Institut for Nationaløkonomi

Handelshøjskolen i København

Working paper 15-2000

AN ECONOMIC ANALYSIS OF INVESTOR PROTECTION IN CORPORATIONS WITH CONCENTRATED OWNERSHIP

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December 2000.

Abstract

We provide a theoretical analysis of the relationship between investor protection and the performance of corporations with concentrated ownership. We present an incomplete contracting model of a corporation with concentrated ownership and apply it to analyze two types of investor protection. First, we analyze the cost and benefits of imposing super-majority requirements on certain important policy issues in the corporation. Second, we analyze why it can be in the interest of the corporation to impose restrictions on the free transferability of shares.

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1 Introduction

A central issue in the corporate governance literature during the last twenty years has been the connection between the degree of agency problems and the performance of corporations. The size of an agency problem is closely related to the ability of owners to protect their investment. In particular, this has been emphasized in the so called incomplete contracting literature (e.g. Hart 1995), which focuses on the consequences of agents not being able to write complete contracts on all possible future contingencies. Obviously, in a world of incomplete contracts it is important to understand how investors' share holdings can be protected either through a corporation's charter or through the legal system and how such investor protection affects the performance of a corporation. This is the topic of the present paper.

A recent empirical literature has studied this issue in a global context (see La Porta, Lopez-de-Silanes and Shleifer 1998 and La Porta, Lopez-de-Silanes, Shleifer and Vishny 1998). They have shown various important facts about ownership structures and protection of investors around the world. First, concentrated ownership is common all around the world and is dominating outside the Anglo-Saxian world. Second, there is evidence for the real agency problem in many firms are between different classes of shareholders and not between the management team and the group of owners as the traditional corporate governance literature has focused on. Third, the degree of protection of shareholders in general and minority shareholders in particular varies a lot across countries. Finally, the degree of shareholders protection has real implications for dividend policy and ownership structure.

All these features fits badly with the traditional model in corporate governance of a public traded firm with dispersed and weak owners that are exploited by a powerful and self interested management team. Instead, it may seem more appropriate to analyze how different classes of shareholders form and how some groups of shareholders seize control over the corporation and exploit other groups of shareholders (Shleifer and Vishny 1997).

In the present paper we begin to analyze the link between protection of share holding and the performance of corporations with concentrated ownership. In particular, we are interested in analyzing how protection of minority shareholders can affect the efficiency and the distribution of rent in a corporation. Obviously, investor protection can be delivered in a large number of ways. To structure the analysis we have chosen to focus on two topics: Imposing super-majority requirements on central policy issues in the in the corporation and allowing for free transferability of shares in a corporation. We have picked these two topics because they seem to be very important not only according to the global facts mentioned above, but also in the corporate law literature (see Clark 1986, O'Neal ??, or Easterbrook and Fischel 1991). To our knowledge, this paper is the first formal economic analysis of these issues.

In Section 2 we set up an incomplete contracting model of a corporation with concentrated ownership. It is a simple model where the owners of a corporation hire a self interested manager to run the firm. The manager can be chosen among the owners or be an outside manager with no ownership stake in the firm. The owners can fire the manager if a majority (which size can be stipulated in the corporate charter or by corporate law) wishes to do so. Associated with the manager's actions is a distribution of private benefits to the manager and the owners. Different actions are supported by different groups of owners. Thus, our model endogenize the formation of various classes of owners. The manager's need to be backed by a majority of the owners gives rise to a conflict between the majority and the minority shareholders and the outcome of this conflict is affected by how shareholders are protected.

In Section 3 and 4 we apply the model to analyze the cost and benefits of providing protection to minority shareholders through changing the size of the majority necessary to fire the manager. Allowing groups of minority shareholders a veto right to fire the manager, naturally limits the amount exploitation these minority shareholders can be exposed to. Legal scholars have long argued that there is a trade-off between protecting minority shareholders' investment and the flexibility the management need to run the firm efficiently. For instance, Easterbrook and Fischel notice that "Drafters of the organizing documents of a closely held corporation cannot avoid a trade-off. On the one hand, they must provide some protection to minority investors to ensure that they receive an adequate return on the minority shareholder's investment if the venture succeeds. On the other hand, they cannot give the minority too many rights, for the minority might exercise their rights in opportunistic fashion to divert returns." (Easterbrook and Fischel 1991, p.238.).

In Section 3 we show that imposing super-majority requirements improves efficiency when the manager can take non-contractible actions and there are complete information about the actions taken by the manager. The intuition is that with a super-majority requirement, the manager must have support from more shareholders than under a simple majority rule. This limits the manager's opportunities of pursuing projects that are not in the interest of all the owners. We also argue that none of the owners should object to such an super-majority in the certainty case.

We then, in Section 4, introduce uncertainty about the value of the corporation which give rise to a trade-off between protection of minority shareholders and the likelihood of costly deadlocks, defined as situations where owners decide to replace the manager. We show that uncertainty can increase the payoff to the majority shareholders in the absence of a super-majority rule. Hence, providing veto rights to a group of minority shareholders may be resisted by the management and the existing majority shareholders both because it may decrease efficiency and because it decreases the rent theses agents can obtain from the firm. In short, we establish the trade-off described in the legal literature, but only in the case of uncertainty.

Section 5 analyzes the consequences of restricting shareholders right to resale their shares. From a first glance it could be argued that allowing exploited minority shareholders to opt out of the corporation limits the amount these shareholders can be exploited and, thus, increases efficiency. However, this argument is flawed, because the balance of power in the corporation, i.e. the distribution of majority and minority shareholders, is endogenous.

For instance, we show, that allowing shareholders to sell cash flow without selling votes alters the balance of power in the corporation, such that the new group of majority shareholders has a tendency to concentrate votes but not cash flows. This decrease efficiency in the corporation through increasing the amount of share holding that can be exploited. This argument explains why most close corporations have rules restricting the transferability of shares. Clark (1986), referring to close corporations, observes: "Shareholders ... will usually want to restrict the transferability of their shares. ... Sometimes the continuing shareholders will want the exiting shareholder to sell to the corporation, rather than to any of themselves, in order to *preserve the existing balance of power*' (Clark (1986) p. 763, emphasis added).

Conclusions are drawn in Section 6 and all proofs are delegated to the appendix.

2 The Model

An entrepreneur (also denoted the initial owner or the founder) seeks finance to set up a firm that at a future date yields a potential cash flow of size r. She sells cash flow rights, c, and votes, v, to a number of outside investors.

The timing of the model is as follows,

Date 1 Firm established at cost $\gamma < 1$. Founder sells ownership stakes $\{v_i, c_i\}$, $i \in I = \{1, ..., I\}$, where I is the set of new owners. Define $\mathbf{v} = \{v_i\}_{i \in I}$ and $\mathbf{c} = \{c_i\}_{i \in I}$.

