than zero and, therefore, (9) will not hold (if x_1 is a positive externality to Firm 2 at $x_1 = x_1^u$, $\partial v_2 \partial x_1 > 0$). For (9) to hold, x_1 will have to be increased to some point between x_1^u and x_1' (with x_1 being a positive externality, $x_1' > x_1^u$). When (9) holds, $\partial v_1/\partial x_1 < 0$ and $(\partial v_1/\partial x_1 + \partial v_2/\partial x_1) > 0$, so that undiversified shareholders consider x_1 too high but the diversified shareholders view it as too low.

Of the many possible comparative static results, we note only one: if $f(W_1)$ and $g(W_2)$ are linear, then increases in df/dW_1 move the optimal x_1 in the direction of x_1^u. In words, the more responsive is support from undiversified shareholders to their wealth, then the closer will be corporate policy to what the undiversified shareholders want. It may be, for instance, that undiversified shareholders monitor corporate managers more closely than diversified shareholders (who can be characterized as institutional investors) and, therefore, will have voting behavior that is more responsive to changes in firm value.[7]

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[7]Demsetz and Lehn (1985) discuss the extent of "block ownership" for U.S. stocks and possible impacts of such concentrated ownership on corporate policy. They argue that block owners might not

D.   Shareholders as Consumers and Employees

Shareholders might also be consumers of the products that their firm produces and/or employees of the firm. Indeed, as of 1990, 47.3 million Americans directly owned stock in public corporations and another 25.3 million owned stock mutual funds (PR Newswire, January 21, 1993); if we consider the ultimate owners of pension funds, these numbers would be still greater. In 1988, more than 90 percent of all firms listed on Japan's eight stock exchange markets had an ESOP, and almost 50 percent of the labor force in firms with ESOPs participated in the plan (Jones and Kato (1993), pp. 352–367). In America, 9,500 stock ownership plans covered 10 million employees in 1994 (Nibley (1994), p. E1).

Shareholders who are also consumers or employees want firms to pursue nonvalue-maximizing policies only if the firm has monopoly power in the product market (for shareholders as consumers) or can hold up employee investments in the labor market (for shareholders as employees). For brevity, we will discuss only the case of monopoly power in the product market and the implications for shareholders as consumers.

If the firm maximizes its value and has monopoly power in the product market, it will choose an output where marginal revenue equals marginal cost; marginal cost will, therefore, be less than price, which equals the marginal value of the firm's output to consumers. Any shareholder who consumes some of the product would like a higher output: the last unit's marginal profit contribution is zero but its contribution to consumer utility is positive. In the "perfect" case, where each customer holds the same number of shares and has the same demand curve for the product (and, therefore, consumes the same quantity), and where there are no nonshareholder consumers, there will be unanimity over how the firm should operate: produce the competitive output, i.e., where price equals marginal cost.

As before, heterogeneity prevents unanimous agreement over a single output level. Shareholders who consume a smaller percentage of the firm's output than their percentage ownership will prefer an output relatively closer to the monopoly level. Applying our model in the case of heterogeneous shareholder/consumers would yield a prediction on output somewhat between the competitive and monopoly levels, depending again on the mix of shareholder/consumers and the responsiveness of those shareholder/consumers' support to their utility.

III.   Controlling the Incentives to Deviate from Holding the Diversified Market Portfolio

A.   The Free-Rider Problem and the Role of Takeovers

We have argued that diversified share ownership causes firms to internalize some of the externalities imposed on other firms and consumers—thus mitigating the classic free-rider problem. However, a new question emerges: how is diversified share ownership to be *obtained and maintained*? If enough shareholders

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want value maximization because they will use the company to pursue nonpecuniary activities that benefit only themselves. The thrust of our model is different: block owners, if not well diversified, do *not* receive pecuniary externalities that nonblock owners do; the block owners therefore want value maximization. The two theories are not mutually exclusive.

are diversified in their holdings, or if enough shareholders are also consumers or externality recipients, corporate policy can be influenced by broader shareholders' interests. However, if shareholders are successful in maximizing portfolio value rather than firm value, corporate profits will decline. This, in turn, implies one of two additional consequences: either the market value of the company's shares must fall to represent the present value of the lower profits at the firm's current cost of capital; or the monetary return that the shareholders demand must fall (bear in mind that the shareholders are receiving external benefits from the firm's nonvalue-maximizing behavior).

Both possibilities, however, give rise to new free-rider problems. If share prices fall, each shareholder (or outsider/nonconsumer who does not receive any externalities) has an incentive to become undiversified and acquire a controlling interest in the company, change its policies, and reap the gains of increased profits. Any single original shareholder would be willing to sell his shares to such a corporate raider because he views the effect of their sale as having a negligible effect on corporate policy. Similarly, if a lower monetary return were somehow imposed on the shareholders, each shareholder would again have an incentive to sell his shares in that company and buy shares in another company that promises a normal return. In either case, those who sell their shares would each assume that, since they own such a small percentage of a company's total shares, they can sell their shares and still receive the company's external benefits. Thus, if companies are to internalize externalities, there must exist institutional arrangements that prevent a person unaffected by externalities from purchasing a controlling interest in the firms. Our theory, therefore, yields a new explanation for several sets of institutions, as we shall now explain.

B. The Role of Institutional Mechanisms

One way to alleviate the free-rider problem among shareholders is for shareholders in a company to enact a corporate policy against takeovers—in essence, legally restrict any one shareholder from acquiring too large a stake in the company and, therefore, acquiring both the incentive and ability (voting power) to change corporate policy. Yet, there also exists a cost to antitakeover amendments: they can serve the purpose usually alluded to in the literature, that of making it more difficult to remove incompetent or self-aggrandizing managers.[8,9] We are not discounting or ignoring this cost. We are simply pointing out that there may be many instances where one company's share price does not send the correct signal about how well managers are serving the shareholders' interest, and that in these situations, shareholders might rationally make it more difficult for raiders to remove

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[8] Karpoff and Malatesta (1989), DeAngelo and Rice (1983), and others have interpreted the negative effect of these rules on stock values as evidence these rules are inefficient. Our interpretation is that the antitakeover legislation allows firms to pursue portfolio maximization policies, which may well be efficient.

