The choice of the voting structure for privatizing a company

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Abstract

We study the role of security-voting structure when a government wants to privatize a company. Our results show that the one share–one vote structure is optimal for allocating control rights to the most efficient pretender. However, this structure is not always optimal for maximizing the sale’s revenue.

Keywords: Security-voting structure; Corporate control; Auctions; Privatization

JEL classification: D44; G34

1. Introduction

This paper analyzes the problem of optimal security design in the context of a state-owned company’s privatization. By definition, the government is the only shareholder. It can have two objectives which are not mutually consistent. The first is to maximize the expected global revenue of the tender. The second is to maximize the value of the firm in the future, i.e. attract the most efficient manager. Some different securities structure can then be derived on the basis of the government trade-off between ‘efficiency objective’ and ‘revenue objective’ (Cornelli and Li, 1997).

We shall focus on Eastern Europe companies for which the pretenders are generally foreign companies. Their objectives can often be to extract private benefits to the detriment of domestic citizens and hence, not to improve the firm’s quality, technology . . . Thus, the governments must choose between selling to the most efficient candidate or selling to the highest bidder. We use security-voting structure as a tool which allows governments to screen these two types of candidates. We shall assume that the public company is sold through an English auction.

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2. The model

Following Grossman and Hart (1988) we assume that the government creates two classes of shares. It specifies the fraction of dividends $s^c$ and the fraction of total votes $v^c$, for $c = 1, 2$ to which class $c$ is entitled. Without loss of generality, we consider that the superior voting stock is class 1, i.e. $v^1 > v^2$, and we assume $v^1 + v^2 = 1$ and $s^1 + s^2 = 1$.

A candidate must obtain at least the fraction $a$, $a \in (0.5, 1]$, of votes to take control of the firm. Moreover, we assume that $(v^1, v^2, s^1, s^2, a)$ are common knowledge.

Let us consider two potential buyers represented by a couple $(Y, Z)$ where $Y$ is the market value of the firm under control of candidate $k$ (public benefits) and $Z$ is the private benefits of control accruing only to the manager. We assume that $j$ is more efficient than $i$ iff $Y_j > Y_i$. We have to mention that the highest bidder may not be the most efficient candidate because of private benefits. We shall specify later the agents’ information about $Y$ and $Z$.

To focus on the impact of securities structure we assume that the government tenders the fraction $x$ of the class 1 shares and the remainder $(a - x)/(v^1)$ from the class 2 shares. The fraction $x$ is such that $xv^1 + v^2 \geq a$. This package brings $a$ votes.

The willingness to pay of a buyer $k$ for the package is:

$$w_k = \left(xs^1 + s^2 \frac{\alpha - \alpha v^1}{v^2}\right)Y_k + Z_k$$

for $k = i, j$.

Simplifying yields:

$$w_k = \Omega Y_k + Z_k$$

for $k = i, j$.

Then, under the one share–one vote structure ($s^1 = v^1 = 1$) $\Omega = a$. Under extreme structure ($s^1 \to 0, v^1 = 1$) $\Omega$ tends to 0, the two bidders are interested only in the votes and so, bid for the class 1 shares. Their willingness to pay becomes $w_k = s^1 \alpha Y_k + Z_k$.

Since an English auction is used, if buyer $i$ wins, he pays the highest valuation of $j$. Hence, the expected payment from $i$ is given by:

$$E(w_i) = E(\Omega Y_j + Z_j) \cdot \text{prob} (\Omega Y_j + Z_j \leq \Omega Y_i + Z_i).$$

We obtain the government’s expected revenue of the tender by adding up the expected payments from buyers $i$ and $j$:

$$E(S) = E(w_i) + E(w_j).$$

We know that the government offers only a package of shares. It holds the stake $(1 - \Omega)$ valued under the winning management candidate. Therefore, its expected global revenue is:

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1. When $v^2 = 0$ a buyer $k$ buys only the class 1 shares and his willingness to pay becomes $w_k = \alpha s^1 Y_k + Z_k$.

2. Due to legal restrictions, unbundling votes, i.e. $(s^1 = 0; s^2 = 1; v^1 = 1; v^2 = 0)$, are ruled out. So, the most extreme structure is $(s^1 \to 0; s^2 \to 1; v^1 = 1; v^2 = 0)$. 