Date 2 A manager, m, is hired. The manager can be one of the owners or an outside manager with no ownership stake in the firm. Define $I_{-m} = I \setminus \{m\}$ ($= I$ if the manager is not an owner) and $I_m = I_{-m} \cup \{m\}$ as the set of owners and management. Having a manager is necessary to create any value in the firm. The manager picks a non-contractible action $a \in A$. Associated with this action is a vector of private benefits, $\{b(a)_i\}_{I_m} r$, to the manager and each of the owners. There is a private effort cost for the manager of choosing action a equal to $(\sum_{i \in I_m} b(a)_i)^2 r$.

Private benefits are received by the agents at date 3 if and only if the manager is still present in the corporation.

Date 2 1/2 The manager can be replaced with an alternative manager at any point after date 2. The alternative manager cannot do anything except from canceling the action chosen by the previous management. It costs kr, $0 \leq k < 1$, to replace the manager and the decision has to be backed by a majority, which size is stipulated in the corporate charter, of the owners.

Date 3 If the manager is not replaced, then the ex post value of the firm, given action a, is $(1-\sum_{i\in I_m} b(a)_i)r$. The ex post value is paid out in dividend to all owners. In addition, the owners and the manager receive their private benefit, $b(a)_i r, i \in I_m$.

If the manager is replaced, the ex post value of the firm is $(1-k)r$ which is paid out in dividend to the owners.

Assumption 1.
Assume A is so large that any non-negative distribution of private benefits is feasible, i.e. the manager chooses $\mathbf{b} \in \mathcal{R}_+^{\#I_m}$.

Assumption 1 implies we can suppress the action, a, and instead assume the manager chooses a distribution of non-contractible private benefits. Define the aggregate level of diversion as $\bar{b} \equiv \sum_{i\in I_m} b_i$.

How is the manager selected? We can distinguish between at least three types of firms: (a) Some firms will need a professional manager with some specific skills the investors do not possess, i.e. these firms hire an outside manager. (b) In many firms the founder will keep on operating the firm after having sold the bulk of the firm to outside owners. (c) In other firms, the new owners will go together and pick a manager among them self. The focus in the present analysis is on how investor protection affects efficiency in corporations and not on how management is elected.[1] We therefore simply assume that the manager is in place at date 2. There are many qualified agents who are able to manage the firm implying that the reservation wage is competed down to zero. If the manager is fired she receives also zero utility from running the firm, but she keeps any ownership stake she possesses.

3 Investor protection when firm value is certain

In this section, we characterize the equilibrium of the model when the firm value, r, is certain and known to all agents. We are interested in the consequences of having different majority requirements on the amount of diversion in the model, on the distribution of private rent among owners and manager, on efficiency and on the probability of having a dead-lock, defined as a situation where the manager is replaced.

Let ν be the amount of votes necessary to replace the manager. For instance $\nu = 50$ pct. is a simple majority rule and $\nu = 10$ pct. means that any group of shareholders that possess at least 10 pct. of the outstanding votes can fire the management. For any set $A \in I_m$, denote $c(A) = \sum_{i \in A} c(A)$ and $v(A) = \sum_{i \in A} v(A)$ as the amount of cash flow (respective votes) that group A possesses. Define $\boldsymbol{\mathcal{S}}(\mathbf{v}, \nu)$ as the family of *strong coalitions* of owners, i.e. the family of sets of owners which support is sufficient to keep the manager in place, i.e. $\sum_{i \in A \cup \{m\}} v_i > 1 - \nu$ pct. $\forall\ A \in \boldsymbol{\mathcal{S}}(\mathbf{v}, \nu)$. A strong coalition is thus an element of $\boldsymbol{\mathcal{S}}(\mathbf{v}, \nu)$. Furthermore, let $\boldsymbol{\mathcal{R}}(\mathbf{v}, \nu) \equiv \{A \in \boldsymbol{\mathcal{S}}(\mathbf{v}, \nu) :$

[1] This is analyzed in our related work on close corporations (see Bennedsen and Wolfenzon 1998). The model presented here can be thought of as an incomplete contracting version of our previous model of a close corporation. The incomplete contracting framework is more suitable to analyze the topic of investor protection and in addition it avoids some of the assumptions of our previous model: first, the action taken by a single manager is a **non-contractible** action who cannot be influenced by anyone. Second, there is no board in the model, only owners and a manager, hence, the particular procedure to select the board (voting rules, number of board members, etc. etc.) is not an issue. Finally, there is not imposed any exogenous distribution rule of the diverted cash flow among the shareholders.

$\neg B \subset A$ and $B \in \boldsymbol{\mathcal{S}}(\mathbf{v}, \nu)\}$ be the family of *relevant strong coalitions*, defined as the subset of strong coalitions which are not strong if any one member of the coalition is removed. Finally, let $\phi_i(b, d) \in \{fire, keep\}$ be owner i's vote on replacement given the manager's action.

Definition 1 (Equilibrium).
$\{\{b, d\}, \{\phi_i\}_{i \in I_{-m}}\}$ is a Subgame Perfect Equilibrium if and only if
1) $\{b, d\}$ maximizes the manager's utility given $\{\phi_i(b, d)\}_{i \in I_{-m}}$.
2)$\phi_i(b, d)$ maximizes owner i's utility given $\{b, d\}$.

Using pure-strategy subgame-perfect equilibrium as our solution concept leaves us with a large number of equilibria. Therefore, we use a cooperative refinement similar to Aumann's (1959) *strong equilibrium.* When voting about firing the manager, we require that no coalition of owners can jointly deviate, and by doing so increase the payoff of each one of them. This is equivalent to assume that each owner vote as if she was pivotal in deciding if the manager should be replaced.

Theorem 1.
1) The manager selects a majority coalition M^* that possesses the following minimum cash flow property,

$$M^* \equiv Arg \min_{A \in \boldsymbol{\mathcal{S}}(\mathbf{v}, \nu)} c(A), \tag{1}$$

2) The distribution of private benefit is given by:

If $k \leq 1 - c_m$:

$$\begin{aligned}
\bar{b} &= \max\{k, 1 - c(M^* \cup \{m\})\}, \\
d &= \min\{1 - k, c(M^* \cup \{m\})\}, \\
b_i &= \max\{0, (1 - k - c(M^* \cup \{m\}))c_i\} \ \forall \ i \in M^*, \\
b_i &= 0 \ \forall \ i \in I_{-m} \setminus M^*, \\
b_m &= \max\{k, (1 - c(M^* \cup \{m\})^2 + kc(M^* \cup \{m\})\}.
\end{aligned}$$

If $k \geq 1 - c_m$:

$$\begin{aligned}
\bar{b} &= 1 - c_m, \\
d &= c_m, \\
b_i &= 0 \ \forall \ i \in I_{-m}, \\
b_m &= 1 - c_m.
\end{aligned}$$

Theorem 1 explains how different classes of owners are formed endogenously. By varying the distribution of private benefits, the manager receives support from different groups of owners. The manager, therefore, chooses actions such that a majority of the owners are satisfied with his performance. Our model starts from distribution of ownership and explain the formation of majority and minority classes of owners, i.e. explains the distribution of power.