[9] It is easy to point to the externalities associated with many common practices following takeovers. Reducing working capital is one policy often followed by acquirers but, at least in the case of increased accounts payable, it is possible that the target firm's gain is to a great extent another firm's loss.

incumbent managers so that those managers can more freely pursue nonvalue, but shareholder utility, maximizing policies.[10]

Another method to maintain diversified share ownership and, therefore, the internalization of externalities works if citizens of a country have delegated investment decisions to large investment institutions such as pension funds. If institutional investors hold most of an economy's firms, externalities are again internalized: those externalities affecting other firms are internalized because institutions hold all firms, and externalities affecting consumers or residents are internalized if the institutions, in turn, recognize the true interests of their principals.[11] However, restrictions that keep any one fund from becoming undiversified and, therefore, gaining the interest and ability to change policies of the few companies in which it has concentrated its investments are necessary to ensure this outcome. In fact, legal restrictions on U.S. institutional investment funds do limit how much of any single company they can own (Drucker (1991), p. 113).[12]

Consumer cooperatives use other techniques to ensure that shareholders remain consumers and, therefore, have the incentive to maintain consumer surplus maximizing policies. Since many consumer cooperatives are potential monopolies—for example, grocery stores in small towns or grain silos in farming districts—there is the possibility that efficiency and firm value will be in conflict. What consumer cooperatives do is to tie the returns to shareholders to purchases from the cooperative: frequently, shareholders of the cooperative receive a percentage discount on their purchases over the course of the year. Consumers of the cooperative often buy just enough shares to give them rights to the discount, and as "tied" shareholder/consumers, they then support the cooperative's efforts to maximize consumer surplus instead of share value.

The frequent rule that each shareholder is allowed only one share in the cooperative is consistent with our discussion that allowing any one customer too large a percentage of the cooperative would result in that one shareholder preferring a value-maximizing strategy over a utility-maximizing strategy (e.g., for a

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[10] A series of papers (e.g., Brickley, Lease, and Smith (1988), Eakins (1993), and Gordon and Pound (1990), (1993)) have studied how institutional stockholders vote on issues such as hostile tender offers, adoption and repeal of poison pills, and removal of staggered boards and supermajority restrictions. For example, Brickley, Lease, and Smith (1988) show that institutional investors are more likely to vote against antitakeover amendments than nonblockholder shareholders, and Gordon and Pound (1993) show that proposals receive more votes when they are sponsored by an institutional stockholder and when they restore shareholders' voting rights. Assuming that all institutions are well diversified, this evidence contradicts what our theory predicts. Before accepting this as a conclusive test, however, we would want to check for differences in the extent of diversification for the institutions voting for vs. against various proposals and for the likelihood of significant externalities between the concerned company and other publicly held companies. In fact, Brickley, Lease, and Smith (1988) also show that institutions such as insurance companies, who may get external benefits from their dealing with the company, are less likely than other institutional investors to vote against antitakeover amendments. This is consistent with our theory, and we would suggest extending the analysis of externalities to institutional investors who own companies that would be hurt by a takeover of the company in question.

[11] Hansen and Lott (1992) discuss this example in the context of the privatization of firms in Eastern Europe through the use of vouchers and the large mutual funds that have grown up to pool those investments.

[12] Besides specific restrictions that limit the amount of any one firm that pension funds can own, Section 13d of the Securities Exchange Act creates large costs (some in the form of legal liability) for any shareholder who owns more than 10 percent of a company and is active in corporate governance. As has been pointed out by many observers, this is a major impediment to investment funds that want to pool small investors' funds and engage in an activist investment policy.

consumer cooperative, a monopoly price vs. a competitive price).[13] However, we predict that the larger the variation in purchases across customers, the more likely it is that cooperatives will move away from one share per customer rules. At least some cooperatives like those in the milk processing industry do link differences in patronage with share ownership through using revolving financing (Porter and Scully (1987), p. 494).

Another form of consumer cooperative—of tying ownership to consumption—may be local government ownership. For example, local utilities, which are frequently publicly owned, potentially involve both monopoly and externality problems with obvious conflicts between efficiency and firm value maximization. Having a local utility owned by outsiders would, therefore, not be an efficient solution. Regulating a privately owned utility might be an improvement, but there are obvious costs of regulation. Regulation does not by itself correct the core of the problem, which is that outside owners will not care about loss of local consumer surplus or externalities. Local public ownership could emerge as the best solution, for it aligns owners' interests with local consumers and citizens.[14] If the utility sets prices at the efficient level, it may incur losses that will be borne by local taxpayers/consumers, but they are the same people who benefit from efficient prices. Interestingly, Peltzman (1971) finds that publicly owned utilities consistently charge lower rates than do privately owned firms. He also finds some evidence that public utilities sell electricity at higher rates to nonvoters than to voters. Both findings are consistent with our theory.[15]

Laws that restrict the purchase of shares in companies by foreigners can also alleviate certain shareholder free-rider problems. Although we are unaware of such restrictions applying to the city or state level,[16] restricting purchases of U.S. companies by non-U.S. investors is at least a debated issue. Such restrictions are most likely to be efficient if they applied to cases where the domestic corporation generated externalities (e.g., negative externalities such as domestic pollution).

The Japanese *keiretsu* system is another economic institution that can be easily explained by our theory.[17] Under the keiretsu system, a set of vertically

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[13]While the argument is very common that cooperatives were formed to prevent either monopoly or monopsony problems (e.g., see Porter and Scully (1987) for a literature survey), institutional restrictions on the number of shares held by any single shareholder have been taken as exogenous. Of particular relevance for our discussion, Porter and Scully (p. 490, fn. 6) mention two other papers making the assumption that cooperatives are motivated by maximizing their representative owner's utility.

[14]While we do not expect systematic mistakes by the regulators, the conflicting interests of regulators and the regulated firm will make regulation costly, and when these costs become sufficiently large, public ownership will be preferred (see also Peltzman (1971), p. 120). This discussion fits in with the notion that there is a tendency towards efficiency in political institutions (Becker (1976) and Lott (1996)).

[15]Our discussion also has more general implications for another area involving externalities. If firms are already internalizing the social costs of pollution, optimal penalty theory implies that there is no role for legally imposed sanctions (Becker (1968)). Optimal legal sanctions depend upon the extent that shareholders are already internalizing the pollution costs, and according to our model, this will depend upon the extent to which those affected by the pollution are also shareholders in the polluting firm.

