KATHOLIEKE
UNIVERSITEIT
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DEPARTEMENT TOEGEPASTE ECONOMISCHE WETENSCHAPPEN

RESEARCH REPORT 0249

ONE SHARE, ONE VOTE?

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D/2002/2376/49

One Share, One Vote?*

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First draft: March 2001; this version: September 2002
Preliminary — comments very welcome

*We thank Linda Van de Gucht, Cynthia Van Hulle, Martina Vandebroek, participants in workshops at KU Leuven and Universities of Antwerp and Ghent, at the 2002 VEV Conference, for useful comments and criticisms. All remaining errors are the author's.

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Abstract

In the theoretical framework considered in the two seminal contributions, Grossman and Hart (GH, 1988) and Harris and Raviv (HR, 1989), the "one share, one vote" (1S1V) rule is optimal whether private benefits are enjoyed by the incumbent or the rival. In practice, deviations from 1S1V are frequent. We complete the GH-HR analysis in three ways. First, we give both incumbent and rival management private benefits. Second, we not only examine the behaviour and optimality of feasible rules in a local or *ex post* sense (*i.e.* at the moment the rival appears and his characteristics are observed), but we also consider the *ex ante* problem where the entrepreneur-founder only knows the distribution from which the rival will be drawn. The issue is what set of rules the entrepreneur will put in place, *re* take-overs, so as to maximise the IPO value of the firm. Lastly, we go beyond the dual-class case, explaining the role and usefulness of multiple-class structures.

Keywords: Corporate Control, Security Design, Takeovers.

JEL-codes: G32, G34.

One Share, One Vote?

Introduction

This paper examines how voting structure and take-over rules can influence the value of a company and whether deviations from the one-share one-vote (1S1V) rule create extra value for the initial shareholders of the firm. The seminal papers in the literature on voting structure, Grossman and Hart (GH, 1988) and Harris and Raviv (HR, 1989), derive conditions for the optimality of 1S1V. Both papers have a rather similar set-up (which we broadly adopt in our paper). Specifically, there are two types of cash flows: the security benefits accruing to the security holders, and the private benefits obtained by the controlling party. A rival management team attempts to dismiss the incumbent managers and take control of the target firm. Incumbent and rival teams have different management abilities, which affects the level of both the security benefits and the private benefits. GH find that, by and large, 1S1V is optimal. They do acknowledge exceptions, but confine that part of their analysis to an example, arguing that these exceptions should be rare and insignificant. Harris and Raviv likewise find that under their conditions a single voting security is optimal.

We show that this conclusion may be somewhat hasty, for two reasons. First, the GH-HR analysis assumes that the rival's abilities to generate and divert cash are known at the time the charter was written or last revised. One could argue, however, that at that time the rival's cash-generating abilities are usually known only in a probabilistic sense. Thus, the question arises as to how the entrepreneur should draft the take-over items in the charter *ex ante*, that is, having in mind a distribution rather than an individual realization. Second, GH and HR essentially consider cases where only one of the contestants can extract private benefits, either the incumbent or the rival. However, if one team can extract some rents, why would another one in the same position not be able to do so—especially as even GH-HR seem to be in two minds as to at which side the private benefits are most likely? We show that, by excluding the case where both contenders can derive private benefits, GH-HR miss cases where 1S1V does not do well even *ex post*, that is, in the absence of uncertainty about the rival's characteristics.[1] Consistent with this, our *ex ante* analysis fails to produce even a single case where 1S1V does better than the two competing dual-class charters that enter our horse race.

Dual-class security structures have been studied before. Bergstrom and Rydqvist (1992) analyse why differences occur in take-over bids on shares which differ in voting rights. The authors therefore introduce a blockholder and restrict private benefits to synergy gains for the bidding company, thus focusing on extra rents for the bidding firm only. Their analysis shows that a blockholder prefers a dual class structure, even if 1S1V maximizes the value of the firm. The rival's bid prices are equal for both classes when there is no influential blockholder, otherwise bids are differentiated. Bergstrom and Rydqvist provide tests on Swedish data. Taylor and Whittred (1998) empirically examine the use of dual class stock in the Australian IPO market and find that firms with dual class shares are comparatively small and their firm value positively related to the human capital of the founding shareholders, rather than to assets in place. And, as mentioned, Grossmand and Hart (1983) offer some numerical examples of cases where 1S1V does less well.