In general, there may be many ways to pick such a majority, so among the potential majority groups, the manager picks the coalition with the least amount of cash flow. This provides the manager with the largest set of share holding to exploit. We say that any element of M^* has the smallest cash flow property.

The total amount of diverted cash flow depends on the distribution of ownership and the size of the replacement cost. In Figure 1, we have drawn the aggregate diversion level as a function of k taking ownership distribution as given. When the replacement cost is sufficiently small, the manager internalizes all the cash flow possessed by all the majority owners in the chosen

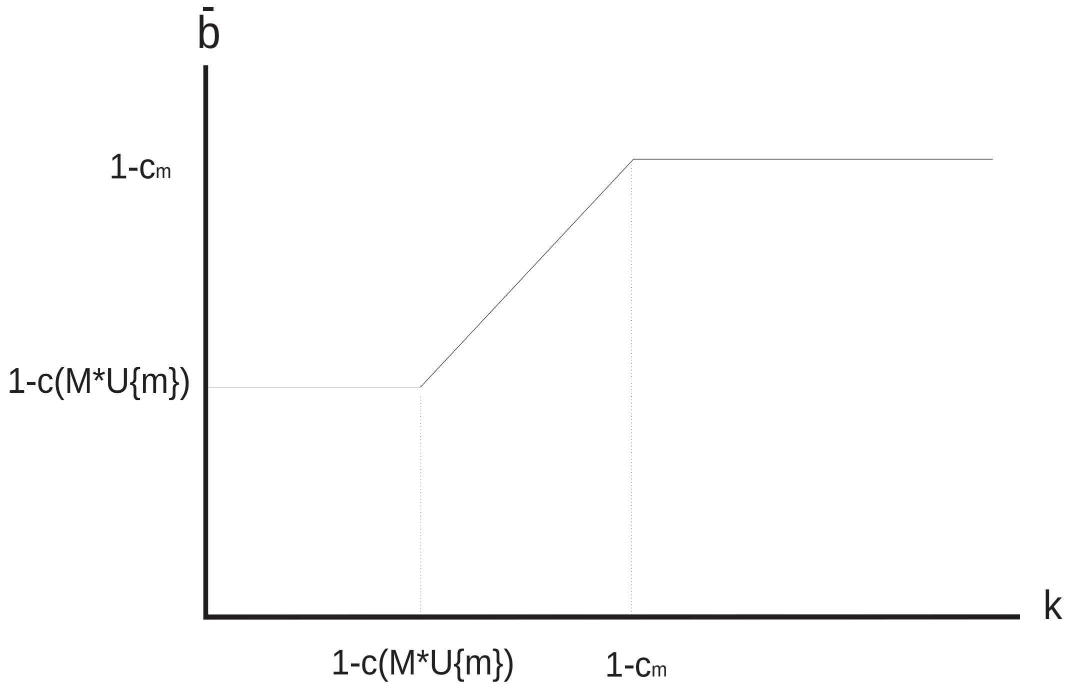

Figure 1: diversion as a function of firing cost.

element of M^*. In this case the manager chooses the optimal diversion level equal to $1 - c(M^* \cup \{m\})$, that is she diverts a share of the total resources in the firm equal to the minority shareholders' share of the cash flow. Hence, the more cash flow possessed by strong groups of owners with the minimum cash flow property, the less rent is diverted and the more efficient is the outcome.

When the firing cost is larger than the minority shareholders' possession of cash flow, i.e. when $k > 1 - c(M^* \cup \{m\})$, the manager is less restricted by the need to compensate the majority owners in order not to be fired. At this level of firing cost, the manager simply just diverts k to herself and does not compensate any of the owners.

Finally, when the manager is an owner herself, i.e. when $c_m > 0$ it is not optimal to steal all the firm even if she is not replaced due to a high replacement cost. Thus, when $k > 1 - c_m$, the manager diverts a share of the total resources equal to the amount of cash flow possessed by all the other owners together. The lower amount of dividend paid out in this model is thus equal to the manager's share of cash flow. The more cash flow the manager possesses the more efficient is the outcome when the replacement cost is high.

The distribution of rent when the firm value is certain is as follows: the majority owner receives what they would have received if they replaced the manager; the minority owners receive only their share of the dividend, which is significantly less than what they would have received, if the manager was replaced; and, finally, the manager receives a strictly positive rent, partly due to the exploitation of the minority shareholders and partly due to the rent she can extract because it is costly to replace her with another manager.

From the perspective of the initial owner, there are potentially three kinds of efficiency costs that can arise in this model. The first is the dead-weight loss from the manager pursuing inefficient activities that benefits herself and the controlling shareholders. The second cost is the amount of private benefit an outside manager extracts for herself, since a wealth constrained outside manager cannot pay up front for this rent. The founder is less concerned about the rent left to the owners, since as long as the demand for shares is sufficiently large, this rent will be reflected in the price the founder receives for the shares at date 1. Finally, there is an replacement cost in the case the owners choose to fire the manager.

Theorem 1 implies that dead-locks never occur for any majority rule when the firm's value is certain. Hence, the first type of efficiency cost is not an issue. However, as we will show in the next section, this efficiency cost may be significant when uncertainty is introduced.

Notice, in the absence of firing costs ($k = 0$) and if the initial owner keeps the firm without selling any votes or cash flow, the manager is forced to choose the efficient action even if the manager is an outside manager. Hence, in this model inefficiency is not a necessary result of the division between management and control. Rather it arises because the presence of a conflict between different classes of owners allowing the management and controlling shareholders to exploit non-controlling shareholders.

Theorem 1 simplifies considerably in the case where there is no firing cost, there is a 50 pct. majority rule and the manager is a wealth constrained outside manager. In this case M^* is a - simple - majority coalition with the minimum cash flow property and,

$$\begin{aligned} \bar{b} &= 1 - c(M^*) \\ d &= c(M^*), \\ b_i &= 1 - c(M^*)c_i \ \forall\ i \in M^*, \\ b_i &= 0 \ \forall\ i \in I \setminus M^*, \\ b_m &= (1 - c(M^*))^2. \end{aligned}$$

This solution is equivalent to the distribution of private benefits in our previous work on close corporations when diversion technology is quadratic (Theorem 1 in Bennedsen and Wolfenzon (1998)). From the minimum cash flow among potential majority coalition property above we proved *the optimality of bundling cash flow to votes according to a one-share-one-vote rule and that the optimal ownership structure has either one large owner or several equal sized owners.* Even though this is not the topic of the present paper, it is worth emphasizing that these results follow directly from Theorem 1 above when $k = 0$, $\nu = 50$ pct. and the $\{v_m, c_m\} = \{0, 0\}$.

