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

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**EXTERNALITIES AND CORPORATE OBJECTIVES
IN A WORLD WITH DIVERSIFIED
SHAREHOLDER/CONSUMERS**

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**Center for the Study of
the Economy and the State**

The University of Chicago

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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 follow a policy of portfolio value-maximization. This translates into internalization of between-firm externalities. Any kind of externality, pecuniary or non-pecuniary, 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, diversification therefore offers additional benefits to shareholders by internalizing externalities. This paper documents the extent of diversification and cross ownership of stocks 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 universal acceptance by financial economists that value-maximization should be all firms' goal, the caveat on competitiveness has been laid to rest, presumably by assuming that markets are indeed perfectly competitive. While this assumption may be met in *capital markets*, it would seem obvious from the modern literature in industrial organization that *product markets* are emphatically not perfectly competitive.² Yet, competitive product markets are just as necessary for unanimity over value-maximization as competitive capital markets (this lesson is perhaps easily missed in models that deal with state-claims over only one consumption good).

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 caused by imperfect competition. 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 radically differently from value-maximizers. This observation leads to a broad set of testable

¹ See Section II.E. below for a classic statement of the unanimity theorem, see Hirshleifer and Riley (1992, p. 144). Relevant references include DeAngelo (1981), Ekern and Wilson (1974), Hart (1979), Makowski (1983), Grossman and Stiglitz (1977), Jensen and Long (1974), and Leland (1974). Grossman and Stiglitz (1977) re-examine much of the previous *spanning* literature that purported to prove the unanimity of shareholders in preferring value maximization as a corporate objective. They show that in markets where trading occurs, another assumption — what they call “competitiveness” — 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 competitiveness, 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 may provide another reason for the breakdown, we do not see how spanning arguments lead to straightforward predictions over what will emerge as the desired corporate objective, as does a focus on externalities.

² As we discuss further below, the belief in imperfection of product markets is evidenced by the extensive use of game theory to study firm behavior. See, for example, Tirole's (1988) book on industrial organization. For a similar conclusion from a quite different perspective see Klein, Crawford, and Alchian (1978, p.299).

II. The Theory

A. The Model with Non-Consuming Shareholders

The general argument against maximizing individual share value and in favor of portfolio value-maximization can be made using a simple model. 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

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

and

$$v_2 = v_2(x_1, x_2) \quad (2)$$

Thus, each firm's value depends upon its *competitor's* actions as well as on its own actions. Alternatively, we can say that externalities exist: one firm's action will have pecuniary effects on 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 they might be 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).

Will these ownership structures lead to different behavior by the firms (assuming for now that managers act in the interests of their shareholders)? In a world of zero transaction costs, the Coase Theorem of course implies that no difference in behavior should exist. To see this, begin by noting that a single owner (Ownership Structure 1) would choose x_1 and x_2 such that

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

also not underestimate the problems inherent in negotiating side-payments, which would be necessary if either firm is to internalize the impact of their actions on the other firm.

With Ownership Structure 3, the diversified shareholders will again see the potential for greater total value through joint value-maximization. However, there is a significant difference 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 has interest in maximizing $(v_1 + v_2)$. This means that many of the transaction costs associated with Coasian bargaining can be avoided, thereby making the achievement of joint value-maximization 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 (even 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: they lose more from their holdings in the other firm than they gain from their holdings in the defecting firm.

In summary, we should expect either a single owner or perfectly diversified owners to instruct the firms that they own to maximize joint value,⁴ that is, to internalize the impact that the firms have on other firms in the portfolio. With separate owners, the usual policy prescription of "solo" value maximization holds. Such owners would like their firm to pursue negotiations 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

Externalities are necessary if the actions by firms that maximize joint value are to be different from the actions that maximize individual firms' values. There are numerous economic settings where actions by one firm are certain to affect other firms' values. Taking vertical relationships

⁴ By perfectly diversified, we mean that a shareholder owns the same percent of every firm, so that their interest is indeed in maximizing $(v_1 + v_2)$. A shareholder that owned $a\%$ of Firm 1 and $b\%$ of Firm 2 would want to maximize $(av_1 + bv_2)$, an interesting consideration that we explore below. A holder of the market portfolio is perfectly diversified, at least across the firms in the market portfolio.

have otherwise.⁸ The fund owns stock in all these companies and was able to internalize the costs of transferring assets between the firms.⁹

This is by no means an exhaustive list, and we presume that any reasonable observer of modern economies would conclude, with us, that externalities are quite prevalent.

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. And in Section IIC, 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.