This paper is structured as follows. In Section 1 we set up the model. The analysis of the actual take-over game, given the set of rules laid down in the corporate charter, follows in Section 2. Section 3 provides a GH-HR style *ex ante* analysis of the optimal charter, and Section 4 the results of the *ex post* analysis. Section 5 concludes.

1 Model set-up

The setting is as follows: An entrepreneur with no financial resources has started up a firm. She appoints a management team i, the incumbent, under whose control the firm generates security cash flows y_i and private benefits z_i. The entrepreneur also issues multiple classes of shares with various degrees of voting power and cash flow rights. In most of the paper, we limit this to a dual-class system with class-A and class-B shares

[1]The thrust of these two major contributions is to be seen in their context. Both papers are written at a time a policy debate was in full swing, with the discussion being whether the 1S1V structure had to be a requirement for listing on a US stock exchange. The research question in GH, for instance, is therefore more focused on whether exceptions should be allowed for or not, rather than on examining the mechanics behind these deviations. Furthermore, in the US dual-class structures are rather rare.

having, respectively, voting powers v_a and $v_b = 1 - v_a$, and cash-flow rights $s_a y$ and $s_b y = (1 - s_a)$. The entrepreneur also sets a level for α, the proportion of votes a team needs to assume control of the company. Lastly, she sells all claims to atomistic, risk-neutral investors. Neither the incumbent management nor any potential rival owns any of these securities.

The take-over issue then arises from the arrival of a rival, r, under whose management the firm would generate a cash flow y_r and private benefits z_r. These characteristics are known to all investors. This rival management team publicly announces its bid, taking into account that any bid may trigger a counterbid from the incumbent, revised bids from r, and so on. In line with GH-HR, bids are conditional offers for all shares. After r's final bid (and i's final counterbid, if any), investors choose to tender shares or votes to either i or r. In fact, under our full-information assumption nothing is gained by playing a multi-stage game: r moves only if he will succeed, and r's first move, if any, will be his only one. After this bidding/tendering stage, a vote is held, and all shareholders vote. A change of control occurs when more than the fraction α of the voters vote in favour of the change; and if α is below 1/2, the largest group of votes determines the issue.[2]

Before we solve the problem for the entrepreneur regarding the voting and security structure, we consider the control contest in more detail.

2 Analysis of the bidding game

Without loss of generality we assume that the A shares represent at least as many votes as the B shares, *i.e.* $v_a \geq v_b$. Table 1 shows that there could be two types of bidding contests:

- the double bid: r bids for both the A and B shares (if that is needed to achieve a supermajority or to avoid a tie), and i can thwart r by buying either A or B;
- the single bid: r bids for the A shares, and i can thwart r only by buying these very A shares.

[2]GH assume $\alpha > 1/2$ to avoid degenerate solutions. By accepting that, in such a case, the majority determines the outcome, we do not need this assumption.

Table 1

charter	bidding game
equal voting power ($v_a = v_b = 1/2$)	
$\alpha > v_a = v_b$	• r needs both A and B to muster α of the vote • i needs either A or B to block r
$\alpha = v_a = v_b$	• r needs both A and B to avoid a tie • i needs either A or B to block r
unequal voting power ($v_a > 1/2 > v_b$)	
$\alpha > v_a > v_b$	• r needs both A and B to muster α of the vote • i needs either A or B to block r
$\alpha = v_a > v_b$ or $v_a > \alpha \geq v_b$ or $v_a > v_b \geq \alpha$	• A suffices for r to win • A suffices for i to block r • B is useless to both r and i

Thus, a single bid by r for the B shares cannot be rational. We start our analysis with the bidding war for the A-shares.

2.1 The bidding war for the A shares

The characteristics of the optimal bid prices $p_{a,.}$ if r is to win a bid for the A-shares[3] are:

$$p_{a,r} > p_{a,i}, \tag{2.1}$$

$$p_{a,r} > s_a y_r, \tag{2.2}$$

$$p_{a,r} < s_a y_r + z_r, \tag{2.3}$$

$$p_{a,i} > s_a y_i, \tag{2.4}$$

$$p_{a,i} < s_a y_i + z_i. \tag{2.5}$$

Condition (2.1) simply says that r outbids i. The lower bound on r's bid price in (2.2) is the free-rider bound: even if r outbids i, the shareholders will still not tender to r as long as the offer price remains below the post-bid security value of those shares. The upper bound on r's bid prices in (2.3) is r's reservation price, beyond which r's

[3]From the shareholder's point of view the conditions of success for a bid on the A shares are independent of the take-over's impact on the B shares. The reason is that atomistic investors treat the probability of a change of control as unaffected by their own decision. Thus, when bidding is for the A-shares, the effect of the contest on the B-shares is irrelevant in the investor's decision (not) to tender A shares.

profit turns negative: the total amount of premia paid over and above the security value cannot rationally exceed r's entire private benefits. The conditions on i's offer, in the last two equations, are analogous.