[16]However, companies sometimes offer shares only to local residents: Ben and Jerry's, for example, initially sold shares only to Vermont residents. With that set of shareholders, Ben and Jerry's may have the incentives and ability to pursue certain nonvalue-maximizing policies.

[17]While Drucker (1991) notes the obvious vertical dependencies between members of a keiretsu, he focuses his discussion more on the "long-term view" aspect of Japanese decision making than on the "cooperative" aspect.

related companies have cross-holding equity interests, and one or several banks have equity interests in all the companies. Chief executives of the keiretsu's companies serve as an executive committee for the whole group; this committee meets regularly to make decisions that affect the group as a whole (Drucker (1991), p. 113). Externalities within the vertical chain are, therefore, internalized. For example, if one company gets into financial distress, the keiretsu may negotiate new contracts between the distressed firm and its suppliers and customers. The resulting value reductions for the suppliers and customers may be less than the reductions that would result if the distressed firm halted production.

Japanese law restricts banks from taking more than a 5-percent interest in any one company. This is similar to U.S. restrictions on institutional investors and represents one method of preventing each bank from acquiring too much of a company—too much in the sense that the bank would then want to maximize the value of that one company alone. The Japanese system, therefore, achieves diversification to internalize externalities while it simultaneously prevents large blocks of ownership from accumulating.

Our theory permits us to interpret T. Boone Pickens' experience with buying a stake in Koito Manufacturing as a rational wealth-maximizing response by other Japanese shareholders to Pickens' plans (Graven, June 18, 1990). Koito is an automotive lighting manufacturer and a member of the Toyota keiretsu. Toyota owned 19 percent of Koito stock (Toyota keiretsu members own 60–65 percent of the total), and several of Koito's executives are from Toyota; Toyota also has three board seats with Koito. Toyota was also Koito's second largest customer.

Given the Japanese practices of relying on one or a few suppliers and on just-in-time production processes, Koito probably possesses significant market power. If Koito were to maximize its own value, it would likely charge higher prices to (downstream) Toyota. This would create distortions to all downstream members of the keiretsu (upstream also, probably) and would reduce the value of the group as a whole by more than it increases Koito's value. Since the Japanese shareholders of Koito are diversified across the keiretsu, however, these shareholders do not want Koito to maximize solely its own value. These shareholders also have an effective means—the executive committee of the keiretsu—to effect the policies they would like to see at Koito.

Unlike Koito's institutional shareholders, an outsider like T. Boone Pickens, who holds only Koito's stock and not the stocks of other firms in the keiretsu, would want Koito to maximize only its own value. One of Mr. Pickens' complaints was that Koito sold at low prices to Toyota; the implication is that if he had control, he would raise prices. Mr. Pickens argued that Koito favored Toyota at the other shareholders' expense. In fact, while Mr. Pickens lost his proxy fights for opening up Koito's books and obtaining seats on its board of directors, his proposals won the support of "more than 57 percent of Koito's individual shareholders" (Dow Jones News Wire, June 27, 1990). Our theory predicts that if T. Boone Pickens and the other individual shareholders also owned Toyota stock as well, they would find their *portfolio value* was well served by Koito's policy. It is not surprising

that Koito's shareholders did not want to give any power to Mr. Pickens and fought against seating him as one of Koito's corporate directors.[18]

In the U.S., aspects of the venture capital industry resemble the keiretsu system. Typically, venture capital funds are specialized in the sense that they invest in a small number of industries. Funds are, therefore, likely to hold shares in firms that impose externalities on one another, either horizontally or vertically. Since the venture capital fund owns shares in related companies, however, it will, like banks in Japan, have the incentive to make firms internalize externalities. Furthermore, venture capital funds take active roles in management of their portfolio companies by taking positions as directors.[19] In this way, the venture capitalists also acquire an ability to influence the practices of portfolio companies; we, therefore, expect that companies funded by venture capitalists are unlikely to be value maximizers.

Numerous areas exist where maximizing one firm's value might not maximize the value of a venture capitalist's portfolio: for instance, when more than one firm is pursuing the same technology; prices are being set between vertically related companies; technology is being licensed to other portfolio companies; or firms are involved in joint venture agreements. While we have been unable to find any study of venture capitalists' objectives in managing their portfolio, we predict that the more extensive these externalities, the greater are the returns to venture capitalists inducing the firms they fund to maximize something other than those firms' own profits.[20]

Another phenomenon consistent with our theory concerns the activism of certain large institutional investors, most notably CALPERS, the California public pension system. Several firms that had supported reform of the public pension system because they thought it would reduce state taxes reversed their positions after (alleged) pressure from CALPERS (WSJ, June 10, 1991, p. A14). We interpret this as indicating that the firms' shareholders—CALPERS—benefited from

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[18] A natural question would be why a keiretsu does not formally vertically integrate. We conjecture that it is efficient to retain a market value for each firm in the keiretsu as this can be used to give managers of that firm incentive to engage in actions that increase the value of their firm without adverse consequences on others (e.g., cost-cutting). Thus, the keiretsu system avoids opportunism through diversified ownership and oversight but retains some incentives for improved individual performance.

[19] The placement of corporate directors is one obvious way of helping ensure that firms internalize externalities, and interlocking directorships (where CEOs sit on one another's boards) are one method of doing this. Interlocking corporate directorships are quite common. While there are legal restrictions that forbid interlocking directorships from the same industry (Dooley (1969)), Hallock (1995) shows that 20 percent of a 773 firm sample have interlocking directorships, which is significantly greater than the 4.4 percent we would find if directors were randomly assigned to firms. Many directors also simultaneously serve on the boards of many related companies. While Hallock explains interlocking directorships as a way of increasing executive salary, our theory suggests that such interlocking relationships should be explained by the level of externalities between firms. One test would be to see if interlocking or common sets of directors are most prevalent when the cross-ownership of stock is highest. Structuring executive compensation is another way of insuring that firms take into account the effects that they have on other firms. While we do not know of any examples where compensation is positively related to how well other firms do (possibly for antitrust reasons), many firms pay executives based upon how well their firm does relative to other firms. Everything else equal, our discussion implies that the greater the cross-ownership between competing firms, the less will executive compensation depend upon the performance of the executive's own firm.

