Deviations from One-Share One-Vote can be Optimal: An Entrepreneur's Point of View *

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Abstract

In light of renewed interest in the relation between shareholder protection and control arrangements, we thoroughly review the optimality of one-share one-vote (1S1V). The issue is what set of rules the entrepreneur will put in place, *re* take-overs, so as to maximize the IPO value of the firm. The structural changes we admit relative to the original setting of Grossman and Hart (GH, 1988) and Harris and Raviv (HR, 1989) are that both incumbent and rival management can have private benefits rather than just one of them, and that bids are unconditional offers for all shares. We first explore the set-up where the entrepreneur-founder knows the characteristics of the incumbent and rival management team and extend the analysis further to the imperfect-foresight problem where the entrepreneur-founder only knows the distribution from which the rival will be drawn. We find that, from the founder's perspective, 1S1V is never optimal with imperfect foresight, and its optimality is surprisingly rare even with perfect foresight. We also explain why governments rarely step in: from simulations we find that the social impact of the charter choice seems to be far smaller than the private impact (on IPO value or post-take-over value). Lastly, we go beyond the dual-class case, explaining the role and usefulness of multiple-class structures.

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Introduction

Google's 2004 IPO was innovative in many ways: it relied on a Dutch auction and the amount first announced equaled 2,718,281,828 billion (that is, e, the Neperian base); but also, as news.com.com writes (April 29, 2004),

> In an unusual provision for a technology company, Google will create two classes of shares with different voting rights [...]. Such structures have proved beneficial in media companies such as The New York Times, the filing states.

The newsflash adds that the dual-class charter is meant to preserve control for the owners, echoing Bebchuck's (1999) rent-protection theory. Yet preventing take-overs needs not to be the sole purpose of such a structure. We examine how, relative to a one-share one-vote (1S1V) charter, a dual- or multiple-class voting structure interacts with majority requirements to create extra shareholder value in case of a take-over bid, and to what extent the owner's optimum deviates from the social optimum.

The seminal papers in the literature on voting structure, Grossman and Hart (GH, 1988) and Harris and Raviv (HR, 1988, 1989) derive conditions for the optimality of 1S1V. The GH-HR papers have a rather similar set-up (which we broadly adopt in our work). 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 establish conditions for the optimality of 1S1V from the perspective of an entrepreneur writing a charter. They argue that, by and large, 1S1V is optimal. They do acknowledge exceptions, but confine that particular part of their analysis to an example, arguing that these exceptions should be rare and insignificant. HR(1988), in a similar set-up, find that a simple majority rule in combination with 1S1V are the socially optimal structure. However, an entrepreneur in their model, if allowed, would prefer to issue two extreme securities, one with pure votes and one with only cash flow rights. In a more general version of their first paper, HR(1989) stress that an entrepreneur would optimally issue a single voting security, and that this "generalizes the results of GH(1988) and HR(1988) who proved the optimality of one-share one-vote ..."

The focus of the above papers and the claim of one-share one-vote being an optimal structure overall, fit in a context. First, the papers were written at a time a policy debate was in full swing as to whether the 1S1V structure had to be a requirement for listing on a US stock exchange. The research question in GH and HR is therefore rather normative, focused on whether exceptions on 1S1V should be allowed for or not, rather than on examining the mechanics behind these deviations. Second, in the US dual-class structures are rather rare. In Europe they are not. The Scandinavian countries as well as Switzerland and Italy, for instance, have long had restricted and unrestricted stock with different voting rights. The Dutch have an extreme form of non-1S1V: the original shares are placed into a trust, which then keeps the voting rights and passes on the cash rights to certificates. While the Scandinavian and Swiss dual-share structures seem to be on the way out, the Dutch *administratiekantoor* structure remains quite popular and is now even spreading to Belgium. Belgium used to have, and Germany still has, an upper limit on the number of votes that could be effectively used by a single shareholder in the General Assembly. Volkswagen's charter not only limits a single shareholder's voting rights to 20 percent, but even requires an 80 percent majority for a take-over (and other major decisions), thus giving one large shareholder—the *Land* Niedersachsen—a veto. A number of well publicized recent IPOs in the US also introduced dual or multiple share classes (*e.g.* Google, Agere). The EU is starting hearings (April, 2006) on whether or not there should be a 1S1V Directive (which, if issued, gets codified into law in all EU countries). This far from exhaustive list shows that 1S1V is not a universally accepted system. This raises the positive-economics issue as to what prompts the writers of charters to deviate from 1S1V as predicted in GH(1988) and HR(1989) or from extreme securities as in HR(1988), and the shareholders and regulators to accept changes away from 1S1V.

