Inside vs Outside Ownership*

A Political Theory of the Firm

Holger M Müller† Karl Wärneryd‡

April 23, 2001

Abstract

If contracting within the firm is incomplete, managers will expend resources on trying to appropriate a share of the surplus that is generated. We show that outside ownership may alleviate the deadweight losses associated with such costly distributional conflict, even if all it does is add another level of conflict. In case managers have to be provided with incentives to make firm-specific investments, there is a tradeoff between minimizing conflict costs and maximizing output. This suggests, among other things, an explanation of why some firms are organized as partnerships and others as stock corporations. *Journal of Economic Literature* Classification Numbers: D23, D74, G32, G34, L22. Keywords: Outside ownership, conflict, incomplete contracts, property rights, theory of the firm.

*Forthcoming in the *RAND Journal of Economics*. This paper has benefited from comments and suggestions by Guido Friebel, Roger Gordon, Bengt Holmström, Roman Inderst, Christian Laux, Paul Milgrom, Kay Mitusch, Stergios Skaperdas, Luigi Zingales, seminar participants at UC Irvine and at the Universities of Berlin (FU), Lund, and Mannheim, two anonymous referees, and, in particular, Joe Harrington. Financial support from Deutsche Forschungsgemeinschaft, Sonderforschungsbereich 504 (Müller), and the Bank of Sweden Tercentenary Foundation (Wärneryd) is gratefully acknowledged.

†Department of Economics, University of Mannheim, A5, D—68131 Mannheim, Germany. Email: `hmueller@pool.uni-mannheim.de`. URL: `http://www.vwl.uni-mannheim.de/hellwig/holger`.

‡Department of Economics, Stockholm School of Economics, Box 6501, S—113 83 Stockholm, Sweden. Email: `Karl.Warneryd@hhs.se`.

[C]ovenants, without the sword, are but words, and of no strength to secure a man at all.

Thomas Hobbes, *Leviathan.*

1 Introduction

Suppose a group of agents by making a joint effort could produce something of value. Much of economic theory is based on the idea that such potential gains from trade would be fully exploited. Implicitly, we assume the existence of institutions that ensure the cooperation of all parties involved, such as complete contracts and their enforcement by a legal system. But in reality contracts are incomplete and courts less than omniscient, and any *ex ante* agreement, such as on how to split the surplus resulting from a joint activity, is subject to opportunistic behavior *ex post*. In this paper, we argue that outside ownership of firms may be an institution that fills in the gaps left by imperfect formal enforcement.

Consider the costs that arise from imperfect enforcement. In a joint undertaking, such as a partnership or cooperative, individuals may be able to divert part of the jointly produced surplus for their own uses. A partner may use company money to finance private activities, but claim that the money was used for business purposes. Preparing to support such a claim before a court or an arbitrator, the partner may manipulate documents and accounting information, and hire lawyers or expert witnesses. Since the court has no information about the case apart from what is presented by the parties, the outcome depends partly on strategic, costly decisions by the parties themselves. Hence relying on courts to enforce contracts may in fact exarcerbate rather than reduce the total costs of conflict in a business transaction.

The legal literature contains many cases concerning individuals in partnerships engaging in self-dealing or fraud at the expense of their co-partners. Banks [2] cites, e.g., *Bentley v. Craven*, in which a partner had been employed to purchase sugar on the firm's behalf. Without the knowledge of his co-partners he supplied the firm with sugar previously purchased on his own account at a favorable price, for which he charged the firm the full market value. Similarly, in *Dunne v. English*, the plaintiff and the defendant, both partners in the same firm, agreed to buy a mine for £50,000 with a view toward reselling it later at a profit. It was ultimately arranged that the defendant would sell the mine to a third party for £60,000, and that the plaintiff and the defendant would divide the resulting profit of £10,000. As it happened, the defendant sold the mine for a sum far in excess of £60,000, claiming that the price was only £60,000.

A second, perhaps not as obvious, cost of imperfect enforcement arises since an agent may

have to invest effort also in guarding his share of surplus against the first, appropriative type of activity on the part of others. As noted by Tullock [19], the social costs of theft are not just the resources diverted from productive activity into burglary, but also those used to put locks on doors.

To the extent that they involve costly time and effort, both types of activity are wasteful, since they only serve to reallocate income. Using an established term, we shall refer to such behavior as *rent-seeking*.[1]

Thomas Hobbes famously suggested that, but for the institution of government, all of society would be engaged in a wasteful war of every man against every man. Only by giving up their natural liberties to the Sovereign, who would then become a more fearsome threat, would citizens avoid internal conflict. Similarly, by selling the firm to outsiders, the members of a partnership involved in distributional conflict may improve on their situation—even if the only *de facto* right that comes with a share is the right to participate in the fight over the surplus.

There is nothing about outside ownership *per se* that guarantees that the outsiders get anything out of the firm.[2] The insiders in a firm control the accounting machinery. To force the insiders to distribute the produced surplus, the outsiders must first provide evidence that the surplus indeed exists. For instance, they must disentangle book earnings from true earnings. Outside ownership may therefore realistically be viewed as a distributional conflict where the insiders and outsiders fight over the surplus that is generated in the firm by investing costly resources in the covering and uncovering, respectively, of information about the true size of the surplus.

In this paper, we show that outside ownership may reduce total rent-seeking costs even though it adds another level of conflict. In equilibrium, the outsiders extract at least part of the firm's surplus. With less surplus left in the firm to fight about, less resources are wasted by the insiders in the subsequent internal distributional conflict. The outsiders take on the role of a "common enemy," forcing insiders to lower the amount spent on internal conflict. Of course, against this beneficial effect must be counted the extra resources now spent in the conflict between insiders and outsiders. We show that the net effect may well be positive.[3]

[1] Alternative expressions are *safeguarding activities* (Williamson [24]), *influence activities* (Milgrom [13]), and *power-seeking activities* (Rajan and Zingales [15]).