From this we immediately obtain the condition under which r wins this contest and the price at which this occurs. Notably, r can (and will) win a contest for the A shares if her reservation price exceeds that of i. That is, if there is a contest for the A-shares, r will win if

$$s_a y_r + z_r > s_a y_i + z_i. \tag{2.6}$$

The most economical bid that meets all constraints (2.1)-(2.3) then is

$$p_{a,r} = \text{Max}(s_a y_r, s_a y_i + z_i), \tag{2.7}$$

implying that the target company woudl be worth

$$\begin{aligned} V_r^A &= \text{Max}(s_a y_r, s_a y_i + z_i) + s_b y_r, \\ &= y_r + \text{Max}(z_i + s_a[y_i - y_r], 0). \end{aligned} \tag{2.8}$$

In contrast, if (2.6) is not met the value of the target company stays at y_i.

The 1S1V outcome can be obtained by setting $s_a = 1 = v_a$.

2.2 The double-bid game

If r is to win a double-bid game, then for both the A and B shares r's offer must beat i's, clear the no-free-riding hurdle, and leave r some gain. This already yields five conditions,

$$\begin{aligned} p_{a,r} &> p_{a,i}, \\ p_{b,r} &> p_{b,i}, && (2.9) \\ p_{a,r} &> s_a y_r, \\ p_{b,r} &> s_b y_r, && (2.10) \\ p_{a,r} + p_{b,r} &< y_r + z_r. && (2.11) \end{aligned}$$

With respect to the last equation, note that r's private benefits now provide the upper bound on the total premia spent (over and above the security value) for both classes of securities together. At this point, two advantages of the incumbent over the rival become apparent. First, while the rival needs the votes from both classes of shares to make a successful bid on the target company, the incumbent can block this bid by focusing on only one class of shares. Second, the rival makes the first move, so the incumbent can wait and see whether a winning counterbid is feasible and, if two counterbids are feasible, which of these is the cheaper one. Thus, r should be prepared for a counterbid for either the A or B shares, each being within i's relevant constraints (no free riding, and no loss for i):

$$\begin{aligned} \text{either } s_a y_i < p_{a,i} &< s_a y_i + z_i, \\ \text{or } s_b y_i < p_{b,i} &< s_b y_i + z_i. \end{aligned} \tag{2.12}$$

From this, the conditions under which r wins, and the corresponding prices, again follow immediately. The rival has to make sure that i can top neither $p_{a,r}$ nor $p_{b,r}$ even when the incumbent team would spend its entire private benefits on buying one type of shares:

$$p_{a,r} > s_a y_i + z_i, \tag{2.13}$$

$$p_{b,r} > s_b y_i + z_i. \tag{2.14}$$

For these bids to be possible, r's rationally spendable resources must exceed the sum of i's alternative reservation prices, *i.e.*

$$y_r + z_r > y_i + 2z_i. \tag{2.15}$$

Note that, unlike in (2.6), to i a dollar of private benefits now provides twice as much firepower as it does to r. To dampen any excessive excitement among poison-pill consultants, though, we should perhaps note that this extra-firepower feature is relevant only when y_i is sufficiently large relative to y_r. Indeed, when y_i is way below y_r, the doubling of the efficacity of z_i would not help at all in raising the hurdle for r. Details are provided in Section 4.

If (2.15) is met, r takes over the target at the lowest prices that satisfy both (2.13), (2.14), and the free-rider bounds; that is, the value of the firm becomes

$$\begin{aligned} V_r^{AB} &= p_{a,r} + p_{b,r} \\ &= \text{Max}(s_a y_r, s_a y_i + z_i) + \text{Max}(s_b y_r, s_b y_i + z_i) \\ &= y_r + \text{Max}(0, s_a(y_i - y_r) + z_i) + \text{Max}(0, s_b(y_i - y_r) + z_i). \end{aligned} \tag{2.16}$$

2.3 A digression to multiple-class structures

We saw that a double-bid dual-class charter can force a sufficiently strong rival to fork out more cash. In this subsection we briefly abandon our dual-class approach and verify to what extent a multiple-class structure could add more benefits of that type. We start with three classes of shares, A, B and C, and we assume without loss of generality that $v_a > v_b > v_c$. With just three classes an exhausting classification of all possible structures, in the style of Table 1, already becomes rather tedious, so we confine ourselves to a discussion of some illustrative cases. Our purpose is to show that some three-class games can be reduced to the single- and double-bid ganes we have already considered, while for other parameter values a triple-bid game can emerge that may add more value.