[20] J.P. Morgan & Company held a large diversified portfolio of railroad stocks during the 1880s and 1890s and Morgan tried to use his holdings to coordinate the actions of these different railroads (Chernow (1990), pp. 57–58 and 67–70). His attempts to cartelize the industry eventually failed because of the entry of new competitors (p. 58).

lower taxes on the firms but suffered from lower pensions. Through shareholder activism, the firms altered their behavior from maximizing share value to maximizing shareholders' overall wealth/utility.[21,22]

Therefore, since institutional investors can frequently use their influence to maximize shareholder wealth as distinct from share value, our discussion also provides an explanation for why many recent studies rarely find systematic abnormal returns around proxy mailing dates (e.g., Karpoff, Malatesta, and Walkling (1994) and Wahal (1996)) despite evidence that pension fund activism changes the governance structure of targeted firms (Wahal (1996)). Increased activism by institutional investors might signal increased monitoring of a firm and, thus, less shirking, but it might also signal that these large investors will use their influence to insure that the firms maximize their total portfolio or broader measures of wealth and not just the returns to that particular firm. Using event studies to measure systematic abnormal returns, thus, makes sense only if one believes that institutions use their holdings to maximize individual share value.

IV.   A Capital Markets Test

A.   Explaining the Returns to Mergers

Our earlier discussion of Easterbrook and Fischel (1982) suggests the following test of our theory. If one looks at the stock market evidence on corporate takeovers, one finds that although target firm shareholders definitely benefit from takeovers, acquiring firm shareholders do not necessarily benefit (Jarrell, Brickley, and Netter (1988)). There is substantial evidence that acquiring firm returns were, on average, negative during the 1980s, with well more than half of the acquiring firms experiencing negative returns. Maloney, McCormick, and Mitchell ((1993), pp. 194–217) provide evidence of the negative time trend in acquirer announcement returns from 1962 to 1982, with acquirer returns declining by about 0.2 percent per year over the period.

Our theory offers a simple explanation for this empirical finding, which can be motivated as follows: the negative returns to bidders are of limited relevance to diversified acquiring firm shareholders, for those shareholders will also benefit from their holdings in the target. Diversified shareholders will, therefore—at least as a first approximation—be indifferent to how any gain from an acquisition is to be divided.

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[21]Other examples illustrate unions using share ownership to increase their benefits. For instance, Ray Rogers has gained notoriety as a consultant who advises unions to use their pension funds stock holdings to pressure firms to accept union contracts that are more in the union's interests (WSJ, March 1, 1994). The Journal reports that, "Rogers and his partner analyze a company to see which banks and investment companies hold the financial purse strings. Then, by challenging directorships, fighting proxy battles, moving hefty pension funds and encouraging unions and union members to pull their money out of the target banks, they pressure the creditors to encourage the company to settle."

[22]Another example that is consistent with shareholders trading off lower stock values for other returns involves the U.S. companies that stopped doing business with South Africa. One could argue that this was value maximizing, but another explanation is that the move maximized the *utility* of U.S. shareholders—that is, shareholders were better off with a lower market value of their portfolio and fewer dealings with a country that practiced apartheid. A test to distinguish between the two explanations would be to check if firms' values declined upon announcement of a cessation in business dealings in South Africa.

This indifference holds, of course, only if acquiring firm shareholders hold shares in the target firm. For targets that are private, closely-held firms, this condition is unlikely to be met.[23] In such acquisitions, we should expect acquiring firms to only make bids that would increase their own value. Our prediction is then that acquiring firm returns will be higher for acquisitions of private targets than for publicly held targets.

Before turning to the evidence, we would like to note the results of an auction model that we developed to examine bidding behavior in the context of shareholders that own both the bidder and target. In such a context, bids will be higher than when shareholders of the bidder and target are separate, and indeed, bids (as well as amount paid) will sometimes exceed the bidder's own value of the target. The intuition behind this result can be readily explained. Consider what is known as a second price sealed bid auction, where the highest sealed bid wins the company being sold but pays the amount of the second highest bid.[24] If bidders know their own value of the target company, and they wish to maximize their own expected profits, the dominant strategy in such an auction is to place a bid equal to one's own value. Then the bidder with the highest value wins, but pays an amount equal to the second highest value. Consider how bidding strategies change when a bidding firm acts in the interests of shareholders who also own shares in the target company. In this situation, for the second price auction, the optimal bid is higher than the bidder's own value of the target: by bidding higher, the bidder forces competing bidders to pay more in the event that they win the auction, and the losing bidder's shareholders gain thereby via their shares in the target.[25]

More formally, let there be two bidders in what is known as an independent private values context: each bidder knows his own value of the target but only has a probability distribution describing his knowledge over the other bidder's value. Further, let one of the bidders—call it Bidder 1—have shareholders who each own equal percentages of both Bidder 1 and the target. Writing out the objective function for Bidder 1 (assuming it acts in the interests of its diversified shareholders) and maximizing with respect to the bid submitted leads to the result that the optimal bid exceeds Bidder 1's own value of the target. Taking the two bidders' valuations to be distributed over a uniform distribution on [0, 1] leads to the specific result that the optimal bid strategy for Bidder 1 to be (since the

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[23] Stock ownership is much more concentrated in privately held firms and this is consistent with owners of privately held firms holding less diversified positions. For example, while Demsetz and Lehn ((1985), pp. 1156-1157) find that the top five owners of 511 large U.S. corporations, on average, own 24.8 percent of these companies, Beatty and Zajac (1994) find that the mean ownership interest of top management of 435 private firms prior to IPOs was 55 percent.

[24] A second price sealed bid auction is similar to the common ascending price oral auction in that the price in each auction is set by the second highest bidder. We choose to model the second price auction for reasons of simplicity, but similar results could be obtained for other auction forms. For a review of auction theory, see McAfee and McMillan (1987). Derivations of our results are in a working paper version of this article available from the authors.