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\[ E(R) = E(S) + (1 - \Omega)E(Y_w) \text{ for } w = i \text{ or } j \]

where \( Y_w \) is the market value of the dividends stream under the winner’s control.

Our aim is to characterize the structure maximizing the expected global revenue and the structure increasing the value of the firm in the future (i.e. the structure which attracts the most efficient candidate).

We shall consider four cases depending on the agents’ information. Two of them yield straightforward results.

When the candidates have the same public benefits which are common knowledge, and differ only in the private benefits (\( Y_i = Y_j = Y \) and each \( Z_k \) for \( k = i, j \) is drawn independently from the same distribution function), the voting structure is irrelevant. This result is quite obvious, since this case is the usual one of an auction with private values where the government maximizes the revenues (the efficiency objective is irrelevant in this case).

When the candidates have the same private benefits which are common knowledge, and have different public benefits (\( Z_i = Z_j = Z \) and each \( Y_k \) for \( k = i, j \) is drawn independently from the same distribution function), it is optimal to sell ‘extreme securities’ (only one share carries all votes). The intuition is that the government benefits from the improvement of the public value of the company by retaining all the other shares.

We shall develop the following cases: both public and private benefits are different, but one of the two is common knowledge, while the other is private information of the bidders. Let candidate \( H \) have highest characteristics and \( L \) lowest.

2.1. Uncertainty on private benefits

We consider a more efficient candidate. We denote \( Y_H \) their public benefits. \( Y_L \) represents the public benefits of the less efficient candidate, \( Y_H > Y_L \). Let us suppose that each \( Z_k \) for \( k = i, j \) is drawn from the same uniform distribution \( F(\cdot) \) over \([0, \bar{Z}]\). Assuming \( Y_L + \bar{Z} > Y_H \) guarantees the participation of the less efficient candidate.

The efficiency objective is attained with the one share–one vote structure. Since the revenue objective does not matter in that case, we know that an English auction is efficient and therefore the one-share–one-vote structure is optimal.

If the government wants to maximize its expected global revenue, this result does not always hold true. There exist some cases in which it should issue several classes with one at least richer in votes. We show that the expected global revenue \( E(R) \) reaches a maximum for \( \Omega < 0.5 \) which cannot be attained under the one share–one vote structure (we have to recall that in this case \( \Omega = \alpha \) and \( \alpha \in (0.5, 1) \)).

**Proposition 1.** When the candidates are asymmetric and uncertainty is on private benefits and the company is sold through an English auction:

- if the government wants efficiency, the one share–one vote structure and \( \alpha = 1 \) are optimal
- if its objective is to maximize the sale’s revenue, there exist some cases in which it should issue several classes with one at least richer in votes.
Proof. See Appendix A.

2.2. Uncertainty on public benefits

Now, the candidates differ in their private benefits $Z_k$. We assume that each $Y_k$ for $k = i, j$ is drawn from the same uniform distribution over $[0, Y]$. $Y$ is the maximum realization of $Y_k$ for $k = i, j$. Without loss of generality we take $Y = 1$. The participation constraint of the less efficient candidate involves: $\Omega \geq Z_H - Z_L$.

If the government wants to attract the most efficient candidate, it has to characterize the structure which maximizes the expected public benefits of the winner $E(Y)$. We show that $E(Y)$ is increasing in $\Omega$ for $\Omega \in (0, 1]$: the optimal structure is one share–one vote and $\alpha = 1$.

The one share–one vote structure does not maximize the expected global revenue $E(R)$. In fact, we find that $E(R)$ is maximized for $\Omega < 0.5$.

**Proposition 2.** When the candidates are asymmetric and uncertainty is on public benefits and the company is sold through an English auction:

- if the government wants efficiency, the one share–one vote structure and $\alpha = 1$ are optimal
- if its objective is to maximize the sale’s revenue, there exist some cases in which it should issue several classes with one at least richer in votes.

Proof. See Appendix B.