Consider, for instance, a charter with $(v_a > v_b >)v_c > \alpha$. If $v_b + v_c < v_a$, then holding the A-shares is enough to meet the α-hurdle without any risk of being outvoted. This leads to the single-bid game we already analysed, with r and i fighting for the A-shares, and with a composite security, B+C, now taking the role played by B in the dual structure we had before. The existence of third class is of little importance here.

Consider, next, a charter with $\alpha > v_a(> v_b > v_c)$ and $(v_a+v_b > v_a+v_c >)v_b+v_c > \alpha$. The rival goes for a combination of two classes (whichever pair is cheaper) to muster the required votes and be safe from being outvoted. The incumbent can thwart r's plan by bidding for either of whichever pair r goes for. Thus, r must set the prices such that i can not outbid him for either of the two, which again provides i with the doubled firepower per unit of z_i like in the double-bid games we considered in the previous section.

Consider, lastly, a charter with $\alpha > v_a(> v_b > v_c)$ and $v_a + v_b + v_c > \alpha > v_a + v_b$. Here, to muster the required number of votes and be safe from being outvoted, r needs all three classes. The incumbent, by contrast, can stop the takeover by obtaining either the A-, or the B-, or the C-shares. Thus, r's bid for each and every class must be such that it it cannot be beaten by i: $p_{a,r} > s_a y_i + z_i$, $p_{b,r} > s_b y_i + z_i$ and $p_{c,r} > s_c y_i + z_i$, implying $p_{a,r} + p_{b,r} + p_{c,r} > y_i + 3z_i$ and. therefore, $y_r + z_r > y_i + 3z_i$. Here, the triple-bid game provides i with three times the nominal firepower per unit of z_i. Thus, provided the rival is sufficiently rich to afford this, a triple-bid charter would improve the value of the firm.

In general, then, multiple-class share structures are a way of milking a rival that has a total cash-generating ability $(y + z)$ exceeding that of the incumbent; and any z_i units of added total value warrants a new class of securities and a voting structure that forces r to buy each and every class of shares. Two caveats are in order, though. First, if y_r is quite high relative to y_i, the no-free-riding bound may already be so tough that r would be paying out most of the added value even without a double or triple bid. Second, if a triple-bid charter is installed before the rival is known, it may spoil useful takeovers if the rival turns out to be of less than the triple-star quality the founder hoped for.

* * *

This second caveat has brought us to the main issue of the paper. The problem for the entrepreneur is how to specify the required fraction of votes α, as well as the cash-flow and voting rights (s_a and v_a) for the classes of equity, so as to maximize the value of the firm. In the next section we again consider just two classes of shares. Starting from the conditions and payoff structures for single- and double-bid charters, we verify which charter does best among 1S1V, the single-bid structure, and the double-bid one.

The assumption underlying GH-HR's work is that when r show up, the founder has ample opportunity to size him up and then design a charter that extracts the maximum price out of him. In reality, the founder would rarely have the chance at such surgical precision. Thus, we give the founder a much blunter instrument, viz. a charter that is tailored to a given distribution but that, once set, applies to any drawing from that distribution. After this *ex ante* analysis of Section 3, we still provide, in Section 4, a GH-HR type *ex post* analysis. This approach serves to explain some of the less obvious patterns in our findings, and to show that the disagreement with GH-HR is caused caused not by the *ex ante* feature of our approach but by the presence of private benefits on two sides.

3 Ex-ante optimal sharing & voting structure under uncertainty

We choose normal distributions for y_r and z_r. The values for y_i and z_i, in contrast, are deterministic because the entrepreneur appoints a known party as the initial management team. We normalise the value for y_i to unity and consider expected values for y_r that range from (on average) "bad" to "good"—0.8, 0.9, 1, 1.1 and 1.2—and standard deviations of either 0.2 or 0.3. For z_r, we choose distributions with means of 0.05, 0.1, 0.15, 0.2, 0.25 and 0.3, and standard deviation of 0.02. Our (deterministic) values for z_i are set at in lower zone of the same range of average z_rs: 0.05, 0.1 and 0.15. This gives us in total 180 different combinations of distributions, each with its optimal choice of voting structure and its resulting value of the target firm. We solve numerically, by discretizing and assigning the according probability value for the joint normal distributions to each point in the $[y_r\ ,\ z_r]$ grid. In total, we calculate values of about 40,000 grid points. Then we maximise the value of the firm by varying/optimizing the proportion of cash flow rights assigned to each class of securities.