[2] Indeed, the notion that managers are reluctant to pay out funds to investors is a fundamental motivation for the recent literature on corporate governance. See Shleifer and Vishny [16] for a survey.

[3] Wärneryd [22] uses a related effect to explain federalist structures of jurisdictional interaction.

The distributional conflict perspective therefore provides a rationale for outside owners who provide no productive input—indeed, in our model they only waste resources—or risk-sharing function, who perform no monitoring (in contrast with Alchian and Demsetz [1]), do not break the balanced-budget constraint (in contrast with Holmström [9]), and do not control important physical assets (in contrast with Grossman and Hart [6] and Hart and Moore [7]).

Since, in general, there will be less of the surplus left in the firm with outsiders taking part of it, insiders will face dulled incentives to make incontractible firm-specific (e.g., human capital) investments relative to the partnership model. Hence there may be a tradeoff between minimizing the cost of distributional conflict and maximizing surplus. This suggests an explanation of why many partnerships, such as law firms, medical practices, and accounting agencies, are found in areas where human capital investments are important. It also provides a possible explanation of why some firms that start out as partnerships or closed corporations eventually go public. Initially, marginal returns to firm-specific investments are typically high, implying that for incentive reasons inside ownership is the optimal ownership arrangement. With decreasing marginal returns to investment, however, there may come a time when the most profitable investment opportunities have been exhausted. At this point, reducing rent-seeking costs may be more important than promoting firm-specific investments, and going public may become optimal.

Our paper is related to, but differs in its focus from, some recent contributions on cooperatives. Both Hart and Moore [8] and Kremer [12] study the choice between inside and outside ownership. Hart and Moore focus on price and quality decisions in consumer cooperatives. Kremer discusses why egalitarian sharing rules are often found in practice in partnerships. In both papers, cooperatives are characterized by the use of voting procedures to make collective decisions. In contrast, we focus on costly decentralized conflict, but find, along with Kremer, that the importance of providing incentives for human capital investments is crucial in determining whether a partnership or outside ownership is optimal.

The rest of the paper is organized as follows. Section 2 examines distributional conflicts in partnerships. We show that introducing outside ownership may lower the total cost of distributional conflict in Section 3. The effect of outside ownership on the incentives for insiders to make firm-specific investments, and the resultant tradeoff, is discussed in Section 4. Section 5 discusses the relation between our approach and other theories of the firm, and concludes.

2 Partnerships

We consider a group of m agents (to be called *managers*) who by joining forces can potentially carry out a profitable project, if they can agree beforehand on the forms for doing this. We assume no binding contracts can be costlessly written, and that any value produced in the firm is subject to costly distributional conflict. Ultimately, we shall be interested in the constitutional question of which organizational structure maximizes the expected value of the original m managers, without the unanimous agreement of which the firm cannot be formed.

In this section, we consider the option of organizing the firm as a partnership. Under this arrangement, we shall therefore sometimes refer to the managers as *partners*.

The production activity of the firm gives rise to a surplus Y given by

$$Y := (1-\theta)\,\bar{y} + \theta \sum_{i=1}^{m} e_i,$$

where $\bar{y}$ is a constant, e_i is the firm-specific (human capital) investment of manager i, and $\theta \in [0,1]$ is a parameter that measures the importance of managerial investments for the value of output. For now, we shall assume that we have $\theta = 0$, i.e., that output is independent of firm-specific investments. We discuss the case where firm-specific investments matter in Section 4.

We assume that contractual incompleteness within the firm gives rise to a costly distributional conflict between the partners over the produced surplus. As we argue in the introduction, this may be because

1. a partner may divert part of the surplus to finance private activities, claiming that the money is used for business purposes, and

2. a partner may have to take action to safeguard his share against the appropriative activities of others.

To potentially support his claim before a court or arbitrator, partner i may invest costly resources (e.g., time and effort) of value r_i in the production of favorable evidence. We shall assume that the greater is a partner's rent-seeking effort relative to the sum total of such efforts, the greater is the share of the surplus that he can appropriate.

In particular, we assume partner i's share of the surplus is

$$\alpha_i := \begin{cases} r_i/R & \text{if } R > 0 \\ 1/m & \text{otherwise,} \end{cases}$$

where $R := \sum_j r_j$.[4]

For simplicity, we assume the managers are risk-neutral and that the disutility of expending r_i is simply r_i. Then partner i's utility is

$$u_i := \alpha_i Y - r_i.$$

We can now look for an equilibrium in rent-seeking expenditures. Clearly, there is no equilibrium such that nobody makes a positive expenditure, since an individual partner could then get the entire surplus by expending an arbitrarily small amount. The optimal rent-seeking expenditure of partner i, given the expenditure of everyone else, is therefore determined by his first order condition

$$\frac{\partial u_i}{\partial r_i} = \frac{R - r_i}{R^2} Y - 1 = 0.$$

This condition implies that in the unique equilibrium, rent-seeking expenditures are the same for all partners. Let $r(m, W)$ be the common equilibrium expenditure in a contest with m participants and a prize of value W. Then in the partnership model individual equilibrium expenditures are

$$r(m, Y) = \frac{m-1}{m^2} Y.$$

Hence total equilibrium rent-seeking expenditures are

$$R_I := m r(m, Y) = \frac{m-1}{m} Y.$$

and each partner receives the share

$$\alpha_i = \alpha := \frac{1}{m}$$

of surplus.