[25] This discussion assumes that there is no cross-ownership between bidders. If there were cross-ownership of bidders in addition to that between some bidders and the target, then shareholders would care less about the division of any gains and would simply want the target to go to the highest valued bidder. A multitude of bidding equilibria yield such an outcome. Our assumption of no cross-ownership of bidders and the target is reasonable in that many corporate auctions include private bidders (e.g., leveraged buyout houses).

other bidder's shareholders are not assumed to be diversified, it continues with the dominant strategy of bidding its value)

$$(10) \qquad\qquad b \;=\; (1+v_1)/2,$$

where v_1 is Bidder 1's value of the target. Note that for $v_1 < 1$, $b > v_1$. This is, then, our testable prediction: when bidding firm shareholders are diversified across the target, bids will be higher than when shareholders are not diversified, and indeed, in the diversified case, we expect bids to exceed the bidder's own value. This means that in some circumstances, the amount paid will also exceed value (in second price contexts, bids and amount paid differ, with the amount paid being set by the second highest bid).

We would also note that our auction-theoretic justification for lower and negative acquirer returns for public targets can be supplemented with other arguments. For one, fairness opinions necessary for a public target's board of directors will either under or over value the target firm. In the case of under valuation, there should be no impact as the constraint being placed is nonbinding. With over valuation, however, the constraint is binding and potentially deal-stopping. If, however, a potential acquirer exists whose shareholders are diversified across the target, then the acquirer would be willing to pay more than value for the acquisition—and, indeed, would have to if it wanted to proceed. Also, it could be that for diversified shareholders, the optimal price for the target from a tax point of view would be greater than the direct value of the target to the acquirer. In such a case, the diversified shareholders would approve of over paying for the target, knowing that their overall gain is thereby greater. The reverse is again not true: paying less than value of the target may be optimal from a tax standpoint, but competition would not let that occur.

To test this proposition, we collected data on 252 acquisitions of public and private companies over the period 1985–1991.[26] Returns for the acquiring firm were tracked over a period 14 days prior to announcement to five days after. Figure 1 shows the excess return sequence for the acquiring firms' shares depending on whether the target is publicly or privately held.[27] Table 3 shows summary statistics for the key variables.

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[26] The data were compiled using the Lotus OneSource database, which identifies whether a company is public or private, and gives an announcement date for the transaction. We also required the acquiring firm to be on the CRSP tapes, deal size to be at least $25 million, and the transaction to be either 100-percent acquisition or merger. In two cases (Union Carbide-Chemical Business and Greyhound Capital), we believe that the database incorrectly recorded the ownership structure of two companies and we reclassified these targets as being publicly owned, since both of these were subsidiaries of Union Carbide or Greyhound. The results are not affected by this reclassification.

[27] The data we report below use as excess return the stock's actual return minus the stock's expected return, where the expected return was calculated using an alpha (intercept) and a beta estimated over a 90-day period just prior to the two-week preannouncement period. We also did the analysis using excess returns calculated as the stock's actual return minus the market return for that day, with the market being a value-weighted index of all NYSE and ASE stocks. No significant difference in the results appeared. The necessity of calculating betas caused us to lose five additional observations because of incomplete stock price data.

FIGURE 1

Acquirers' Cumulative Excess Returns

Public Targets vs. Private Targets
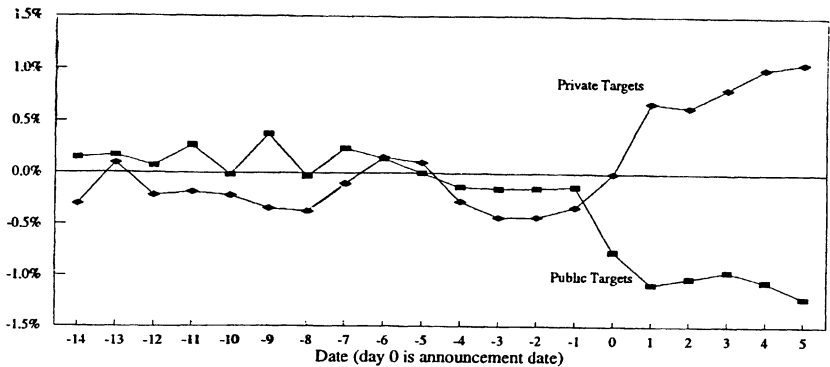
Acquirers' Daily Excess Returns

Public Targets vs. Private Targets
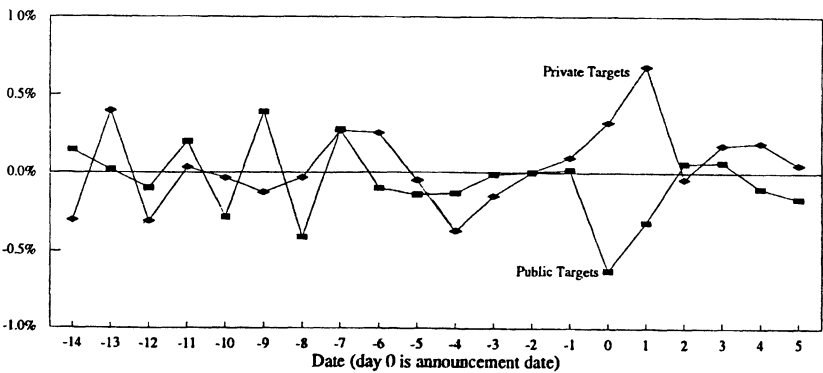
Regressing the acquirers' two-day cumulative excess returns against a dummy variable for type of target and then also the dollar value of the transaction and whether the transaction was financed with cash or stock yields[28],[29]

[28] Travlos (1987) provides empirical evidence and Hansen (1987) provides a theoretical discussion of why cash payments are consistent with higher abnormal returns.

[29] We use day zero and day one for the window, where day zero was identified as the announcement day. Day one is relevant if the announcement was made while the market was closed. Information on the percent of the purchase paid for in stock was obtained using the Dow Jones News/Retrieval Service. Because information on the method of payment was not always released on the announcement date, the above regression assumes that the market had foreknowledge or rational expectations on the method of payment. Limiting the sample used in the second regression to only those events where the initial announcement contained precise information on whether cash or stock was being offered to the target produced virtually the same results as those listed above. In that case, the coefficient for the $PRIVATE_i$ variable was 0.0193 (t-statistic = 2.70). In this specification, the t-statistic on the $CASH_i$ variable increases to 0.87.