We are interested in what the efficiency consequences of improving investor protection through changing the necessary amount of votes to block the manager's work. Theorem 1 implies that improving investor protection this way improves efficiency when the firm value is certain. A smaller ν implies that the manager needs the support of more or bigger owners implying that the amount of cash flow internalized by the majority, and hence by the manager, increases. That is an increase in ν increases $c(A)\ \forall\ A \in M^*$. Since the manager thus internalizes more of the cost of diversion, she now chooses actions that are more efficient. Hence, the trade-off between securing the return on the minority owners investment and the likelihood of triggering a costly dead-lock, which is often described in the legal literature, does not arise under certainty. Imposing super-majority rules increases the return to the minority shareholder without decreasing the return to the majority owners implying that no group of owners have any reason to be against super-majority rules. The only agent worse off is the manager, who naturally will be against such a rule. However, it is worth emphasizing, that these results do not hold when the value of the firm is uncertain, as we show in the next section.

4 Investor protection when firm value is uncertain

In this section we proceed to analyze the consequences of protecting the minority shareholders through imposing super-majority requirements to accept the manager's actions when there is uncertainty about the firms value. In particular, we are interested in analyzing if introduction of uncertainty increases dead-locks in the firm. We define dead-locks as situations where either the manager is replaced in equilibrium with a positive probability or where there does not exist an equilibrium at all.

We assume that the value of the firm is a random variable $\tilde{r}$ which can take two values, $\tilde{r} \in \{\underline{r}, \overline{r}\}, \underline{r} < \overline{r}$, with equal probability. In the previous section it was convenient, when the firm's value were observable to all agents, to express private benefits and dividend in ratios of r. This is not feasible when r is unobservable, hence in this section we express private benefit and dividend in absolute levels using Greek letters β and δ respectively.

We make the following definitions,

$(\beta(r), \delta(r))$ are the state contingent actions of the manager.

$H_i = \{\beta_i, \delta\}$ is the information set of owner $i \neq m$.

$\mu_i(\beta_i, \delta)$ is the posterior belief of owner $i \neq m$ that $r = \overline{r}$.

$E_1 r(\beta_i, d) = (1-\mu_i(\beta_i, \delta))\underline{r}+\mu_i(\beta_i, \delta)\overline{r}$ is owner i's posterior expectation of the firm's value.

$\phi_i(\beta_i, \delta) \in \{fire, keep\}$ is owner i's vote on replacement of the manager.

The correct equilibrium to use is a perfect Baysian equilibrium, defined as

Definition 2 (Equilibrium).
$\{\{\beta(r), \delta(r)\}, \{\mu_i(\beta_i, \delta)\}_{i\in I_{-m}}, \{\phi_i(\beta_i, \delta)\}_{i\in I_{-m}}\}$ is an equilibrium if and only if
1) $\{\beta(r), \delta(r)\}$ maximizes the manager's expected utility given
$\{\{\mu_i(\beta_i, \delta)\}_{i\in I_{-m}}, \{\phi_i(\beta_i, \delta)\}_{i\in I_{-m}}\}$.
2)$\phi_i(\beta_i, \delta)$ maximizes owner i's expected utility given
$\{\{\beta_i, \delta\}, \mu_i(\beta_i, \delta), \{\phi_j\}_{j\in I_{-m}\setminus\{i\}}\}$.
3) $\mu_i(\beta_i, \delta)$ is updated according to Bayes rule for all i.

We analyze the model of the previous section under some simplifying assumptions.

Assumption 2.
1) There is no dead weight loss of diversion.
2) The manager is an outside wealth constrained manager.
3) Ownership is distributed according to a one-share-one-vote assumption.

Part 1) simplifies exposition. Notice, there are still two kinds of efficiency cost left in the model, namely the rent left to the wealth constrained manager and the replacement cost when the manager is fired. Part 2) reduces notation in the following. Part 3) makes life easier and can be motivated by the optimality of one-share-one-vote in the case where there is no firing cost and an outside manager.

We say that the equilibrium is a *separating* equilibrium if it satisfies Definition 2, all agents strategies are pure and if either $\delta(\underline{r}) \neq \delta(\overline{r})$ or $\beta_i(\underline{r}) \neq \beta_i(\overline{r})$ for some $i \in I$. If all agents strategies are pure and $\delta(\underline{r}) = \delta(\overline{r})$ and $\beta_i(\underline{r}) = \beta_i(\overline{r})$ for all $i \in I$, then the equilibrium defined in Definition 2 is denoted a *pooling* equilibrium. Furthermore, for analytical convenience, we solve for a *symmetric* equilibrium, where all owners in a given class are treated equal, i.e. all majority owners (respective all minority owners) receive the same amount of private benefits.

Lemma 1. *The following constraints are necessary conditions for a symmetric pooling equilibrium:*

$$
\begin{aligned}
&(1) \qquad M(\beta,\delta) \in \boldsymbol{\mathcal{R}}(\mathbf{v},\nu),\\
&(2) \qquad \beta_i = 0 \ \forall\ i \in I \setminus M(\beta,\delta),\\
&(3) \qquad \beta_i + \delta c_i \geq (1-k)E_1 r(\beta_i,\delta)c_i \ \forall\ i \in M(\beta,\delta),\\
&(4) \qquad \sum_{i\in I} \beta_i + \delta \leq (1-k)\overline{r},\\
&(5) \qquad \beta_m(\underline{r}) = \underline{r} - \sum_{i\in I} \beta_i - \delta \geq 0.
\end{aligned}
$$

Theorem 2.
1) $\overline{r} \leq \frac{2-(1-k)c(M^*)}{(1-k)c(M^*)}\underline{r}$ *is a necessary and sufficient condition for the existence of a pooling equilibrium.*
2) Necessary conditions for the existence of a separating equilibrium without dead-locks are,

$$
\begin{aligned}
&(a) \quad \textstyle\sum_{i\in I} \beta_i(\overline{r}) + \delta(\overline{r}) = \sum_{i\in I} \beta_i(\underline{r}) + \delta(\underline{r}),\\
&(b) \quad \overline{r} < \tfrac{2-(1-k)c(M^*)}{(1-k)c(M^*)}\underline{r}.
\end{aligned}
$$

The theorem shows that the set of separating equilibria without deadlocks is small and a prober subset of the set of pooling equilibria. The separating equilibria without deadlocks are supported by the owners always believe that the state is good whenever the manager does not take the equilibrium action and the manager in equilibrium is indifferent between the two actions. Thus, we do not want to put to much emphasize on these equilibria.