Equilibrium utilities may be expressed as fractions of the surplus Y. Defining

$$\delta_I := \frac{1}{m^2},$$

partner i's surplus share *net* of rent-seeking expenditures, his equilibrium utility under inside ownership is

$$\alpha Y - r = \delta_I Y.$$

[4]This particular *contest success function* was introduced by Tullock [20, 21] for the analysis of court proceedings and rent-seeking contests. There is now a vast literature on contest models. For example, Fullerton and McAfee [5] use the same success function, derived from more primitive assumptions, to discuss research contests. Skaperdas [18] axiomatizes it. Baye, Kovenock, and de Vries [3] use the related success function where the highest bidder wins with certainty to study lobbying. For more general discussions of models of conflict of this nature, see, e.g., Skaperdas [17], Dixit [4], and Nitzan [14].

Since everybody spends the same amount in equilibrium, the end result of the distributional conflict is the same division of surplus as if contracting were complete and the partners agreed to an egalitarian sharing rule. The resources spent on rent-seeking are wasted. The partners are trapped in a Prisoners' Dilemma-like situation of escalated rent-seeking. A repeated, long-term interaction might offer the possibility of sustaining a more cooperative outcome, but in the following we shall instead explore the effect of changes in the firm's ownership structure.

3 Outside Ownership

Suppose the partners sell the firm to one or more outsiders. We henceforth refer to the partners as *insiders*. Being the owners, the outsiders have a legal claim to the surplus that is generated. Since the insiders have control over the accounting machinery, this claim is generally worthless unless the owners can prove before a court that a surplus indeed exists. Even though accounting rules and laws potentially constrain what the insiders can do, such rules do not enforce themselves. An outsider may have to take costly action to initiate the enforcement of his claim.[5] Hence we may think of outside ownership as a distributional conflict between the insiders and outsiders, where the parties take costly actions in covering and uncovering, respectively, information about the true size of the surplus. As with the partnership, it is still the case that the insiders must fight against each other over what is left in the firm, but under outside ownership they must also fight as a collective against the outside owners.

That is, we assume that what distinguishes insiders from outsiders is that the former are in control of the surplus when it arrives. Any value generated in the firm first appears within the firm's walls, so to speak, and all of it remains there unless the outsiders take measures to acquire some of it.[6] This naturally gives rise to a two-level procedure for distributional conflict. At the top level, the insiders fight against the outsiders (if any) to retain as much as possible of the surplus within the firm. At the lower level, the insiders fight among themselves over whatever has been retained in the firm.

[5] A referee points out that a problem for outside investors (most notably in, e.g., the former Soviet Union) may be that the insiders can strip the firm of everything before there is time to do anything about it. Our basic assumption is that enough of a legal order (or equivalent private means of enforcement) is in place that outsiders by taking costly measures can guarantee themselves a share of the surplus.

[6] Assuming that there is also a costlessly verifiable, noncontestable part of the surplus that accrues automatically to the outsiders does not change anything in our analysis, which then pertains only to the contestable part of surplus.

Whether we think of the rent-seeking investments at the different levels as taking place simultaneously or sequentially shall make no difference since we abstract from any resource constraints. The equilibrium conditions will look the same under either interpretation. For concreteness, and for a setting in which a time order seems natural, consider the example of a consulting or law firm. Since its mandates and its fee structure may be well known, it may not be difficult for outsiders to reconstruct the firm's revenue. Any direct appropriation of this revenue by the insiders can therefore easily be punished. It may be more difficult, however, to document the firm's cost, including overhead cost and actual working hours by the insiders, and its investment needs. The insiders can therefore inflate the true cost and overstate investment needs. Hence the conflict between the insiders and outsiders takes place not in the form of a fight over the firm's revenue, which may be verifiable, but in the parties collecting or defending claims against this revenue. Once this issue is settled, in or out of court, the insiders are left to fight among themselves over whatever they managed to retain from the conflict with the outsiders.

We shall show that with the optimal number of outside owners, the total deadweight loss from conflict is in fact reduced relative to the partnership model, even though resources are now expended at two levels. In the end, we shall argue that these savings may be internalized by the original insiders if shares are sold to outsiders at competitive rates.

It seems natural to model the higher-level contest between outsiders and insiders analogously with the inside contest, with the single difference that the share retained by the firm is a public good to the managers. Let s_i be the expenditure of manager i in the contest with outsiders and t_j the expenditure of outside owner j, and let S and T be the corresponding aggregate expenditures. We shall assume that the share of surplus remaining in the firm is

$$\beta := \begin{cases} S/(S+T) & \text{if } S+T>0 \\ 1 & \text{otherwise.} \end{cases}$$

When deciding on their individual expenditures in the conflict with the outsiders, the insiders take into account the anticipated equilibrium outcome of the internal conflict. Since βY is what will remain to be fought over inside the firm, each manager expects to ultimately receive $\alpha\beta Y$. Hence insider i's objective function in the conflict with the outsiders is

$$v_i := \alpha\beta Y - r(m, \beta Y) - s_i = \delta_I \beta Y - s_i.$$

We assume the insiders make their expenditure decisions independently in the fight against the outsiders. As before, there is no equilibrium in which no party expends a positive amount on

conflict. (This of course also means that the boundary condition of the success function is irrelevant in equilibrium.) We return to this issue when discussing the incentives of outsiders below. Hence insider i's optimal rent-seeking expenditure, given the rent-seeking expenditures of the outside owners and the other insiders, is given by the first-order condition

$$\frac{\partial v_i}{\partial s_i} = \frac{T}{(S+T)^2}\frac{Y}{m^2} - 1 = 0.$$

Since the surplus share is a public good to the insiders, the first order conditions only determine aggregate insider expenditure. Furthermore, this aggregate effort is suboptimal, since first order conditions for collectively optimal choices would have Y instead of Y/m^2.