The optimized expected values of the firm are illustrated in Figures 2 and 4. The left-hand-side column of graphs shows results for $z_i = 0.05$, the middle column for $z_i = 0.1$, and the rightmost column for $z_i = 0.15$. Each row of graphs refers to a particular mean value of the distribution for y_r, which increases from 0.8 (in the top row) to 1.2 (bottom row). Within each of the 15 graphs, the mean z_r then varies along the x-axis from 0.05 to 0.3. An individual bar in each trio of bars refers to the value of the firm under a particular share/vote structure, with the left bar showing the value of the target firm under 1S1V, the second bar referring to a double-bid dual-class structure, and the third bar referring to single-bid one. Each set of 15 graphs is linked to A particular standard deviation for y_r: .2 in Figure 2, and .3 in Figure 3. Figure 3 corresponds, graph by graph, with Figure 2 and shows how the s_a is optimally set for the single- and double-bid cases.

There are obvious general patterns, like increasing values when we go down the rows of graphs (higher y_r), when we go from the left column to the right one (higher z_i)[4], and when we move to the right within each of the 15 graphs (higher z_r). Our main interest, however, is the comparison of the different voting structures. In marked contrast to the GH-HR prediction, 1S1V never comes out first, a result that will be discussed in more detail in Section 4. Generally, the double-bid dual-class charter seems to do better than the single-bid one if r offers a higher security value y_r, but especially so when relatively more private benefits (on average) can be extracted by the rival management team. Conversely, when the incumbent management team is able to extract relatively more private benefits than its rival team, a single-bid charter seems to do better for a wider range of distributions for r characteristics.

[4]A higher z_i forces r to bid higher, and r is often able to do so because in our experiments z_r tends to be above z_i.

Increasing the standard deviation for y_r from 0.2 to 0.3 (Figure 4) tends to intensify the value differences, not an unexpected finding in light of the option-like features in the valuation formulae. Qualitatively, though, the observations remain unaffected.

Figure 3 shows the optimum s_a's underlying the values in Figure 2. We note a tendency for extreme choices for s_a in the double-bid case when the rival comes out of a distribution with potentially higher private benefits. The picture for the single-bid case is more varying, generally displaying a more U- or hill-shaped pattern.

It is, we think, fair to say that our results are rather different from the GH-HR ones. To confirm this result and deepen our understanding, we look at the same problem again, this time following GH-HR more closely by assuming away all uncertainty about r's cashflow generating capabilities. Thus, in the next section we show that even if we adopt the GH-HR certainty assumption, 1S1V is rarely optimal. In addition, this analysis helps the interpretation of some of the *ex ante* results in the uncertainty case.

4 GH-HR Ex Post optimal sharing & voting structure

Starting from the conditions and payoff structures for single- and dual-class bids of Section 2 we examine in what optima the formally dual structure collapses into a a virtual 1S1V. Such a pseudo-1S1V arises when the optimal dual-class charter is a single-bid one with $s_a = 1$. Such a charter is as good as 1S1V since the votes assigned to the B-shares are, apparently, not useful to anybody. A double-bid optimum, in contrast, can never collapse to a virtual 1S1V: even when $s_a = 1$, the double-bid assumption is that the class-B shares are needed for a majority, which is incompatible with 1S1V-equivalence.

4.1 Scenario 1: The incumbent provides larger security benefits

Mathematically, the GH-HR type analysis depends heavily on whether $y_i > y_r$ or not. In this section we consider all cases with $y_i > y_r$, in ascending order of z_r. With $y_i > y_r$, a higher s_a generally increases the takeover value, which also means that the requirements in terms of z_r become tougher.

- $z_r < z_i$. This implies that, even with $s_a = 0$, r's reservation price remains below i's.

There is no bid, and the firm value is y_i.