TABLE 3

Average Characteristics of Mergers and Tender Offers when Publicly Owned
Firms Attempt to Acquire Either Public or Private Targets: 1985–1990

(Standard Deviation in Parentheses)

	Private Target	Public Target
Abnormal	1.15%	−0.98%
Excess	(5.51)	(4.70)
Return	$n = 101$	$n = 151$
Transaction	$188	$1,093.1
Size	(350.8)	(2,236)
(in millions)	$n = 101$	$n = 151$
% of Offer	75.2%	69.06
Consisting	(40.4)	(44.1)
of Cash	$n = 88$	$n = 140$

The identification of events and information of the size of transactions is taken from Lotus OneSource database. Information on the percent of an offer consisting of cash or stock is from the Dow Jones News/Retrieval Service.

$$(11) \qquad CER_i \;=\; -\underset{(2.39)}{0.0098} + \underset{(3.29)}{0.0213}\,PRIVATE_i,$$

$$R^2 \;=\; 0.041568, \quad n \;=\; 252,$$

$$(12) \quad and \quad CER_i \;=\; -\underset{(1.02)}{0.0098} + \underset{(2.62)}{0.019}\,PRIVATE_i - \underset{(2.37)}{0.000005}\,SIZE_i$$

$$+ \underset{(0.77)}{0.0000623}\,\%CASH_i,$$

$$R^2 \;=\; 0.073495, \quad n \;=\; 228,$$

where CER_i is the two-day cumulative excess return for the ith transaction, $PRIVATE_i$ is 1 for private targets and 0 for public targets, $SIZE_i$ is the dollar amount (in millions) of the transaction, and $\%CASH_i$ shows the percent of the transaction that was paid for with cash. The absolute value of the t-statistics are given in parentheses.

As predicted, acquiring firm shareholders experience larger returns when acquiring a private firm. These regressions imply that an acquirer's abnormal returns are about two percentage points higher when they purchase a privately owned target. These findings are not accounted for by just a few transactions. While 65 percent of the firms acquiring public targets experienced negative two-day excess returns, 43 percent of the firms acquiring private targets did. Nor are the results significantly altered when the largest positive values for privately owned targets are removed from the sample. We also do not think that these results can be explained by differences in the degree of competition for public vs. private targets. In fact, we would argue that public targets are restricted in choosing their auction methods because of legal requirements. For example, public targets find it difficult to commit to sealed bids as a sales device, for they could easily be sued by shareholders for not considering a higher, but later, bid. Thus, private targets

should have more degrees of freedom in conducting as competitive an auction as is appropriate.[30]

While the other variables signs are consistent with previous studies, their effects are much smaller economically than the ownership effect. Even changing payment methods so that they are made entirely in cash as opposed to stock raises the acquirer's excess return by only 0.6 percentage points. For 90 percent of the sample's firms, the transaction size variable reduces the excess return by, at most, 0.8 percentage points. Replacing size with the log of size increases the statistical significance of the ownership dummy variable, though the size variable is no longer significant.

Our PRIVATE variable is only one way of looking for effects of cross-ownership on the terms of mergers and acquisitions. Another method is to look directly at the degree of stock cross-ownership when one public firm acquires another public firm. Transactions with little cross-ownership should show higher returns for acquirers than transactions with significant cross-ownership. To accomplish this test, we employed the CDA/Spectrum data, discussed earlier, to determine the degree of institutional cross-ownership between the two firms in each transaction. Because of data availability, we were restricted to only the 32 transactions between public acquirers and public targets for 1989–1990. We ran regressions similar to those above with the following changes.

First, we replace our private ownership dummy PRIVATE with a variable that measures cross-ownership by institutions of the acquirer and the target. The new variable is,

(13) $CROSS_i$ =   (Percent of target firm's shares held by institutions holding both target and acquirer) $\times$ (Percent of acquiring firm's shares held by institutions holding both target and acquirer).

Our theory implies that the higher is $CROSS_i$, the higher will be the bids of acquiring firms and, thus, the lower will be acquirers' returns. Intuitively, the greater the percent of the target held by institutions who also own the acquirer, the more those institutions will favor a high bid policy. We interact the percent of the target held with the percent held in the acquiring firm by the same institutions since if those institutions own little of the acquiring firm in total, they should be expected to have little influence.

Second, we are concerned about possible free-riding when there are many institutions that hold both the target and the acquirer, so we also include a variable NUMBER OF INSTITUTIONS$_i$, that is, simply the number of institutions simultaneously holding the target and acquirer.

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[30] A reviewer noted that private firms may be unable to mimic the verifiable information disclosure of a public firm and would, therefore, sell for a lower price. For example, public firms must provide audited financial statements. This does not explain why acquirers often overpay for public firms. Private firms are, in fact, able to mimic public corporations in many ways (for example, if there really are these benefits, they can hire an outside auditor and, if necessary, they can do it for several years). Also, for the relatively large private firms in our sample, it is likely that audited financial statements would be available due to the requirements of bank financing.

The results with these new variables, and over the 32 public/public transactions in 1989–1990, confirm our hypothesis,

$$(14) \qquad CER_i \ = \ \underset{(0.44)}{-\ 0.0041} - \underset{(4.00)}{0.0000506}\,CROSS_i,$$

$$R^2 \ = \ 0.348058, \quad n \ = \ 32,$$

and

$$(15) \qquad CER_i \ = \ \underset{(1.04)}{-\ 0.0137} - \underset{(2.74)}{0.0000578}\,CROSS_i - \underset{(1.74)}{0.000008}\,SIZE_i$$

$$+ \underset{(1.22)}{0.0002014}\,\%CASH_i$$

$$- \underset{(1.22)}{0.000247}\,NUMBER\ OF\ INSTITUTIONS_i,$$

$$R^2 \ = \ 0.437458, \quad n \ = \ 32.$$

These regressions imply that cross-ownership has an even larger effect than shown in equations (11) and (12). A one standard deviation increase in cross-ownership as measured by $CROSS_i$ decreases the acquirer's excess return by either 3.2 or 3.6 percent, for specifications (14) and (15), respectively. In comparison, a one standard deviation change in the excess returns for the entire sample is 5.1 percent, and for the public targets during 1989 and 1990, it is 5.4 percent.