Next consider the outsiders. For generality, assume that for any amount Z acquired by the outsiders as a group in the top-level fight against the insiders, each individual outsider gets $\nu(n)Z$, with $\nu(n) \in (0, 1/n]$, $\nu'(n) < 0$, $\lim_{n\to\infty} \nu(n) = 0$, and $\nu(1) = 1$. That is, we assume an aggregate deadweight loss of $(1 - \nu(n)n)Z$ among the outsiders. It appears natural to assume that this loss is zero when there is only a single outsider. We can now consider the cases where the outsiders fight among themselves in exactly the same manner as the insiders (in which case we have $\nu(n) = 1/n^2$) and where proceeds from the top-level conflict are paid out as well-defined dividends (in which case we have $\nu(n) = 1/n$), among others.

The utility of outsider i from the viewpoint of the top-level fight is then

$$w_i := \nu(n)\,(1-\beta)\,Y - t_i.$$

We assume the outsiders make their expenditure decisions noncooperatively. Suppose the insiders expend nothing in the top-level conflict. Then any outsider can increase his expected payoff by expending an arbitrarily small amount. Hence there is no equilibrium in which some party expends zero. The relevant condition for outsider i's optimal choice is therefore the first-order condition

$$\frac{\partial w_i}{\partial t_i} = \frac{S}{(S+T)^2}\nu(n)Y - 1 = 0.$$

Again, we note that these first-order conditions only determine aggregate rent-seeking expenditures. Hence there is a continuum of equilibria, all involving the same aggregate expenditures from the respective groups. We focus on within-group symmetric equilibria. That is, we shall assume all insiders make the same equilibrium expenditure s, and all outsiders make the same equilibrium expenditure t. The first-order conditions then reduce to

$$\frac{ms}{(ms+nt)^2}\nu(n)Y - 1 = 0$$

and

$$\frac{nt}{(ms+nt)^2}\frac{Y}{m^2}-1=0.$$

Solving this system of equations for s and t, we have that

$$s=\frac{1}{m\nu(n)\eta^2}Y,$$

where $\eta := (1/\nu(n)) + m^2$, and

$$t=\frac{m^2}{n\eta^2}Y.$$

The equilibrium share of surplus retained in the firm is therefore

$$\beta=\frac{1}{1+\nu(n)m^2}.$$

We note that the share retained in the firm is a strictly increasing function of the number of outside owners, and that β approaches 1 as the number of outsiders approaches infinity. Intuitively, since monitoring the insiders is a public good, total resources expended by the outsiders in the distributional conflict with the insiders become less as the number of outsiders increases.

Insider i's equilibrium *ex post* utility under outside ownership is then

$$\frac{1}{m}\frac{1}{\nu(n)\eta}Y-s-r(m,\beta Y)=\delta_O Y,$$

where $\delta_O := (\eta - m)/\nu(n)m^2\eta^2$ is his surplus share *net* of rent-seeking expenditures when both the internal conflict and the conflict with the outsiders are taken into account.

Recall that total rent-seeking expenditures under inside ownership are

$$R_I=\frac{m-1}{m}Y.$$

The total deadweight loss under outside ownership, taking into account the resources expended by the insiders in fighting for individual shares over whatever is left in the firm, is

$$R_O := ms+nt+\frac{m-1}{m}\beta Y+(1-\nu(n)n)(1-\beta)Y=\frac{m(1+\nu(n)+m^2\nu(n)(1-n\nu(n)))-1}{m\nu(n)\eta}Y.$$

For $m>1$ and $n\geq 1$ we then have that

$$R_O<R_I \text{ as } \nu(n)>\frac{m+1}{m^2n}.$$

Since this condition always holds for $n = 1$, total rent-seeking costs can always be made lower under outside ownership than under inside ownership. Hence we have the following result.[7]

Proposition 1 *If output is independent of firm-specific investments, total rent-seeking expenditures under outside ownership with an expenditure-minimizing number of outsiders are strictly lower than under inside ownership.*

While outside ownership entails additional rent-seeking expenditures of $ms + nt$ incurred in the conflict between the insiders and outside owners, and a deadweight loss of $(1 - n\nu(n))Y$ at the outsider stage, it reduces the rent-seeking expenditures incurred in the internal conflict between the insiders by $mr(m, Y)(1 - \beta)$.

Two main effects are at work in generating this phenomenon.

- Under outside ownership with the optimal number of outsiders, part of the surplus is shifted to agents who dissipate less of it.
- There is a free-rider problem among the insiders in the collective conflict with the outsiders.

It is worth considering some robustness issues at this point. Recall that we are ultimately interested in the optimal ownership structure from the point of view of the original insiders. Any reductions in overall deadweight losses can be internalized by the insiders by the selling of shares *ex ante*, as we shall discuss below. Hence we need only consider arrangements that are optimal. For this reason, potential internal conflict and free-riding among outsider groups with more than one member do not affect our conclusions, since we know that total rent-seeking costs are always lower with a single outsider than under inside ownership.