- $z_i \leq z_r \leq z_i + (y_i - y_r)$. With these parameter values it is feasible for the entrepreneur to trigger a bid on the A shares. For instance, with a charter stipulating $s_a = 0$, the no-loss condition (2.6) for a bid on the A shares simplifies to $z_r > z_i$, which is satisfied in the domain currently considered. But as a higher s_a improves the value of the firm, it is optimal to increase s_a until the no-loss condition (2.6) holds as an equality. Thus, we get the rent-extracting solution,

$$\text{if } z_i \leq z_r \leq z_i + y_i - y_r \text{ then } 0 \leq s_a^* = \frac{z_r - z_i}{y_i - y_r} \leq 1 \Rightarrow V_r^{A*} = y_r + z_r. \tag{4.17}$$

  The last result follows from plugging the optimal s_a into (2.8). Obviously, the optimal charter is not a pseudo-1S1V one—except in the special case $z_i - z_r = y_r - y_i$ ($\Rightarrow s_a = 1$). With the optimal charter, r just breaks even. A 1S1V rule would have made the takeover impossible.[5]

- $z_i + (y_i - y_r) \leq z_r \leq 2z_i + (y_i - y_r)$. Here, a bid for (just) the A shares can still be triggered, but since we cannot increase s_a beyond unity it is no longer possible to have r pay out all rents. Instead, we get the corner solution,

$$\text{if } z_i + (y_i - y_r) \leq z_r \leq 2z_i + (y_i - y_r) \text{ then } s_a^* = 1 \Rightarrow V_r^{A*} = y_i + z_i. \tag{4.18}$$

  In this case we do have a quasi-1S1V rule: $s_a = 1 = v_a$ would perform equally well as a two-class/single-bid structure with $s_a = 1 > v_a > 1/2$ that we consider here.

- $z_r > 2z_i + (y_i - y_r)$. Now a double-bid takeover becomes possible. In the value formula (2.16), both Max() terms are "in the money" because $z_i \geq 0$ and, by assumption, $y_i > y_r$. Thus, $V_r^{AB} = y_r + (y_i - y_r) + 2z_i = y_i + 2z_i$, which dominates the outcome of the single-bid solution, $y_i + z_i$.[6]

$$\text{if } z_r > 2z_i + (y_i - y_r) \text{ then } V_r^{AB*} = y_i + 2z_i \text{ for any } s_a. \tag{4.19}$$

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[5] Note also that even though the optimal s_a forces the rival to pay out the entire value, this is still below the total value under i's management (that is, $y_r + z_r < y_i + z_i$). To see this, note that if r's no-loss condition is met exactly with $s_a^* < 1$ and if $y_i - y_r > 0$, then $z_r - z_i = s_a^*(y_i - y_r) < (y_i - y_r)$, that is, $y_r + z_r < y_i + z_i$. Worse, if $y_i - y_r > z_i$, this solution may entail a drop not just in social value but even in shareholder value, from y_i to $y_r + z_r$; a standard prisoner's dilemma prevents atomistic shareholders from abstaining, as the offer is conditional. If the founder has enough flexibility in writing the charter, she would stop all takeovers of that type, making the solution even less 1S1V.

[6] The first one-bid solution, paying out the full reservation value $y_r + z_r$, is no longer feasible here: it would require $s_a > 1$.

Since the two-bid solution strictly dominates here, we are back in a zone where 1S1V is suboptimal.

The finding thus far is that while in one domain quasi-1S1V does no harm, in two others it does. We no rational basis for assessing which cases would be rare and insignificant and which not.

4.2 The rival provides the larger security benefits

In the case $y_r > y_i$ a there is no unique, immediately obvious *a priori* ranking of the domains of single- *v.* double-bid games. Thus, we start with a separate analysis of single- and dual-bid games, and afterwards identify the relevant subdomains where each solution is relevant.

First assume a charter that allows a single bid. Equation (2.8) shows that the firm's value is negative in s_a, so we would like to set s_a at a lower bound:

- *Case a.* The corner solution $s_a = 0$ restricts the general no-loss set, (2.6), to the subset $z_i < z_r$, where r does keep some profit. Thus, in a single-bid game,

$$\text{if } z_i \leq z_r \text{ then } s_a^* = 0 \Rightarrow V_r^{A(a)} = y_r + z_i \ . \tag{4.20}$$

  Given that the A shares have at least half of the votes, here, the solution $s_a = 0$ is as far from 1S1V as one can get.