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.¹⁰ 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.¹¹ Some of these institutions approach perfect diversification in that they hold market portfolios. Anecdotally, one large investor, CALPERS, the California Public Employees’ Retirement System with over \$85 billion in total assets,¹² was reported to be increasing the percent of its assets under passive

⁸ From a talk at Wharton on December 2, 1992.

⁹ Another example that is consistent with our theory involves some U.S. companies that have stopped doing business with South African companies. 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 are better off with a lower market value of their portfolio and less dealings with a country that practices apartheid. A test of the two potential explanations would be to check if firms’ values decline upon announcement of a cessation in business dealings in South Africa.

¹⁰ Sametz and Bicksler (1991, p. 18).

¹¹ For example, see Prowse (1991, in Sametz and Bicksler (1991, p. 50)). There are also many discussions about how economies of scale in managing indexed portfolios is leading towards more concentration of institutions who are making these investments.

¹² See Szep [December 5, 1994].

Data from Control Data Advisors (CDA)/Spectrum documents the holdings of institutions with more than a \$100 million in assets and allows us to examine particular industries to see the extent to which funds combine the ownership of related firms.¹⁸ We chose to examine the computer and automobile industries in-depth, as these are industries where casual review of industrial structure suggests a prevalence of externalities.¹⁹ The evidence, summarized in Table 1, indicates substantial cross ownership of some stocks. For example, the table indicates that slightly over 77 percent of Microsoft and 71 percent of Compaq are owned by institutions that have holdings in at least one of the other 5 computer industry companies listed. Fully 56 percent of Chrysler is held by institutions that simultaneously hold shares in Ford and/or General Motors.

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 6 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 billion, total value of \$154 billion).^{20,21} For the automobile industry, 298 funds 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 compares the percentage of all institution investments in an industry that are made by funds 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

¹⁸ 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 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.

¹⁹ Many funds explicitly concentrate in only a very limited set of firms. Some of the dedicated types of funds include health care, medical research, natural resources, mining, electronics, computer software, utilities, environmental, finance, insurance, regional banks, global telecommunications, and regional and state funds.

²⁰ Our discussion ignores another major source of cross ownership: that firms may hold stock in each other. For example, IBM owns a 20 percent stake in Intel (Electronic News, January 10, 1994).

²¹ 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. 51 more funds invested in five companies and accounted for \$1,764 million. 62 more funds invested in four companies and accounted for \$2,783 million.

more than a bare majority (e.g., a position that wins with 90 percent of the vote is less likely to be challenged in the future).²²

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 extent, but not perfectly. To see this formally, let Firm 1 be owned by only two 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 :

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

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

$$W_2 = a_2 (v_1(x_1, x_2) + v_2(x_1, x_2)) \quad (7)$$

Following the public choice literature, we assume that the total support from Type 1 shareholders is $f(W_1)$, with $\partial f / \partial W_1 > 0$ and $\partial^2 f / \partial W_1^2 < 0$, 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 $\partial g / \partial W_2 > 0$ and $\partial^2 g / \partial W_2^2 < 0$. 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:

$$S = pf(W_1) + (1 - p)g(W_2)$$

²² For a literature survey on the empirical and theoretical problems with the median voter approach in political markets see Jung, Kenny, and Lott (1994).

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% of all firms listed on Japan's eight stock exchange markets had an ESOP, and almost 50% of the labor force in firms with ESOPs participated in the plan (Jones and Kato, 1993, pp. 352-367).²⁴

Shareholders who are also consumers or employees will want the firm to pursue non-value maximizing policies only if the firm has monopoly power in the product market (for shareholders as consumers) or 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 shareholder holds the same number of shares and has the same demand curve for the product (and therefore consumes the same quantity), 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 closer to the monopoly level than the competitive level. Applying our public choice 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.

²⁴ In 1994, there were 9,500 stock ownership plans covering 10 million American employees (Nibley, July 18, 1994, p. E1).

time, if any at all, in discussing the dependence of firm value-maximization as the proper corporate objective on firms that have no monetary impact on one another. (They also do not generally discuss the Coase Theorem, which is the only theoretical reason for dismissing the externalities problem.)

There is, however, a strand of literature in the law reviews that makes our point, albeit for a special but important situation. Easterbrook and Fischel (1982, p. 713) argue that the management of a "target" firm should act to maximize the joint value of its and the acquirer's share values, since it is likely that investors will be holding both companies in their portfolios:

"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."