The beneficial effect of outside ownership is reinforced by the fact that the insiders face a free-rider problem in contributing to the contest with the outsiders, implying that only a

[7] We are assuming, of course, that the outsiders own all of the firm. Suppose instead they collectively own some total share $\gamma \in [0, 1]$, equally distributed. Then the share remaining in the firm is $(1 - \gamma) + \gamma\beta$, and that going to outsiders is $\gamma(1 - \beta)$. It is easily seen that manipulating γ is equivalent to manipulating n in its effect on equilibrium conflict expenditure, since increasing γ or reducing n both improve an outsider's incentives in the top-level contest. Without loss of generality, we therefore focus on the case of $\gamma = 1$. The analysis becomes more complicated, however, if we allow the outsiders to hold different numbers of shares. The outsiders then have different valuations of the share of surplus extracted. In general, only the outsider with the highest valuation (i.e., the largest number of shares) will be willing to expend a positive amount on conflict. Since equilibrium utilities then also differ among the outsiders, the determination of share prices becomes less straightforward. We suggest further exploration of these matters as an interesting avenue for future research.

relatively small share of the surplus is retained within the firm. It can be shown, however, that Proposition 1 continues to hold if the fighting against the outsiders is delegated to a single insider and the cost of fighting is split equally between the insiders.

The central force behind our result is therefore the shifting of part of the surplus to a party that has a higher valuation of it. Although it is inconvenient for our purposes to adopt a more general model of conflict, since we need to be able to compare indirect utilities in order to rank ownership structures, this effect of asymmetric valuations is likely to hold under fairly general conditions.

Now note that

$$\lim_{n\to\infty} R_O = \frac{m-1}{m}.$$

As the number of outside owners approaches infinity, total rent-seeking costs under outside ownership approach total rent-seeking costs under inside ownership, and the share of surplus captured by the outsiders approaches zero. Hence from a distributional conflict perspective, a firm with a large number of outside owners (e.g., a widely held stock corporation) is like a closely held firm.

In the following we shall assume that what the outsiders get out of the firm is paid out in the form of well-defined individual dividends, i.e., that we have $\nu(n) = 1/n$. This seems natural if for no other reason than that it is a standard way of remunerating owners in real-world corporations.

Then, differentiating R_O with respect to n shows that total rent-seeking costs under outside ownership are strictly increasing in the number of outside owners. It follows that total rent-seeking costs are minimized by having a single outside owner. As we discuss in the next section, this does not automatically imply that the optimal ownership structure is always to have a single outsider. If managerial human capital investments are important, a relatively larger share of surplus may have to be retained in the firm in order to give managers incentives. One way of accomplishing this is by increasing the number of outsiders, since this exarcerbates the free-rider problem among the outsiders. In particular, since when the number of outsiders increases, the individual return to an increase in the outside share falls, we have that

$$\frac{\partial \delta_O}{\partial n} = \frac{1}{m}\frac{n(m+1)+m^2(m-1)}{\eta^3} > 0.$$

That is, the share of output ultimately consumed by an individual manager is a strictly increasing function of the number of outside owners. Hence inside ownership or outside ownership with more than one owner may be optimal in such a setting. If we have $\theta = 0$, however, i.e., human capital investments play no role, then clearly outside ownership (with a single outsider)

is efficient.

Intuitively, the benefit from having outside owners is that they withdraw part of the surplus from the firm. Since this means there is less left to fight over, this reduces the amount of resources wasted in the internal distributional conflict between the insiders. Having a single outside owner maximizes the amount withdrawn as it overcomes the free-rider problem in monitoring.

If capital markets are perfectly competitive, the insiders can extract the full efficiency gain from selling the firm to outsiders as then the outsiders can be made to pay exactly their (aggregate) net gain

$$(1-\beta)\,Y - nt = \frac{m^2\,(\eta-1)}{\eta^2}Y.$$

As it seems reasonable to assume that membership in the firm is well defined, each partner can sell his share individually on the capital market. This rules out any conflict over the proceeds from transfers of ownership. Accordingly, if all insiders have an equal share in the firm *ex ante,* insider i's *ex ante* utility (which includes the proceeds from the sale of his share in the firm) is

$$\left(\delta_O + \frac{1}{m}\frac{m^2\,(\eta-1)}{\eta^2}\right)Y = \frac{m^3-m+n}{m^2\eta}Y,$$

which, as expected, is strictly greater than his utility $\delta_I Y = Y/m^2$ under inside ownership.

4 Incentives for Firm-Specific Investments

We have seen how introducing outside owners lowers rent-seeking costs in the firm. The benefit from having outsiders is that the outsiders extract part of the firm's surplus. Since there is now less left to fight over within the firm, this reduces the amount of resources wasted in the distributional conflict between the insiders. Even though additional resources are wasted at the new conflict level, in our model the overall effect is positive.

The net effect is not so clear if the insiders have to be provided with incentives to make firm-specific investments at an interim stage (i.e., before the distributional conflicts take place but after shares have been sold). Since managers receive a smaller share of the total surplus when there are outside owners, their incentives to make firm-specific investments are dulled. Hence in choosing an optimal ownership structure, there is a tradeoff between minimizing rent-seeking costs and providing investment incentives. In what follows, we take a step back and consider the determination of these incentives.

Suppose the insiders noncooperatively choose their firm-specific investment levels e_i. The

objective function of insider i is

$$\delta\left((1-\theta)\,\bar{y}+\theta\sum_{i=1}^{m}e_i\right)-c\left(e_i\right),$$

where $\delta \in \{\delta_I, \delta_O\}$ is his net surplus share as determined in the subsequent distributional conflict(s), and c is an increasing, strictly convex function.

There is then a unique equilibrium in which all insiders make the same investment e given by

$$\delta\theta = c'\left(e\right).$$

Since c' is increasing, the noncooperatively selected investment levels are strictly lower than the collectively optimal level $e^\star$ given by

$$\theta = c'(e^\star).$$

This is, of course, an instance of the standard holdup problem discussed by, e.g., Williamson [23, 24], Klein *et al.* [11], and Grossman and Hart [6]. Anticipating that they must share part of the surplus with the other insiders (and possibly also with outsiders), the insiders underinvest. In the present case, this problem is exarcerbated since the sharing takes place through costly conflict, which means that individual shares do not sum up to 1.