- *Case b.* Outside the subset $z_i < z_r$, the founder would still like to set s_a as low as possible, but now she is stopped by r's no-loss constraint rather than by the natural zero bound. The zero-profit solution $s_a^* = (z_i - z_r)/(y_r - y_i)$ is possible if it yields values in the range [0,1], that is, when $z_r \leq z_i \leq z_r + (y_r - y_i)$. Thus, in a single-bid game,

$$\text{if } z_r \leq z_i \leq z_r + (y_r - y_i) \text{ then } 0 \leq s_a^* = \frac{z_i - z_r}{y_r - y_i} \leq 1 \Rightarrow V_r^{A(b)} = y_r + z_r. \tag{4.21}$$

  Again this is not pseudo-1S1V—except in the single special case in the corner, $s_a = 1$ ($\Leftarrow z_i - z_r = y_r - y_i$).

For single-bid contests with $y_r > y_i$ there is no genuine zone with corner solutions $s_a = 1$, and therefore no regular quasi-1S1V zone. Indeed, if the founder would set $s_a = 1$, the no-loss constraint becomes $y_r + z_r \geq y_i + z_i$, that is, $z_i \leq z_r + (y_r - y_i)$, but in that domain, as we just saw, value maximisation requires s_a to be set as low as possible rather than fixed at unity.

Now consider the double bid. Considering the value formula (2.16) with its two Max(.) functions, there are three possible solutions: (c) both of the Max() terms are in the money; (d) one of them is, and (e) none of them is. We still assume $y_r > y_i$.

- *Case c.* When both of the "Max" terms in the value formula (2.16) are in the money, (2.16) again simplifies to $V_r^{AB(c)} = y_i + 2z_i$. It is easily verified that, for both Max() functions to be in the money, s_a is necessarily in the interval $[1 - z_i/(y_r - y_i), z_i/(y_r - y_i)]$, which is non-empty only if $z_i > (y_r - y_i)/2$. This condition, and similar ones derived below, guarantees feasibility, not optimality.
- *Case d.* Without loss of generality, assume the first Max in the money, the second one out. These outcomes require, respectively, $s_a < z_i/(y_r - y_i)$ — which is always feasible because $z_i \geq 0$ — and $s_a < 1 - z_i/(y_r - y_i)$, which is feasible iff $1 - z_i/(y_r - y_i) > 0$, *i.e.* $z_i < y_r - y_i$. The value-maximising double-bid charter in this case is $s_a = 0$ (when the first Max is positive), or $s_a = 1$ (when the second Max is positive).[7] In either case the value formula (2.16) reduces to $V_r^{AB(d)} = y_r + z_i$.
- *Case e.* When both of the "Max" terms in the value formula (2.16) are out the money we have $V_r^{AB(e)} = y_r$. For both Max() functions to be out the money, s_a is necessarily in the interval $[z_i/(y_r - y_i), 1 - z_i/(y_r - y_i)]$, which is non-empty only iff $z_i < (y_r - y_i)/2$.

Table 2 shows the proper orderings of the various possible intervals for the three possible orderings of z_r relative to $y_r - y_i$ and $(y_r - y_i)/2$. The table indicates which solution is possible where, what the resulting value is, and which value is dominated by an alternative charter. We note that the double-bid contest with premia for both shares, case c, is preferred only for high values of z_r, while the bid without any premium at all, case e, is not used at all. Case d is potentially more popular but does not add any value

[7]For instance, set $s_a = 0$. This means that A's pre- and post-takeover security value is zero, so that r needs to offer no more than z_i for the voting rights so as to pre-eampt a counterbid by i for the A shares. The condition $z_i < (y_r - y_i)/2$ implies $y_r > y_i + 2z_i$, that is, the security value of the B-shares (y_r) exceeds i's reservation value ($y_i + z_i$). Thus, r offers the new security value for B, and value-wise such an offer does not add anything to a single-bid offer for A where the B shares remain outstanding.

Table 2: possible outcomes when $y_r - y_i > 0$

case	Panel A: when $z_r > y_r - y_i > 0$					
z_i :	$\frac{y_r-y_i}{2}$	$y_r - y_i$	$\frac{z_r+y_r-y_i}{2}$	z_r	$z_r + y_r - y_i$	
a	$V^A = y_r + z_i$	$V^A = y_r + z_i$	$(V^A = y_r + z_i)$	$V^A = y_r + z_i$		
b					$V^A = y_r + z_r$	
c		$(V^{AB} = y_i + 2z_i)$	$V^{AB} = y_i + 2z_i$			
d	$V^{AB} = y_r + z_i$	$V^{AB} = y_r + z_i$				
e	$(V^{AB} = y_r)$					