We proceed by characterizing the set of symmetric pooling equilibria. Lemma 1 tells us that such equilibria does not have deadlocks.

The best symmetric equilibrium for the majority owners are the one where condition (5) in Lemma 2 binds, i.e. where there is zero rent left to the manager in the bad state of the world.

Corollary 1. *The majority owners' prefered equilibrium is given by,*

$$\begin{aligned}
\delta &= 0, \\
\beta_i &= 0 \ \forall \ i \in I \setminus M^*, \\
\beta_i &= \min\{\frac{1}{c(M^*)}\underline{r}; (1-k)\overline{r}\} \ \forall \ i \in M^*, \\
\beta_m(r) &= \begin{cases} \max\{0; (1-(1-k)c(M^*))\underline{r}\} \ \textit{if } r = \underline{r}, \\ \max\{\overline{r}-\underline{r}; (1-(1-k)c(M^*))\overline{r}\} \ \textit{if } r = \overline{r}, \end{cases} \\
\mu_i(\beta_i, \delta) &= \frac{1}{2} \ \forall \ i \in I.
\end{aligned}$$

The best equilibria for the manager is the ones where the majority owner is indifferent between firing the manager or not, i.e. where condition (3) in Lemma 2 binds.

Corollary 2. *The manager's prefered equilibrium is given by,*

$$\begin{aligned}
\delta &= 0, \\
\beta_i &= 0 \ \forall \ i \in I \setminus M^*, \\
\beta_i &= (1-k)E_1 r(\beta_i, \delta) \ \forall \ i \in M^*, \\
\beta_m(r) &= r - (1-k)c(M^*)E_1 r(\beta_i, \delta). \\
\mu_i(\beta_i, \delta) &= \frac{1}{2} \ \forall \ i \in I.
\end{aligned}$$

We have drawn these solutions in Figure 2. The horizontal axis measures the difference in the value of the firm in the two states of the world, which reflects the degree of uncertainty in this model. The vertical axis shows the per share unit amount of rent to each majority owner. Since dividends are zero in the absence of any dead weight loss of diversion, β_i measures the return per share to majority owner i.[2] The area between the solid line and the dashed line constitute the set of symmetric pooling equilibria in the model.

[2] Notice, this is where the one-share-one-vote assumption simplifies the exposition. Alternatively, we could have defined symmetric treatment of majority owners as the same amount of private benefit per unit of cash flow.

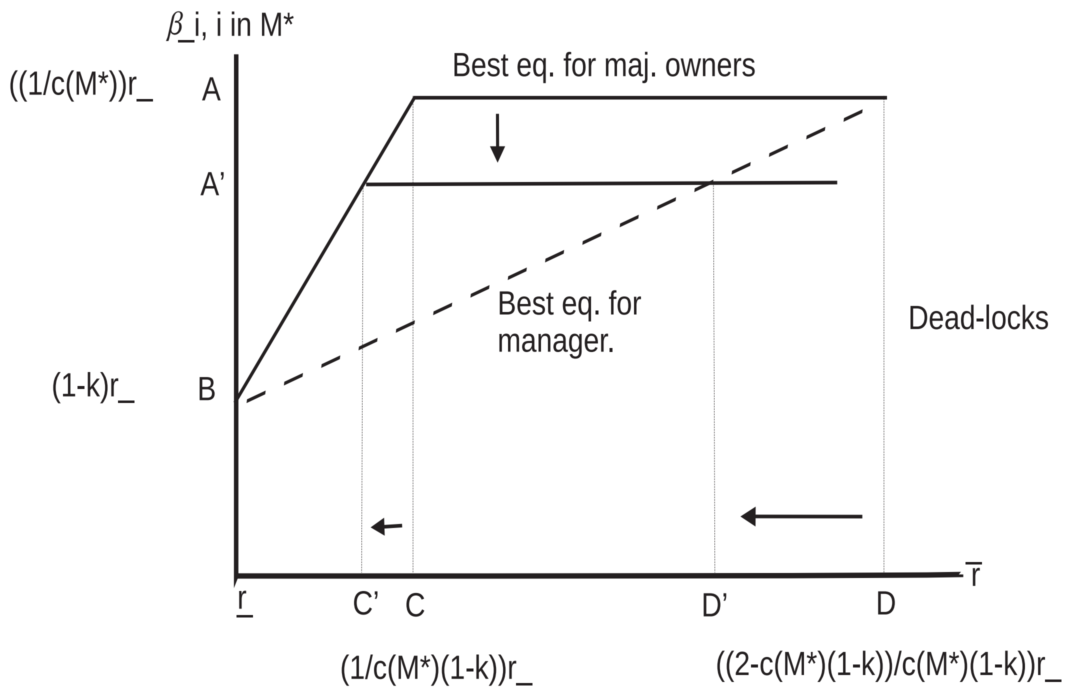

Figure 2: Amount of private benefit for majority owners in the best and worst symmetric pooling equilibrium.

The solid line pictures the equilibrium prefered by the majority owners. The amount of rent to each owner depends on the amount of uncertainty. If $\overline{r}$ is less than C the manager pays out $(1-k)\overline{r}$ in each state of the world implying that the majority owners together receive $v(M^*)(1-k)\overline{r}$. The manager herself receives $\overline{r}-v(M^*)(1-k)\overline{r}$ in the good state and $\underline{r}-v(M^*)(1-k)\overline{r}$ in the bad state. In this case, the majority owners' return is as if there was only a good state in the world. Thus, the manager pays all the cost of having private information, she would be strictly better off if the state of the world was observable, since she would then be able to pay less private benefit out to the majority owners in the bad state of the world. Uncertainty improves efficiency in this equilibrium, since it reduces the rent the manager can extract to herself in the bad state of the world.

At point C, $\underline{r}-c(M^*)(1-k)\overline{r}=0$. Thus the wealth constrained manager cannot pay more out in the bad state of the world. At this point the maximum rent per share in a symmetric equilibrium is achieved. For $\overline{r} \in (C, D)$ the manager pays $\underline{r}$ out to the majority owners in both states of the world. This leaves the manager with more rent in the good state of the firm.