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 argue that at least the externalities between the target and the acquirer should be internalized, so that the only actions taken will be those that increase portfolio value.²⁸ We will be examining the Easterbrook and Fischel argument further in Section III, where we present a simple empirical test of it.²⁹

Gilson and Kraakman (1991, pg. 188) have taken the Easterbrook and Fischel argument further, arguing 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." Gilson and Kraakman use their argument only to suggest that the corporate governance system should be improved to "encourage better managed companies." They do not

Tirole notes our second argument against value-maximization but neglects to mention the externality argument. In later chapters, however, Tirole uses the value-maximization hypothesis in a game-theoretic setting where externalities are clearly present (see his Chapters 5-11).

²⁸ See Coffee (1984) for a reaction to the Easterbrook and Fischel suggestion.

²⁹ As one last note on relevant literature, Reynolds and Snapp (1986) establish that when firms are linked by partial equity interests in one another, their interests approach joint value maximization. They do not point out that the result is the same if the two companies are commonly owned by the same shareholders.

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.

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 anti-takeover 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.³⁰ 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 incumbent managers so that those managers can more freely pursue non-value, but shareholder-utility, maximizing policies.^{31,32}

³⁰ Karpoff and Malatesta (1989) found substantial evidence that the initial press announcements of state takeover legislation resulted in a small but significant decreases in the stock prices of firms incorporated or headquartered in those states. However, DeAngelo and Rice (1983) found no significant stock price changes. The authors of these types of studies have interpreted the negative effect of these rules on stock values as evidence these rules are inefficient. Our interpretation would be that the antitakeover legislation allows firms to pursue portfolio-maximization policies, which may well be efficient.

³¹ A series of papers (e.g., Brickley, Lease, and Smith, 1988; Eakins, 1993; and Gordon and Pound, 1990 and 1993) have studied how institutional stockholders vote on issues like hostile tender offers, adoption and repeal of poison pills, removal of staggered boards and supermajority restrictions, restoration of cumulative voting, and changes in the structure and composition of the corporate board. For example, Brickley, Lease, and Smith (1988) show that institutions were more likely to vote against antitakeover amendments, 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. However, while some evidence is provided on such questions as whether the institutional stockholder might be simultaneously providing the firm with a service (e.g., insurance) (Eakins, 1993), none of these papers investigate how institutional behavior varies with the rest of their institution's portfolio nor do they attempt to identify whether any of the externalities we discuss are present in the different events studied. In addition, as we have seen from Tables 1 and 2 in this paper, it is a mistake to assume that all institutions have the same financial self-interest.

³² It is easy to point to externalities associated with many of the common practices followed after a takeover. Reducing working capital is one policy often followed by acquirors, but at least in the case of increased accounts payments, it is possible that the target firm's gain is to a great extent another firm's loss. It is curious that finance theorists examine transfers from shareholders and taxpayers as a result of takeovers, but have not considered transfers from other firms.

(e.g., for a consumer cooperative, a monopoly price versus a competitive price).³⁵ However, we predict that the larger the variation in purchases across customers, the more likely it is that cooperatives will be to 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 public 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.³⁶ If the utility sets prices at the efficient level, it may incur losses which 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

³⁵ 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 nice overview of this literature), 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. They also reference a large literature which assumes cooperatives are "characterized by decentralized decision making resulting from the profit-motivated behavior of its members." Our point here is that a form of this maximizing shareholder utility view actually extends to many areas outside of cooperatives, and that when the argument is followed to its logical conclusions, it can also help explain additional institutional arrangements concerning cooperatives.

³⁶ The fact that outsiders value profit maximizing behavior creates the externalities in the first place and creates an incentive for managers to evade the regulations. While we do not expect systematic mistakes by the regulators, these conflicting interests 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, 1995).

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 had to stop production.

Interestingly, though, Japanese law restricts banks from taking more than a 5% 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.

On the subject of keiretsus, our theory permits us to interpret T. Boone Pickens' experience with buying a stake in Koito Manufacturing as a rational response to Pickens' plans, which would have been inconsistent with economic efficiency.⁴¹ Koito is an automotive lighting manufacturer and a member of the Toyota keiretsu. Toyota owned 19% of Koito stock (Toyota keiretsu members own 60-65% 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.

⁴¹ Many newspaper articles discuss Pickens' purchase of Koito stock and the ensuing disagreements. See, for example, "Pickens Poised Again to Battle Koito," *Wall Street Journal*, June 18, 1990. Pickens recently sold his stake back to its original owner.