case	Panel B: when $y_r - y_i > z_r > (y_r - y_i)/2 > 0$					
z_i :	$\frac{y_r-y_i}{2}$	z_r	$\frac{z_r+y_r-y_i}{2}$	$y_r - y_i$	$z_r + y_r - y_i$	
a	$V^A = y_r + z_i$	$V^A = y_r + z_i$				
b			$V^A = y_r + z_r$	$V^A = y_r + z_r$	$V^A = y_r + z_r$	
c		$(V^{AB} = y_i + 2z_i)$	$(V^{AB} = y_i + 2z_i)$			
d	$V^{AB} = y_r + z_i$	$V^{AB} = y_r + z_i$	$(V^{AB} = y_r + z_i)$	$(V^{AB} = y_r + z_i)$		
e	$(V^{AB} = y_r)$					

case	Panel C: when $(y_r - y_i)/2 > z_r$					
z_i :	z_r	$\frac{y_r-y_i}{2}$	$\frac{z_r+y_r-y_i}{2}$	$y_r - y_i$	$z_r + y_r - y_i$	
a	$V^A = y_r + z_i$					
b		$V^A = y_r + z_r$	$V^A = y_r + z_r$	$V^A = y_r + z_r$	$V^A = y_r + z_r$	
c			$(V^{AB} = y_i + 2z_i)$			
d	$V^{AB} = y_r + z_i$	$V^{AB} = y_r + z_i$	$(V^{AB} = y_r + z_i)$	$(V^{AB} = y_r + z_i)$		
e	$(V^{AB} = y_r)$					

Key to Table 2. The table shows the possible outcomes for various voting rules (the lines) and intervals for z_i (the columns) when $y_r - y_i > 0$. The entries in the first row show the critical z_i-values that mark the intervals. An empty box means that for the stated parameter combinations there is no bid possible of that type. A value in small font and between parentheses indicates that, for these parameter values, another charter is available that produces a higher value. Case *a* and *b* are single-bid cases, where the A shares are either pure voting stocks (case *a*: $s_a = 0$) or receive the rent-extracting income share (case *b*: $s_a = (z_i - z_r)/(y_r - y_i)$). Cases $c - e$ are double-bid charters where, respectively, two, one, or none of the "Max" terms in the value formula (2.16) are in the money. In case *c*, any s_a in $[1 - z_i/(y_r - y_i), z_i/(y_r - y_i)]$ will do, in case *d* we need $s_a = 1$ or 0, case *e* imposes no restrictions on s_a. The required voting rights for each case can be found in Table 1.

to the single-bid solution a: in terms of shareholder value, buying the B shares at the post-bid security value $s_b y_r$ does not bring any gains to the investor relative to leaving these shares in the market.

With respect to optimal voting/sharing structure, we have already noted that the quasi-1S1V case does not occur at all when $y_r > y_i$, a conclusion that worsens the already dismal picture we got for $y_i > y_r$ (where only one of the solutions produces 1S1V). This negative conclusion confirms that our earlier results are due to the extension of the GH-HR *ex post* analysis to cases where private benefits arise on both sides, not to the *ex ante* aspect. The *ex post* analysis also predicts the patterns we find in the *ex ante* work, althrough the latter are, of course, smeared out. The *ex post* analysis also tells us that the sign of $(y_r - y_i)$ makes a lot of difference. This explains why in the single bid the effect of s_a on value gets so blurred when realisations with positive $(y_r - y_i)$ get mixed with negative sampled values, and why the optimal s_as are occasionally U-shaped in z_r.

5 Conclusions

In this paper, we extend the theoretical framework in Grossman and Hart (1988) and Harris and Raviv (1989), by looking extensively at control contests when *both* the rival and incumbent potentially can enjoy private perks or realize synergies from being in control of the target firm. The analysis of the game adds interesting new elements to the above seminal papers, and shows that within our setting 1S1V can rarely be an optimal structure in terms of maximising the IPO value of the firm if the rival's characteristics are known in advance. 1S1V lacks two useful ingredients: the flexibility in sharing rules that sometimes leads to complete rent extraction, and the extra premia that sometimes have to be paid when r needs two classes of shares while, to i, one class is sufficient to maintain the *status quo*. We also allow for the rival's characteristics to be stochastic at the time the charter is written, and we numerically solve for the optimal structure by maximising expected firm value across a distribution of possible rivals. We find that 1S1V never comes out first. A last contribution of the paper is that we explore the gains from issuing more than two classes of shares.

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