At point D owner i's expected value of the firm is sufficiently high in equilibrium, such that she expects to benefit from firing the manager. Hence, if $\overline{r} > D$ a symmetric pooling equilibrium is not sustainable anymore. Instead one of two types of dead-lock occurs: either there exists a mixed strategy equilibrium where the manager is fired with some positive probability; or, there is no equilibrium at all. In the first case the firm's value decreases because the expected firing cost is strictly positive. In the second case we have the decision vacuum often described in the legal literature (see for example Easterbrook and Fischel 1991).[3]

The dashed line in Figure 2 represents the manager's prefered equilibrium. In this equilibrium the majority owner's per share private benefit is kept down to where she is indifferent between firing the manager or not. Again, this equilibrium is sustainable up to point D, where the manager pays out all the firm's value in the bad state of the world. The expected amount of rent left to the manager is equal to the rent attained by the manager if the state of the world was observable and equal to $\frac{1}{2}\underline{r} + \frac{1}{2}\overline{r}$. Uncertainty, therefore, does not improve nor decrease efficiency in this equilibrium.

In sum, if there is a limited amount of uncertainty, i.e. $\overline{r} < D$, uncertainty as such is not bad for efficiency reason, because it may force the manager with private information to pay out more dividend in the bad state of the world. However, if there is significant uncertainty, i.e. $\overline{r} > D$, it give rise to costly dead-locks in the firm. In this case uncertainty can decrease efficiency.

Figure 2 provides an interesting insight into what happens when the investor protection increases through requirements of super majority by increasing ν. This is illustrated by the arrows in the figure. An increase in ν increases the amount of cash flow internalized by any group of owners with

[3] In the next iteration of the paper we intent to provide a characterization of the mixed strategy equilibria.

the least cash flow property and this has two effects on the set of equilibria.

First, it lowers the maximum rent per share a majority owner receives. This happens because the maximum rent is attained when the manager pays out all the firm's rent in the bad state of the world and this value is not affected by the voting rule. However, since there are now more shares included in the majority, each share receives less rent. This effect is represented by the shift in the solid line from point A to point A'. When there is little uncertainty, i.e. when $\overline{r} < C'$, then increasing the majority requirements increases efficiency without lowering any owner's rent even in the best equilibria for the owners. Therefore, in the limit when the uncertainty disappears, we get the same insight as in the previous section, namely that requiring supermajorities over management replacement increases welfare and increases the return to a group of previous minority shareholders' return, without lowering the return to any other group of shareholders. It is worth emphasizing, however, that the movement from C to C' implies that the maximum level for each owner is attained at a lower level of uncertainty.

The second effect is the reduction in the set of equilibria without dead-locks. This is represented by the shift from point D to D'. A pooling equilibrium requires that the majority owners are over-compensated in the bad state such that the equilibrium compensation is larger than they expect to receive by firing the manager. Hence, in the bad state, the manager uses some of the rent she exploits from the minority shareholder and distribute this to the majority shareholders. When there is an increase in the size of the cash flow hold by any set of owners possessing the minimum cash flow property, there is less share holding left to exploit and, therefore, less rent to distribute among a larger group of majority shareholders. Thus, the resource constraint in the bad state is more binding implying that dead-locks occur for a lower level of uncertainty. In these cases, an increase in the majority requirement lowers welfare, since we move from an equilibrium without dead-locks to a situation where either the manager is fired with a certain probability or there exists no equilibrium.

From the founder's perspective, the benefit of increasing ν depends on which equilibrium the firm ends up in. If there is little uncertainty about the firm value, there is no cost of imposing a super-majority from the founder's perspective. However, the benefit may also be limited if the agents end up in the prefered equilibrium for the owners in the case of a simple majority. When there is significant uncertainty there is an increased cost through the increased likelihood of a costly dead-lock.

If we compare these effects to the situation without uncertainty, it is worth emphasizing that increasing ν improves welfare for sure in the absence of uncertainty, but that there may be a tradeoff between the increased likelihood of a costly deadlock and the decreased amount of diversion in the case with uncertainty. Furthermore, an increase in the majority requirement is against the manager's interest, because she has less opportunity of diverting cash flow to her self. More surprisingly it may often also be against the interest of the existing majority owners, partly because it increases their chances of incurring costly dead-locks cost, partly because it decreases the benefit they may have extracted from the manager even in the absence of dead-locks.

5 Transferability of shares

Close corporations are characterized by having concentrated ownership and that owners frequently choose to restrict the transferability of shares. Legal scholars argue that restricting the transferability of shares can be a effective way to preserve the balance of power in a corporation (see the quote from Clark (1986) in the introduction).

In our model, free transferability of shares is costly. The reason is that, by trading shares to improve the balance of power in their favor, shareholders end up with a majority coalition that concentrates votes but not cash flows. From Theorem 1 we know that this reduces efficiency in the corporation. Therefore, it is in the interest of the initial owner to restrict the transferability of shares. We provide an example that illustrates this point. For simplicity we assume that the replacement cost is zero and the manager is an wealth constrained outside manager.

Consider the following ownership structure:

	Votes	CashFlow
I_1	40%	40%
I_2	35%	35%
I_3	25%	25%

From Theorem 1, the manager chooses shareholders 2 and 3 as the majority coalition and diverts 40 pct. of the cash flow in the firm. Hence, for the initial owner, the sum of the dead-weight cost and the cost of leaving rent to the future manager is 0.4.

Now, if shares are tradable before the manager chooses his action, shareholder 1 can sell (or even give away for free) one fourth of her shares to an outside investor. The new ownership structure becomes:

	Votes	CashFlow
I_1	30%	30%
I_2	35%	35%
I_3	25%	25%
I_4	10%	10%

Notice that the *balance of power* in the corporation has been altered and that now the majority coalition is formed by shareholders 1 and 3 with a cash flow share of 55 pct. The manager now diverts 45 pct. of the resources in the corporation. Shareholder 1 is strictly better off, since she has changed status from being an exploited minority shareholder to be an exploiting majority shareholder. Hence, free transferability allows the owners to dispose cash flows. By doing this they become more attractive partners to participate in the majority coalition. The sum of the dead-weight cost and the cost of leaving rent to the future manager is now increased to 0.45. Hence, the ability of shareholder 1 to sell her cash flow is bad for the initial owner. Therefore, as legal scholars suggest, a restriction on free transferability is in the interest of the initial owner since it preserves the balance of power in the firm.

Obviously, we need to consider the equilibrium behavior of the three shareholders, but we conjecture that this will only make matters worse. In the case where there are no restrictions on how cash flow can be sold, it is not hard to construct an example where the only equilibrium is one where all owners sell all their cash flow implying that the manager diverts everything. In a more realistic case where cash flow only can be sold bundled to votes according to a one-share-one-vote rule, the lower bound of the cash flow possessed by any majority coalition is 50 pct.

6 Conclusion

The distribution of ownership determines the allocation of power in a corporation, i.e. determines how different classes of owners form. Furthermore, concentration of ownership creates a conflict between controlling owners and management on one side and non-controlling owners on the other side. In the presence of this conflict we have studied how various forms of investor protection affect the performance of a corporation with concentrated ownership and the return different classes of owners receive on their investment.