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.⁴⁴

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 been supporting a reform of the public pension system because they thought it would reduce state taxes reversed their positions after (alleged) pressure from CALPERS.⁴⁵ We interpret this as indicating that the firms' shareholders — CALPERS — benefited from lower taxes on the firms but suffered from the pension reform itself. Through shareholder activism, the firms altered their behavior from maximizing share value to maximizing shareholders' overall wealth.⁴⁶

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 anti-trust 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 degree of cross ownership between competing firms, the less executive compensation should be positively related to how a firm does relative to others.

⁴⁴ J.P. Morgan & Company held a large diversified portfolio of railroad stocks during the 1880 and 1890's and he 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).

⁴⁵ Wall Street Journal, Thursday, June 10, 1991, p. A14.

⁴⁶ Other examples illustrate this point. Ray Rogers has gained a great deal of notoriety by using union 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."

The intuition of the model 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.⁴⁹ If bidders know their own value of the target company, and they wish to maximize their own profits, the dominant strategy in such an auction is to place a bid equal to one's value. Then the bidder with the highest value wins, but pays an amount equal to the second-highest value. We propose to 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 bidding firm's own value for the target: by bidding higher, the bidder forces competing bidders to pay more in the event that they win, and the bidding firm shareholders therefore gain from their holdings in the target.

More formally, let there be two bidders and one target. Bidder 1's value of the target is v_1 while Bidder 2's value is v_2 ; each bidder knows its own value with certainty but does not know the other bidder's value. To capture this latter uncertainty, each bidder is assumed to believe that its competitor's value comes from the probability distribution $F(v)$. (Thus, we are in what is known as an "independent private values" auction context.) The value of the target to itself — that is as a stand-alone entity under current management — is v_T , known to all.

In a second-price sealed-bid auction where each bidder maximizes its own profits from the auction, the optimal bid equals the bidder's value. Bidding more than value would entail paying more than value for any additional sales won, while bidding less than value would only entail losing some potentially profitable acquisitions (since the price paid is determined by the second-highest bid). Thus, placing bids equal to one's own value of the target is a dominant strategy; it does not matter how others are bidding.

⁴⁹ 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. Under certain assumptions, the expected price in a second-price auction is the same as in a first-price sealed-bid auction (where the winner pays the amount of his bid). 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).

For a little further insight, suppose that v_2 is distributed uniformly over $[0,1]$. Then (12) becomes

$$v_1 - b = -(1 - b) \quad (13)$$

or

$$b = \frac{1 + v_1}{2} \quad (14)$$

Note that for $v_1 < 1$, $b > v_1$. The optimal bid when $v_1 = 0$ is $1/2$; as v_1 increases, so does the optimal bid, and $b = v_1$ when $v_1 = 1$.

We have therefore established 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.

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 sometimes over-value the target firm. With diversified shareholders, an acquirer will still want to acquire the target, knowing that any over-payment can be re-couped via increases in the target firm's value. Also, there may be a tax savings associated with paying more than the target's value. Neither of these effects would justify paying more for a target firm that is privately-held, though, for there the presumption is that acquiring-firm and target shareholders are distinct sets.

To test this proposition we collected data on 252 acquisitions of public and private companies over the period 1985-1991.⁵¹ Returns for the acquiring firm were tracked over a period 14 days prior to announcement to 5 days after. Figure 1 shows the excess return sequence

⁵¹ 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% acquisition or merger. In two cases (Union Carbide-Chemical Business and Greyhound Capital), we believed that the database incorrectly recorded the ownership structure of two companies and we reclassified these targets as being publicly owned.

As predicted, acquiring firm shareholders experience larger returns when acquiring a private firm. These regressions imply that an acquirer's abnormal returns are about 2 percentage points higher when they purchase a privately owned target. These findings are not accounted for by just a few transactions. While 65% of the firms acquiring public targets experienced negative 2-day excess returns, only 43% 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 versus 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.

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 .6 percentage points. For 90 percent of the sample's firms the transaction size variable reduces the excess return by at most .8 percentage points.⁵⁵

Our PRIVATE variable is only one way of looking for affects 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

⁵⁵ Replacing size with the log of size increases the statistical significance of ownership dummy variable, though it results in the size variable no longer being statistically significant.

These regressions imply that cross ownership has an even larger effect than shown in equations (15) and (16). 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 specification (18) and (19), 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 Travolos (1987). While equation (19) shows that stock and cash produce a 2 percentage point differential in the acquirer's excess returns for a sample that includes both tender offers and mergers, Travolos finds a 1.77 percentage point differential for mergers and a four percentage point differential for tender offers. Equation (19)'s results may be more comparable than equation (16)'s to previous studies simply because it relies 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 implies less monitoring in many different aspects of how firms operate.⁵⁶

Taken together 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. The regressions shown in these four equations remain essentially unchanged even with different combinations of the control variables.