The coefficients for transaction size and method of payment have the same signs as those reported earlier, though while size is less significant than previously reported, the coefficient for the payment method is slightly more significant. The coefficient estimates for the payment method are larger than previously reported and fall within the range found by Travlos (1987). While equation (15) shows that stock and cash produce a two percentage point differential in the acquirer's excess returns for a sample that includes both tender offers and mergers, Travlos finds a 1.77 percentage point differential for mergers and a four percentage point differential for tender offers. Equation (15)'s results may be more comparable than equation (11)'s to previous studies simply because they rely on a similar data set, which involves public firms acquiring other public firms. The negative, though insignificant, coefficient for the number of institutions is consistent with the notion that more institutions imply less monitoring in many different aspects of how firms operate.[31]

These results provide strong evidence that cross-ownership of stocks have a significant and economically large impact on how much acquirers pay for target firms. These four regressions remain essentially unchanged even with different combinations of the control variables.[32]

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[31]Zingales (1994) provides a game-theoretic explanation for why acquirers' values should fall more when they attempt to acquire privately held firms than when they attempt to acquire publicly owned ones based upon the claim that free-riding by shareholders in a publicly owned firm allows them to extract a bigger surplus from a potential buyer. While we question why privately owned firms could not set up mechanisms that mimic this behavior (e.g., some of the owners of a privately held firm might attempt to hold out for more money and rules can also be set up to require a super majority vote to sell the company), this hypothesis cannot explain the results shown in equations (18) and (19), which examine only publicly held firms taking over other publicly held firms.

[32]Our theory provides an explanation for why recent work finds that public announcements of Japanese companies acquiring American companies produced positive abnormal returns for the acquir-

V.   Concluding Remarks

As we have documented, U.S. shareholders are significantly diversified across firms whose actions clearly affect each other's value. These shareholders will not want firms to pursue unilateral value maximization, and standard public choice theory applied to corporations implies that the diversified shareholders' desires will be catered to, at least to some extent. This means that firms' behavior will be significantly different from the predictions of economic models that are predicated on unilateral profit or value maximization. Corporate auctions represent one area where behavior should be different; we present evidence consistent with the predictions of our theory.

Obviously, there are costs to having firms and managers pursue portfolio value maximization rather than unilateral value maximization. These costs include the managerial costs of assessing and internalizing externalities as well as possibly greater agency costs associated with more managerial discretion than portfolio value maximization implies.[33] A more complete analysis of corporate objectives considering both the benefits and costs of externalizing externalities would yield more refined predictions on when we should observe portfolio value maximization. Unilateral value maximization may still emerge as the preferred solution in such a world, for while unilateral value maximization foregoes the benefits from internalizing externalities, it avoids other costs. As one possible example, takeovers in a world of externalities can be costly in that they may result in less internalization of externalities (when the takeover is by an undiversified individual). A policy that approaches unilateral value maximization helps prevent takeovers and, therefore, can be viewed, in our context, as a costly policy that avoids even more costly takeovers.

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ers during the same period that a negative effect occurs for American acquirers (Pettway, Sicherman, and Spiess (1993)). Our explanation is that there is likely to be much less cross-ownership of firms between the U.S. and Japan than between firms within the U.S. (French and Poterba (1991) provides evidence that shareholders are not very diversified across countries.)

[33]With unilateral value maximization, managerial effectiveness can be relatively easily assessed using measures of the firm's own profitability and value (e.g., its share price). With portfolio value maximization as the firm's objective, assessing managerial effectiveness necessarily involves many more measures of value.

References

Beatty, R., and E. Zajac. "Managerial Incentives, Monitoring and Risk-bearing: A Study of Executive Compensation, Ownership, and Board Structure in Initial Public Offerings." Unpubl. Manuscript, Southern Methodist Univ. (1994).

Becker, G. S. "Crime and Punishment: An Economic Approach." *Journal of Political Economy,* 76 (March/April 1968), 169–217.

————————. "Comment on Peltzman." *Journal of Law and Economics,* 19 (Aug. 1976), 245—248.

Brickley, J.; R. Lease; and C. Smith. "Ownership Structure and Voting on Antitakeover Amendments." *Journal of Financial Economics,* 20 (1988), 267–291.

CDA/Spectrum. *Spectrum 3: Institutional Stock Holdings Survey.* New York, NY: CDA/Spectrum (various issues 1989 to 1991).

Charlier, M. "Ray Roger's Strategies Popular, but Unions Divided over Him." *Wall Street Journal* (March 1, 1985).

Chernow, R. *The House of Morgan.* New York, NY: Simon & Schuster Inc. (1990).

Coase, R. H. "The Problem of Social Cost." *Journal of Law and Economics,* 3 (Oct. 1960), 1–44.

DeAngelo, H. "Competition and Unanimity." *American Economic Review,* 71 (March 1981), 18–27.

DeAngelo, H., and E. M. Rice. "Antitakeover Charter Amendments and Stockholder Wealth." *Journal of Financial Economics,* 11 (1983), 329–360.

Demsetz, H., and K. Lehn. "The Structure of Corporate Ownership: Causes and Consequences." *Journal of Political Economy,* 93 (Dec. 1985), 1155–1177.

Directory of Pension Funds and their Investment Managers (1994).

Dooley, P. C. "The Interlocking Directorate." *American Economic Review,* 59 (June 1969), 314–323.

Drucker, P. F. "Reckoning with the Pension Fund Revolution." *Harvard Business Review,* 69 (March–April 1991), 106–114.

Eakins, S. "Institutional Investor Support of Managers: An Investigation of Tender Offers." *Quarterly Journal of Business and Economics,* 32 (June 1993), 75–84.

Easterbrook, F. H., and D. R. Fischel. "Corporate Control Transactions." *Yale Law Journal,* 91 (March 1982), 698–737.

————————. "The Proper Role of a Target's Management in Responding to a Tender Offer." *Harvard Law Review,* 94 (April 1981), 1161–1204.

Ekern, S., and R. Wilson. "On the Theory of the Firm in an Economy with Incomplete Markets." *Bell Journal of Economics and Management Science,* 5 (Spring 1974), 171–180.

French, K. R., and J. M. Poterba. "Investor Diversification and International Equity Markets." *American Economic Review Papers and Proceedings,* 81 (May 1991), 222–226.

Friedman, M. "Social Responsibility of Business is to Increase Profits." *The New York Times Magazine Section* (Sept. 13, 1970).