Since we have that

$$\frac{\partial e}{\partial \delta} = \frac{\theta}{c''} > 0 \text{ for } \theta > 0$$

equilibrium investments are strictly increasing in the share retained by each manager. (Equilibrium investment for $\theta = 0$ is naturally 0.)

Hence since we have $\delta_O < \delta_I$ for any finite number n of outsiders, the total surplus under outside ownership is strictly lower than under inside ownership. We have already noted that δ_O is increasing in n. In the limit, we have that

$$\lim_{n\to\infty}\delta_O = \delta_I.$$

Thus with respect both to mitigating the costs of distributional conflict and to providing insiders with incentives to make firm-specific investments, a firm with a very large number of outside owners is like a firm with no outside owner at all.

Again, the cost of outside ownership is that it dulls the incentives for insiders to make firm-specific investments, thus leading to a lower surplus. The benefit is that, given whatever surplus has been produced, the total amount of resources wasted in the conflict(s) over the surplus is strictly less than under inside ownership. Trading off the costs and benefits, we can determine an optimal ownership structure.

When deciding whether to sell shares to outsiders or not, the managers consider the value of the firm, i.e., the value of output minus managerial investment and rent-seeking costs, under the different possible arrangements. Under inside ownership, the value of the firm is

$$V_I := \left(1 - \frac{m-1}{m}\right) Y(e(\delta_I)) - mc(e(\delta_I)).$$

Under outside ownership with n outsiders, it is

$$V_O := \left(1 - \frac{m-n+mn}{m\eta}\right) Y(e(\delta_O)) - mc(e(\delta_O)).$$

Assume we have $\theta > 0$ and, as a first step, consider the problem of selecting the optimal number of outsiders given outside ownership. Since V_O is not necessarily a concave function of n, the optimum is not readily characterized.

It is easily seen, however, that the optimal number of outsiders may be greater than 1. Suppose there was a single outsider. As we have already seen, this corresponds to minimal total rent-seeking costs. However, since the share of each individual manager under outside ownership is strictly lower than under inside ownership, managers have less incentive to invest in human capital than under inside ownership, and hence the value of output is lower. Adding more outsiders will i) increase each manager's net surplus share δ_O, leading to more output as managers' incentives improve, but ii) increase total rent-seeking costs. The net effect may be positive. Hence the optimal number of outsiders may be greater than one.

The complete problem consists of comparing the net value of the firm under inside ownership with that under outside ownership with the *optimal* number of outsiders. In the following, we present a specific numerical example with quadratic cost function. This example has the property that there is a threshold value of θ such that for all values of θ below the threshold, outside ownership is optimal, and for all values above the threshold, inside ownership is optimal. This reflects the basic intuition that outside ownership may not be desirable if firm-specific investments are important.

Suppose we have $c(e_i) = e_i^2/2$, $m = 2$ and $\overline{y} = .025$. To evaluate whether inside ownership or outside ownership is optimal, we consider the difference in net firm values $V_O - V_I$. The net firm value under inside ownership is

$$V_I = \frac{1-\theta}{80} + \theta e(\delta_I) - (e(\delta_I))^2,$$

and the net firm value under outside ownership is

$$V_O = \left(\frac{1-\theta}{80} + \theta e(\delta_O)\right) \frac{n+6}{n+4} - (e(\delta_O))^2.$$

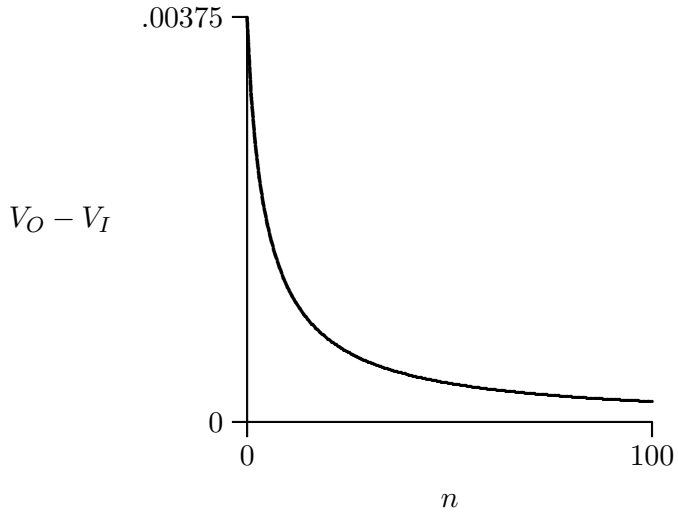

Figure 1: $\theta = .1$.

Given the cost function $c(e) = e^2/2$, equilibrium effort is determined by the first-order condition

$$\theta\delta = e.$$

Hence we obtain

$$V_O - V_I = \frac{1-\theta}{40(4+n)} - \theta^2 \frac{n^3 + 29n^2 + 144n + 192}{4(4+n)^4}.$$

Figures 1–4 show the graph of $V_O - V_I$ for different values of θ. As expected, in all the examples the difference $V_O - V_I$ converges to zero as n approaches infinity.

In Figure 1, where we have $\theta = .1$, the difference $V_O - V_I$ is positive and strictly decreasing for all $n \geq 1$, implying that outside ownership with a single owner is the optimal ownership structure.

Increasing θ to .16, as in Figure 2, we find that outside ownership is still the dominant ownership structure, but the optimal number of outside owners is strictly greater than 1. At $\theta = .16$ the optimal number of outside owners is $n \approx 6$. Intuitively, as firm-specific investments become more important, enlarging the number of outside owners, thereby reducing the share of the surplus that is withdrawn from the firm, is desirable.