56 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. The argument is based upon the claim that free riding by shareholders in a publicly owned firm allow them to extract a bigger surplus from a potential buyer. While we question why privately owned firms could not set up mechanisms which mimic this behavior (e.g., some of the owners of a privately held firm might attempt hold out for more money and rules can also be set up to require a supramajority vote to sell the company), the results shown in equations (18) and (19) examine only publicly held firms taking over other publicly held firms and thus provide evidence against this explanation.

where behavior should be different; we present evidence consistent with the predictions of our theory.

There are obviously costs to having firms and managers pursue portfolio value-maximization rather than unilateral value-maximization. These costs would include the managerial costs of assessing and internalizing externalities as well as possibly greater agency costs associated with more managerial discretion that portfolio value-maximization implies.⁵⁷ We suggest that a more complete analysis of corporate objectives would consider not just the benefits of externalizing externalities, but the costs as well. Such an analysis would yield more refined predictions on when we should observe portfolio value-maximization. Unilateral value-maximization may emerge as a second-best solution in such a world, in that 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.⁵⁸ We will leave elaboration of this more complete model to future research, having here presented the foundations that suggest the general idea of portfolio value-maximization is worthy of attention.

⁵⁷ 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.

⁵⁸ We are indebted to Ralph Winter for phrasing this point as "value-maximizing behavior as an inefficient outcome of a free-rider problem."

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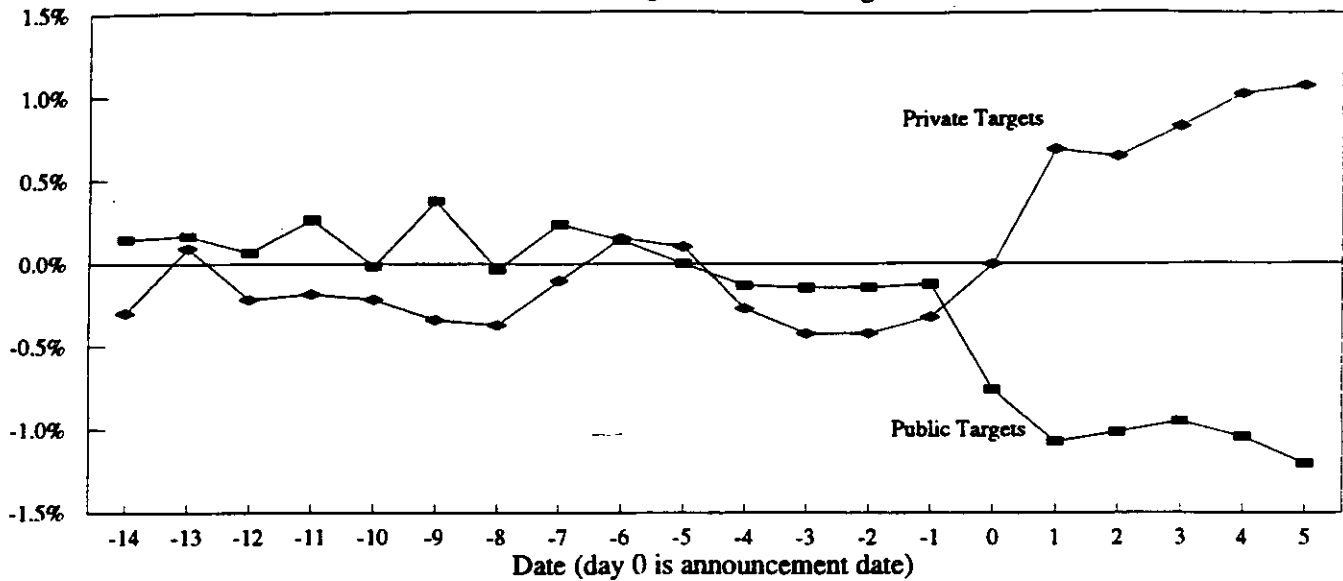
Table 2: Separating Institutional Cross Ownership of Computer Industry Stocks by Horizontally and Vertically Related Sets of Firms: Institutions with Greater than \$100 Million in Assets

	Percent of Stock held by Institutions Which are Simultaneously Holding Stock in All the Two or Three Companies in a Group (in percent)	Market Value of Stock held by Institutions Which 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	

Data Sources: The data is from CDA/Spectrum, where the data for institutional holdings is for the date ending on December 31, 1994.

Acquirers' Cumulative Excess Returns

Public Targets vs Private Targets



Acquirers' Daily Excess Returns

Public Targets vs Private Targets