Gilson, R. J., and R. Kraakman. "Reinventing the Outside Director: An Agenda for Institutional Investors." *Stanford Law Review,* 43 (April 1991), 863–906.

Gordon, L., and J. Pound. "ESOPs and Corporate Control." *Journal of Financial Economics,* 27 (1990), 525–556.

————————. "Information, Ownership Structure, and Shareholder Voting: Evidence from Shareholder-Sponsored Corporate Governance Proposals." *Journal of Finance,* 48 (June 1993), 697–724.

Graven, K. "Pickens Poised Again to Battle Koito." *Wall Street Journal* (June 18, 1990).

Grossman, S. J., and J. E. Stiglitz. "On Value-Maximization and Alternative Objectives of the Firm." *Journal of Finance,* 32 (May 1977), 389–402.

Hallock, K. "Executive Pay and Reciprocal Interlocking Boards of Directors." Working Paper, Princeton Univ. (Jan. 1995).

Hansen, R. G. "A Theory for the Choice of Exchange Medium in Mergers and Acquisitions." *Journal of Finance,* 60 (Jan. 1987), 75–96.

Hansen, R. G., and J. R. Lott, Jr. "Czechoslovak Mutual Funds Fuel Reform." *The Wall Street Journal Europe* (Friday, July 17, 1992), 6.

Hirshleifer, J., and J. Riley. *Analytics of Uncertainty and Information.* Cambridge , England: Cambridge Univ. Press (1992).

Jarrell, G. A.; J. A. Brickley; and J. M. Netter. "The Market for Corporate Control: The Empirical Evidence since 1980." *Journal of Economic Perspectives,* 2 (Winter 1988), 49–68.

Jensen, M. C., and J. B. Long, Jr. "Corporate Investment under Uncertainty and Pare to Optimality in the Capital Markets." *Bell Journal of Economics and Management Science,* 3 (Spring 1972), 151–174.

Jones, D. C., and T. Kato. "The Scope, Nature, and Effects of Employee Stock Ownership Plans in Japan." *Industrial and Labor Relations Review* (Jan. 1, 1993), 352–367.

Jung, G.-R.; L. W. Kenny; and J. R. Lott, Jr. "An Explanation for Why Senators from the Same State Vote Differently So Frequently." *Journal of Public Economics,* 54 (May 1994), 65–96.

Karpoff, J. M., and P. H. Malatesta. "The Wealth Effects of Second-Generation State Takeover Legislation." *Journal of Financial Economics,* 25 (1989), 291–322.

Karpoff, J. M.; P. Malatesta; and R. Walkling. " Corporate Governance and Shareholder Initiatives: Empirical Evidence." Working Paper, Univ. of Washington, Seattle, WA (1994).

Klein, B.; R. G. Crawford; and A. A. Alchian. "Vertical Integration, Appropriable Rents, and the Competitive Contracting Process." *Journal of Law and Economics,* 21 (Oct. 1978), 297–326.

Lappen, A. A. "The SQUEEZE on Fees." *Institutional Investor,* 28 (Oct. 1994), 65.

Long, J. "Wealth, Welfare and the Price of Risk." *Journal of Finance,* 27 (May 1972), 419–433.

Lott, J. R., Jr. "Does Political Reform Increase Wealth?: Or, Why the Difference between the Chicago and Virginia Schools is an Elasticity Question." *Public Choice* (forthcoming, 1996).

Maloney, M. T.; R. E. McCormick; and M. L. Mitchell. "Managerial Decision Making and Capital Structure." *Journal of Business,* 66 (1993), 189–217.

Merton, R. C., and M. Subrahmanyam. "The Optimality of a Competitive Stock Market." *Bell Journal of Economics and Management Science,* 5 (Spring 1974), 145–170.

Morningstar Report (July 1994).

Nibley, M. "Your Workplace Employee Ownership No Guarantee of Success." *Atlanta Constitution* (July 18, 1994), E1.

Peltzman, S. "Pricing in Public and Private Enterprises: Electric Utilities in the United States." *Journal of Law and Economics,* 14 (April 1971), 109–147.

_____. "Towards a More General Theory of Regulation." *Journal of Law and Economics,* 19 (Aug. 1976), 211–240.

Pensions and Investments (Jan. 24, 1994), 17.

Pettway, R. H.; N. W. Sicherman; and D. K. Spiess. "Japanese Foreign Direct Investment: Wealth Effects from Purchases and Sales of U.S. Assets." *Financial Management,* 22 (Winter 1993), 82–95.

Porter, P. K., and G. W. Scully. "Economic Efficiency in Cooperatives." *Journal of Law and Economics,* 30 (Oct. 1987), 489–512.

PR Newswire. "How to Minimize Costs and Hassles in Buying Stocks." (Jan. 21, 1993).

_____. "CREF Variable Annuities Post Strong Investment Returns for 1993." (March 14, 1994).

Prowse, S. "The Structure of Corporate Ownership in Japan." *Journal of Finance,* 47 (July 1992), 1121–1140.

Radner, R. "A Note on Unanimity of Stockholders' Preferences among Alternative Production Plans." *Bell Journal of Economics and Management Science,* 5 (Spring 1974), 181–184.

Reynolds, R. J., and B. R. Snapp. "The Competitive Effects of Partial Equity Interests and Joint Ventures." *International Journal of Industrial Organization,* 4 (1986), 141–153.

Sametz, A. W., and J. L. Bicksler, eds. *Institutional Investing: Challenges and Responsibilities of the 21st Century.* Homewood, IL: Business One Irwin (1991).

Szep, J. "Top Global Fund Sees by Rewards in Asia." *Reutters Limited* (Dec. 5, 1994).

Tirole, J. *The Theory of Industrial Organization.* Cambridge, MA: MIT Press (1988).

Travlos, N. G. "Corporate Takeover Bids, Method of Payment, and Bidding Firm's Stock Returns." *Journal of Finance,* 42 (Sept. 1987), 943–963.

Wahal, S. "Pension Fund Activism and Firm Performance." *Journal of Financial and Quantitative Analysis,* 31 (March 1996), 1–23.

Woutat, D. "State Pension Fund Returns Not What They Used to be." *Los Angeles Times* (April 4, 1993), D3.

Zingales, L. "Insider Ownership and the Decision to Go Public." Working Paper, Univ. of Chicago (Dec. 1994).