In Figure 3, where we have further increased θ to .2, there is a threshold $\overline{n} > 1$ such that the difference $V_O - V_I$ is positive for all $n \geq \overline{n}$ and negative for all $n < \overline{n}$. Hence the optimal number of outside owners is again strictly greater than 1.

At $\theta = .3$, as in Figure 4, inside ownership dominates outside ownership for all $n \geq 1$. Here, firm-specific investments are so important that merely enlarging the number of outside owners

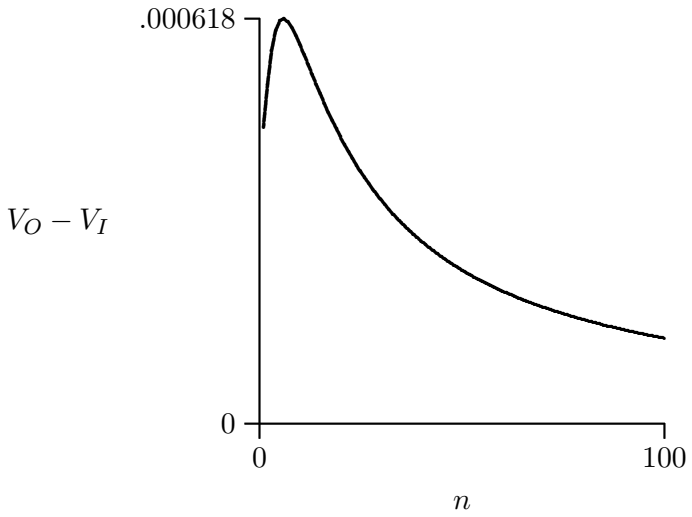

Figure 2: $\theta = .16$.

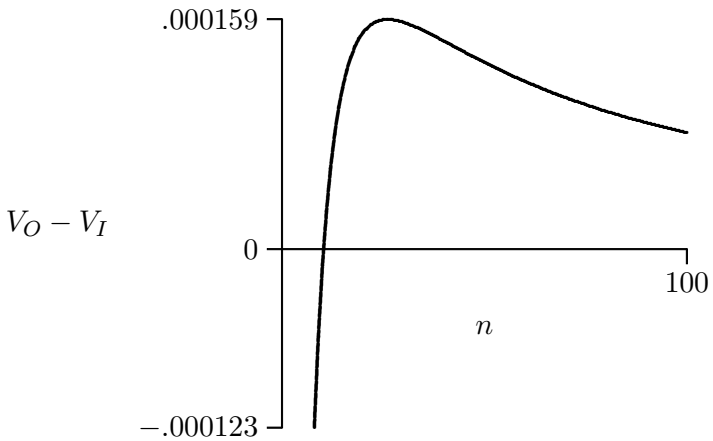

Figure 3: $\theta = .2$.

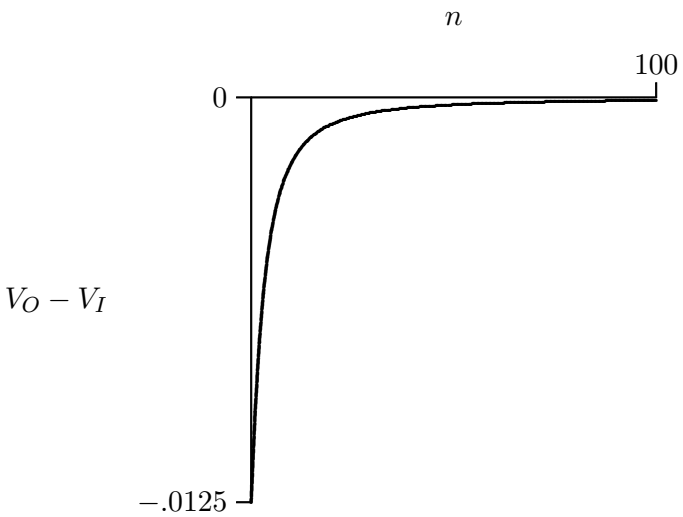

Figure 4: $\theta = .3$.

θ	m				
	2	5	20	100	500
0.0	1	1	1	1	1
0.1	1	1	1	1	1
0.2	26	1	1	1	1
0.3	0	1	1	1	1
0.4	0	16	1	1	1
0.5	0	27	1	1	1
0.6	0	35	128	1	1
0.7	0	40	239	1	1
0.8	0	44	331	1254	1
0.9	0	46	402	5405	1
1.0	0	48	456	10256	251255

Table 1: Approximate optimal numbers of outside owners.

is not enough to provide the insiders with sufficient incentives to invest. The optimal ownership arrangement is therefore to have no outside owner at all.

Table 1 shows the optimal numbers of outside owners of the firm, rounded to integers, for a variety of values of m and θ. That inside ownership is never optimal for $m > 2$ under these conditions is an artifact of our chosen cost function. In general, there will be some threshold number of insiders such that if there are more, outside ownership is always optimal.

From a dynamic perspective, our examples suggest why firms may over time go from being partnerships to being corporations, a not uncommon phenomenon. Firm-specific investments by founders may have an especially important role to play at the outset of a project. Hence it may be efficient to provide the members of the firm with relatively powerful incentives. Later on,

such investment opportunities may become exhausted. At this point, the objective of minimizing rent-seeking costs through outside ownership may become dominant.

5 The Theory of the Firm

Why are some firms owned by insiders (e.g., partners) and others by outsiders not involved in the firm's business? The received literature on this fundamental question focuses mainly on the problem of providing the participants in a firm with the right incentives for productive activities.