Appendix

Proof of Theorem 1

Proof. First we prove the following necessary conditions for $\{\{b,d\},\{\phi_i\}_{i\in I_{-m}}\}$ is a subgame perfect equilibrium:

Lemma 2.
1) $M(b,d) \in \boldsymbol{\mathcal{S}}(\mathbf{v},\nu)$, i.e. the manager is not fired ex-post.
2) $b_i = 0 \ \forall\ i \in I \setminus M(b,d)$.
3) $i \in M(b,d) \Rightarrow b_i = \max\{0,(1-k-d)c_i\}$
4) $M(b,d)) = Arg\min_{A\in\boldsymbol{\mathcal{S}}(\mathbf{v},\nu)} c(A) \equiv M^*$, i.e. the selected majority has the minimum cash flow property.

Proof. Part 1) The maximum utility the manager can attain by being fired is c_m. By choosing $b_m = k$ and $d = 1-k$ the manager is not fired, since $M(b,d) = I_{-m}$, and the manager's utility is $k + c_m(1-k) \geq c_m$.
Part 2) Assume not, i.e. there exists an i s.t. $b_i + c_i d < (1-k)c_i$ and $b_i > 0$. By choosing b, the manager is not replaced, since it is a solution. Consider action b', d' given by $b'_j = b_j \ \forall\ j \in I_{-m} \setminus \{i\}$, $b'_i = 0$ and $b'_m = b_m + b_i$. Notice $d' = d$ and $M(b',d') = M(b,d)$, hence the manager is not replaced when choosing b'. Furthermore, the manager is strictly better off. A contradiction.
Part 3). If $d > 1-k$ then $c_i d > (1-k)c_i$ implying that $i \in M(b,d)$ even if $b_i = 0$. Thus, by the same argument as in Part 2, $b_i > 0$ is never a solution. Assume $d < 1-k$ and $b_i > (1-k-d)c_m$ for some $i \in M(b,d)$. Then the manager can deviate by choosing (b',d') where $b'_j = b_j \ \forall\ j \in I_{-m} \setminus \{i\}$, $b'_i = (1-k-d)c_m$ and $b'_m = b_m + b_i - b'_i > b_m$.
Part 4). Assume not, i.e. $c(M(b,d)) > c(M^*)$. Consider action (b',d') given by $d' = d$, $b'_i = \max\{0,(1-k-d)c_i\} \ \forall\ i \in M^*$, $b'_i = 0 \ \forall\ i \in I_{-m} \setminus M^*$, and $b'_m = b_m - \sum_{i\in I_{-m}} b'_i + \sum_{i\in I_{-m}} b_i = b_m + (1-k-d)(c(M(b,d) - c(M^*)) > b_m$ where we have used that (b,d) satisfies Part 3). Hence, the manager is strictly better off by deviating, a contradiction. □

Using Lemma 1, we set up the manager's problem as,

$$\begin{aligned}
\max_{\{b,d\}}(b_m \quad &- \quad \frac{1}{2}\bar{b}^2 + c_m d)r \\
\text{s.t.} \quad (1) \quad & b_i = 0 \ \forall\ i \in I_{-m} \setminus M^* \\
(2) \quad & b_i = \max\{0,(1-k-d)c_i\} \ \forall\ i \in M(b,d) \\
(3) \quad & M(b,d) = M^* \\
(4) \quad & 0 \leq d = 1 - \bar{b}
\end{aligned}$$

From the constraints we have $b_m = \bar{b} - \sum_{i \in I_{-m}} b_i = min\{\bar{b}, \bar{b}(1-c(M^*)) + kc(M^*)\}$. Thus, we can rewrite the manager's problem as,

$$\max_{\{\bar{b}, b_m\}} (b_m - \frac{1}{2}\bar{b}^2 + c_m(1-\bar{b}))r \quad (2)$$
$$\text{s.t.} \quad (1) \quad b_m = min\{\bar{b}, \bar{b}(1-c(M^*)) + kc(M^*)\}$$

Case 1: Assume $k < \bar{b}$. The interior solution is $\bar{b} = 1 - c(M^* \cup \{m\})$, $b_i = 0 \ \forall \ i \in I_{-m} \setminus M^*$, $b_i = (\bar{b} - k)c_i \ \forall \ i \in M^*$ and $d = c(M^* \cup \{m\})$. Thus, this case happens for $k \leq 1 - c(M^* \cup \{m\})$.
Case 2:If $k > \bar{b}$, the interior solution is $\bar{b} = b_m = 1 - c_m$, $b_i = 0 \ \forall \ i \in I_{-m}$ and $d = c_m$. Thus, this case happens if $k > 1 - c_m$.
Case 3: Finally, if $k \in (1 - c(M^* \cup \{m\}), 1 - c_m)$, the solution is $\bar{b} = b_m = k$, $b_i = 0 \ \forall \ i \in I_{-m}$ and $d = 1 - k$.
It is straightforward to check that these solutions to problem 2 also solves the general problem described in Section 2. □

Proof of Lemma 1

Proof. (1) Assume $M(\beta,\delta) \notin \boldsymbol{\mathcal{S}}(\mathbf{v},\nu)$, i.e. the manager is fired ex post. This cannot be an equilibrium, since the manager is better off by choosing $\delta(\overline{r}) = (1-k)\overline{r}$ and $\beta_m(\overline{r}) = k\overline{r}$. Assume $M(\beta,\delta) \in \boldsymbol{\mathcal{S}}(\mathbf{v},\nu)$ but $M(\beta,\delta) \notin \boldsymbol{\mathcal{R}}(\mathbf{v},\nu)$. Pick $A \subset M(\beta,\delta)$ such that $A \in \boldsymbol{\mathcal{R}}(\mathbf{v},\nu)$. Consider actions β', δ' given by $\delta' = \delta$, $\beta'_i = \beta_i \ \forall \ i \in A$, $\beta'_i = 0 \ \forall \ i \in I_{-m} \setminus A$ and $\beta'_m = \beta_m - \sum_{i \in A} \beta'_i + \sum_{i \in I_{-m}} \beta_i$. The beliefs for all owners in the set A are unchanged by this and the manager is not fired, since $A \subset M(\beta,\delta)$ and $A \in \boldsymbol{\mathcal{R}}(\mathbf{v},\nu)$. Furthermore the manager is strictly better off since, $\beta'_m > \beta_m$.
(2) If not, the manager is better off by choosing (β',δ') given by $\beta'_i = 0 \ \forall \ i \in I_{-m} \setminus M(\beta,\delta), \beta'_i = \beta_i \ \forall \ i \in M(\beta,\delta), \delta' = \delta$ and $\beta'_m = \beta_m + \sum_{i \in I_{-m} \setminus M(\beta,\delta)} \beta_i > \beta_m$.
(3) If not, majority owner i prefers firing the manager and owner i is pivotal by (1).
(4) If not, the manager is better off by choosing $\delta(\overline{r}) = (1-k)\overline{r}$ and $b_m(\overline{r}) = k\overline{r}$.
(5) This is the resource constraint when $r = \underline{r}$. □