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**Appendix A. Proof of Proposition 1**

When each $Z_k$ for $k = i, j$, is drawn from the same uniform distribution, we obtain the following results:

$$E(w_L) = \int_0^Z (s + \Omega Y_H) [1 - F(s + \Omega(Y_H - Y_L))] f(s) \, ds$$

$$= \frac{(-\Omega Y_H + \Omega Y_L + Z)^2 (2\Omega Y_H + \Omega Y_L + Z)}{6Z}$$

$$E(w_H) = \frac{Z^3 + 3\Omega Y_H Z^2 + 3\Omega^2 Z(Y_H - Y_L)(Y_H - Y_L + Z)(Y_H + Y_L) - (Y_H - Y_L)^2(Y_H + Y_L)^2 \Omega^2}{6Z^2}$$

The candidate $H$ wins with probability $F(Z + \Omega(Y_H - Y_L))$. Let $P_H$ be the expected probability that the most efficient candidate wins, we obtain:
The expected global revenue is
\[ ER = E(w_H) + E(w_L) + (1 - \Omega)E(Y_w) \]
where \( E(Y_w) = Y_H P_H + Y_L (1 - P_H) \).

Let \( E(R)' = (\partial E(R)/\partial \Omega) \). This function has a minimum at \( \Omega^* = (3 \bar{Z} + Y_H - Y_L)/(4(Y_H - Y_L)) > 0 \).

Solving the equation \( E(R)' = 0 \) gives two solutions \( \Omega^1 \) and \( \Omega^2 \) with \( 0 < \Omega^1 < \Omega^* < \Omega^2 \). We deduce that the expected global revenue \( E(R) \) has a maximum at \( \Omega^1 \) and a minimum at \( \Omega^2 \). The tangent to the curve \( E(R) \) at the point \( \Omega = 0 \) is increasing and the tangent at the point \( \Omega = 0.5 \) is decreasing. We conclude that the maximum of the function \( E(R) \) belongs to the interval \( (0, 0.5) \). So, \( E(R) \) is maximized for \( \Omega < 0.5 \). The structure one share–one vote cannot be optimal because under this structure \( \Omega = \alpha \) and \( \alpha \in (0.5, 1] \).

**Appendix B. Proof of Proposition 2**

The expected payments from the bidders \( H \) and \( L \) are:

\[
E(w_H) = \int_{0}^{\bar{Y}} (\Omega s + Z_L) \left[ 1 - G\left(s - \frac{Z_H - Z_L}{\Omega}\right) \right] g(s) ds
\]

\[
= \frac{-Z_H^3 - 2Z_L^3 - 6\Omega Z_H^2 + \Omega^3 + 3Z_H(Z_L + \Omega)^2}{6\Omega^2}
\]

\[
E(w_L) = \frac{(\Omega - Z_H + Z_L)^2(\Omega + 2Z_H + Z_L)}{6\Omega^2}
\]

The expected public benefits of the winner are:

\[
E(Y_w) = E(Y_{w_H}) \text{ prob } (w_H \geq w_L) + E(Y_{w_L}) \text{ prob } (w_H \leq w_L) = \frac{2(Z_H - Z_L)^3 - 3\Omega(Z_H - Z_L)^2 + 4\Omega^3}{6\Omega^3}
\]

1. Computing the derivative of \( E(Y_w) \) at \( \Omega \) gives: \( \partial E(Y_w)/\partial \Omega = (Z_H - Z_L)^2(\Omega - Z_H + Z_L)/\Omega^3 \) which is strictly positive over \( \Omega \in (0, 1] \). So \( \Omega = 1 \) is optimal to attract the most efficient candidate.

2. The expected global revenue is \( E(R) = E(w_L) + E(w_H) + (1 - \Omega)E(Y_w) \). We know that the one share–one vote structure cannot be optimal when \( \Omega < 0.5 \). Let us consider \( Z_H - Z_L = 0.2 \) for example. We find \( \partial E(R)/\partial \Omega = 0 \) for \( \Omega = 0.411 \) and \( \partial^2 E(R)/\partial \Omega^2 < 0 \) at \( \Omega = 0.411 \). So, the expected global revenue is maximized for \( \Omega^* = 0.411 \). These results prove that there are some cases in which the one share–one vote structure does not maximize the global expected revenue.
References