Alchian and Demsetz [1] argue that in partnerships, free-rider problems lead to an under-supply of productive inputs. In view of this problem, it may be optimal to bring in a third party to monitor the activities of the insiders. To provide this outsider with the correct incentives, he should be entitled to the firm's residual income, which makes him effectively the firm's owner.

Alternatively, the insiders could write an incentive contract, which, if designed appropriately, induces each agent to supply the efficient amount of effort. Such an incentive contract, however, requires bonuses and penalties that occasionally deviate from the produced surplus. As a solution, Holmström [9] suggests that the firm hire an outsider whose only role is to break the budget-balancing constraint. As with Alchian and Demsetz, outside ownership in this theory entails only benefits, no costs.

More recently, Grossman and Hart [6] and Hart and Moore [7] emphasize the costs and benefits of ownership of indispensable physical assets in providing incentives for one party while diminishing the incentives for another party. There is no meaningful distinction between inside and outside ownership in terms of this theory, however.

In contrast, the present paper addresses the question of inside versus outside ownership in a setting where contractual incompleteness in firms leads to costly distributional conflicts over the produced surplus. We show that outside ownership may ameliorate the cost of such conflict even though it adds a second conflict where the outsiders fight against the insiders. In this conflict, the insiders invest costly resources in, for example, the manipulation of accounting data, claiming that the surplus is low, whereas the outsiders as the legal claimants to the firm's surplus invest resources in proving the contrary. In equilibrium, the outsiders always manage to extract at least part of the surplus, implying that less resources are wasted in the subsequent distributional conflict between the insiders. Hence the owners of a firm may play a role similar to Hobbes's Leviathan in presenting the insiders with an outside threat or common enemy sufficient to lessen their internal squabblings.

In our analysis, outside ownership plays a role much like that of debt in the literature on free cash flow (e.g., Jensen [10]). There, debt is used to force managers to pay out funds, thereby reducing the amount of funds invested in negative net present value projects. In our model, it makes no difference whether the insiders take on debt or sell the firm to outsiders. As the insiders are generally reluctant to pay out funds, they will default on repaying the debt, implying that the debtholders effectively become the firm's new outside owners. In the same fashion as the outside owners in our model, the former debtholders must then engage in a contest with the insiders over the distribution of the surplus.

References

[1] Armen A Alchian and Harold Demsetz. Production, information costs, and economic organization. *American Economic Review*, 62:777–795, 1972.

[2] R C I'Anson Banks. *Lindley & Banks on Partnership*. Sweet & Maxwell, London, 1995.

[3] Michael R Baye, Dan Kovenock, and Casper G de Vries. Rigging the lobbying process: An application of the all-pay auction. *American Economic Review*, 83:289–294, 1993.

[4] Avinash Dixit. Strategic behavior in contests. *American Economic Review*, 77:891–898, 1987.

[5] Richard L Fullerton and R Preston McAfee. Auctioning entry into tournaments. *Journal of Political Economy*, 107:573–605, 1999.

[6] Sanford Grossman and Oliver Hart. The costs and benefits of ownership: A theory of vertical and lateral integration. *Journal of Political Economy*, 94:691–719, 1986.

[7] Oliver Hart and John Moore. Property rights and the nature of the firm. *Journal of Political Economy*, 98:1119–1158, 1990.

[8] Oliver Hart and John Moore. Cooperatives vs outside ownership. NBER Working Paper 6421, 1998.

[9] Bengt Holmström. Moral hazard in teams. *Bell Journal of Economics*, 13:324–340, 1982.

[10] Michael C Jensen. Agency costs of free cash flow, corporate finance, and takeovers. *American Economic Review*, 76:323–329, 1986.

[11] Benjamin Klein, Robert G Crawford, and Armen A Alchian. Vertical integration, appropriable rents, and the competitive contracting process. *Journal of Law and Economics*, 21:297–326, 1978.

[12] Michael Kremer. Worker cooperatives as economic democracies. Working paper, MIT, 1998.

[13] Paul R Milgrom. Employment contracts, influence activities, and efficient organization design. *Journal of Political Economy*, 96:42–60, 1988.

[14] Shmuel Nitzan. Modelling rent-seeking contests. *European Journal of Political Economy*, 10:41–60, 1994.

[15] Raghuram G Rajan and Luigi Zingales. The tyranny of inequality. *Journal of Public Economics*, 76:521–558, 2000.

[16] Andrei Shleifer and Robert W Vishny. A survey of corporate governance. *Journal of Finance*, LII:737–783, 1997.

[17] Stergios Skaperdas. Cooperation, conflict, and power in the absence of property rights. *American Economic Review*, 82:720–739, 1992.

[18] Stergios Skaperdas. Contest success functions. *Economic Theory*, 7:283–290, 1996.

[19] Gordon Tullock. The welfare costs of tariffs, monopolies, and theft. *Western Economic Journal*, 5:224–232, 1967.

[20] Gordon Tullock. On the efficient organization of trials. *Kyklos*, 28:745–762, 1975.

[21] Gordon Tullock. Efficient rent seeking. In James M Buchanan, Robert D Tollison, and Gordon Tullock, editors, *Toward a Theory of the Rent-Seeking Society*, pages 269–282. Texas A&M University Press, College Station, Texas, 1980.

[22] Karl Wärneryd. Distributional conflict and jurisdictional organization. *Journal of Public Economics*, 69:435–450, 1998.

[23] Oliver E Williamson. *Markets and Hierarchies: Analysis and Antitrust Implications*. The Free Press, New York, 1975.

[24] Oliver E Williamson. *The Economic Institutions of Capitalism*. Free Press, New York, 1985.