Proof of Theorem 2

Proof. Part 1). Necessisity: Lemma 2 (3) implies that

$$\sum_{i\in M(\beta,\delta)} \beta_i + \delta c(M(\beta,\delta)) \geq (1-k)(\frac{1}{2}\underline{r} + \frac{1}{2}\overline{r})c(M(\beta,\delta))$$

and Lemma 2 (5) implies that,

$$\underline{r} \geq \sum_{i\in M(\beta,\delta)} \beta_i + \delta.$$

Combining these two equations yields,

$$\overline{r} \leq \frac{2-(1-k)c(M(\beta,\delta))}{(1-k)c(M(\beta,\delta))}\underline{r} < \frac{2-(1-k)c(M^*)}{(1-k)c(M^*)}\underline{r}$$

Sufficiency: proved by examples given in Corollary 1 and Corollary 2.

Part 2). Let $\{\{\beta(r),\delta(r)\},\{\mu_i(\beta_i,\delta)\}_{i\in I_{-m}},\{\phi_i(\beta_i,\delta)\}_{i\in I_{-m}}\}$ be a separating equilibrium. For simplicity, define $\overline{M} = M(\beta(\overline{r}),\delta(\overline{r}))$ and $\underline{M} = M(\beta(\underline{r}),\delta(\underline{r}))$.
(a) If $\sum_{i\in I}\beta_i(\overline{r}) + \delta(\overline{r}) < (>) \sum_{i\in I}\beta_i(\underline{r}) + \delta(\underline{r})$, then the manager would choose the good state's action (bad state's action) in both states of the world.

(b) Case $\delta(\overline{r}) \neq \delta(\underline{r})$. In this case $\mu_i(\beta_i(\overline{r}),\delta(\overline{r})) = 1\ \forall\ i\in I$. This implies $\beta_i(\overline{r}) + \delta(\overline{r})c_i \geq (1-k)\overline{r}c_i\ \forall\ i\in\overline{M}$, thus,

$$\begin{aligned}
\underline{r} &\geq \sum_{i\in I}\beta_i(\underline{r}) + \delta(\underline{r}) \\
&= \sum_{i\in I}\beta_i(\overline{r}) + \delta(\overline{r}) \\
&\geq \sum_{i\in\overline{M}}\beta_i(\overline{r}) + \delta(\overline{r})c(\overline{M}) \\
&\geq (1-k)\overline{r}c(\overline{M}) \\
\Leftrightarrow \overline{r} &\leq \frac{1}{(1-k)c(\overline{M})}\underline{r} \\
&< \frac{2-(1-k)c(M^*)}{(1-k)c(M^*)}\underline{r}.
\end{aligned}$$

Case $\delta(\overline{r}) = \delta(\underline{r})$. Let $\overline{J} = \{i\in\overline{M} : \beta_i(\overline{r}) \neq \beta_i(\underline{r})\}$ and let $\overline{K} = \{i\in\overline{M} : \beta_i(\overline{r}) = \beta_i(\underline{r})\}$. In this case $\mu_i(\beta_i(\overline{r}),\delta(\overline{r})) = 1\ \forall\ i\in\overline{J}$ and $\mu_i(\beta_i(\overline{r}),\delta(\overline{r})) = \frac{1}{2}\ \forall\ i\in\overline{K}$, thus,

$$\beta_i(\overline{r}) + \delta(\overline{r})c_i \geq (1-k)\overline{r}c_i\ \forall\ i\in\overline{J}$$

and

$$\beta_i(\overline{r}) + \delta(\overline{r})c_i \geq (1-k)(\frac{1}{2}\underline{r} + \frac{1}{2}\overline{r})c_i \;\forall\; i \in \overline{K}.$$

This implies,

$$\begin{aligned}
\underline{r} &\geq \sum_{i\in I} \beta_i(\underline{r}) + \delta(\underline{r}) \\
&= \sum_{i\in I} \beta_i(\overline{r}) + \delta(\overline{r}) \\
&\geq \sum_{i\in \overline{M}} \beta_i(\overline{r}) + \delta(\overline{r})c(\overline{M}) \\
&\geq (1-k)\overline{r}c(\overline{J}) + (1-k)(\frac{1}{2}\underline{r} + \frac{1}{2}\overline{r})c(\overline{K}) \\
\Leftrightarrow \overline{r} &< \frac{2-(1-k)c(M^*)}{(1-k)c(M^*)}\underline{r}.
\end{aligned}$$

□

References

[1] Aumann, R., 1959. Acceptable points in general cooperative n-person games. In: Kuhn, H.W., Tucker, A.W. (Eds.), Contributions to the Theory of Games IV. Princeton University Press, Princeton.

[2] Bennedsen, Morten, and Daniel Wolfenzon, 2000, The Balance of Power in Closely Held Corporations, *Journal of Financial Economics*, October, 2000.

[3] Berle, Adolf, and Gardiner Means, 1932, *The Modern Corporation and Private Property*, Macmillan, New York.

[4] Clark, Robert, 1986, *Corporate Law*, Little, Brown and Company.

[5] Easterbrook and Fischel: "Close Corporations and Agency Cost," Stanford Law Review 271 (1986)

[6] Easterbrook, Frank H., and Daniel R. Fischel, 1991, *The Economic Structure of Corporate Law*, Harvard University Press.

[7] Hart, Oliver, 1995,*Firms, Contracts and Financial Structure*, Oxford University Press.

[8] La Porta, R., Lopez-de-Silanes F., Shleifer, A., 1999. Corporate ownership around the world. Journal of Finance 54, 471–517.

[9] La Porta, R., Lopez-de-Silanes F., Shleifer, A., Vishny, R.W., 1998. Law and Finance. Journal of Political Economy 106, 1113–1155.

[10] La Porta, Rafael, Florencio Lopez-de-Silanes, Andrei Shleifer, and Robert W. Vishny, 1998, Agency Problems and Dividend Policy Around the World, Working Paper, Harvard University.

[11] O'Neals Closed Corporations...

[12] O'Neals, F.H., 1987. Oppresion of minority shareholders: protecting minority rights. Close Corporations Law Symposium, Cleveland State Law Review.

[13] Shleifer, Andrei, and Robert Vishny, 1997, A survey of corporate governance, *Journal of Finance* 52, 737–783.