Dual-class security structures have been studied before.[1] Bergstrom and Rydqvist (1992) analyze why differences occur in take-over bids on shares which differ in voting rights. The authors therefore develop a framework that introduces blockholders and restrict private benefits to pure synergy gains, therefore focusing on extra rents for the bidding firm only. Their analysis

[1] An interesting survey of the field (and related corporate governance issues) is provided by Becht, Bolton and Roell (2003).

based on Swedish data shows that a blockholder prefers dual class structures, even if 1S1V maximizes the value of the firm. The rival's bid prices are equal when no blockholders are present, otherwise bids are differentiated. Taylor and Whittred (1998) 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 in an attempt to measure private benefits of control in the Italian market, Zingales (1994) finds that voting shares carry a premium of up to 82% compared to nonvoting shares. Using data from the same market, Nicodano (1998) examines the relationship between group structures and the voting premia on dual class shares. And, as mentioned, Grossman and Hart (1988) offer some numerical examples of cases where 1S1V does less well. Blair, Golbe and Gerard (1989) discuss the difference between a rival bidding for the shares cum voting rights or for just the pure voting rights. Capital gains taxes, they show, would make the second option more attractive.

Another theoretical justification of deviations of 1S1V is based on the behavior of large blockholders or on poor shareholder protection (*e.g.* La Porta, Lopez-de-Silanes and Shleifer, 1999 and Faccio and Lang, 2002), or focuses on post-takeover moral-hazard problems. In this last category, Burkart, Gromb and Panuzzi (1998), for instance, find that one-share one-vote is not necessarily optimal, even from a social point of view.

Finally, the issue is the subject of discussion in circles seeking to harmonize take-over rules in the EU. Some parties, arguing violations of 1S1V disrespect a basic inequality principle, call for limits on the power of high voting shares in so-called "break-away" rules based on a "proportionality principle" (for an overview see eg. Bechmann and Raaballe, 2003). Other academics (eg. Bebchuk and Hart, 2002) refute these attempts by simply arguing that firms could easily circumvent such regulation by setting up pyramid structures. Furthermore, buyers of high voting stock would have already paid a premium for superior voting securities at the time of purchase; by a change of the rules, they would see their acquired rights violated.

In light of this renewed interest, and keeping in mind the widespread violations of 1S1V in reality, we find it useful to thoroughly evaluate the optimality of one-share one-vote within the basic GH-HR setting, without the complication of big structural modifications. So we base our analysis in general on GH(1988) and HR(1989). Deviations between our and their work have to do with the objectives of the study and with two restrictions that are relaxed. Whereas the motivation of GH-HR is normative—to prove or disprove the optimality of 1S1V issue from the viewpoint of the entrepreneur at the design stage—our aim is positive: we attempt to understand why, in reality, entrepreneurs appear to set up a myriad of different voting structures. The modified assumptions are threefold (neither of them touching on the basic structure). First, GH-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? Second, by splitting the original design problem in several scenarios according to the characteristics of the rival and incumbent management teams and by omitting the above scenario with potential control perks for both the rival and the incumbent management teams, GH-HR implicitly assume 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 an entrepreneur with realistically imperfect foresight should assign the voting rights and determine the majority rules, having in mind a distribution rather than an individual realization. The third modification is technical: in line with the post-GH-HR literature we consider just conditional bids for all shares. Unconditional bids create a problem with the existence of equilibrium (see e.g. Bagnoli and Lipman, 1988). Also, take-over codes (EU, UK) often prescribe that a change of control should lead to a bid for all outstanding shares; and in practice, offers are are formally unconditional are typically so hedged-around with escape clauses that the difference with conditional bids becomes tenuous (Bagnoli and Lipman, 1988).

We find that, by focusing on special cases and excluding the case where both contenders can derive private benefits, GH-HR miss cases where dual-class structures outperform 1S1V even with perfect foresight about the bidder's characteristics, and therefore overstating the optimality of 1S1V. Consistent with this, our imperfect-foresight analysis fails to produce even a single case where 1S1V does better than the two competing dual-class charters that enter our horse race. Thus, we have an explanation why deviations from 1S1V are far from uncommon. But we also explain why governments rarely step in: as far as we can tell by our simulations, the social impact of the charter choice turns out to be far smaller than the private impact (on IPO value or post-take-over value). In passing, we also go beyond the dual-class case, explaining the role and usefulness of multiple-class structures.

This note 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 perfect-foresight analysis of the optimal charter, and Section 4 the results of the imperfect-foresight analysis. Section 5 concludes.

1 Model set-up

In setting up our model we choose to closely follow the assumptions in GH. 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 text, we limit this to a dual-class system with class-A and class-B shares having, respectively, voting powers v_a and $v_b = 1 - v_a$, and cash-flow rights $s_a y$ and $s_b y = (1 - s_a)y$. 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. 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 explicitly 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 favor 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]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. But this detail matters little: with bids for all shares, the vital question is whether or not the A shares suffice to gain control.

Table 1: **Classification of voting rules and bidding games**

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

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 the A- or B-shares;
- the single bid: r bids for the A shares, and i can thwart r only by buying these very A-shares.

Thus, a single bid by r for the low-voting-power 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

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, the bidding game for the A shares follows the standard logic of a single-class bid without negotiation option:

Proposition 1 *Under GH assumptions except that each player has potential private benefits* *of control, upon arrival of the bidder the value of the company in a single-bid game equals*

$$V^A = \begin{cases} y_r + Max(z_i + s_a[y_i - y_r], 0) & , \textit{if } s_a y_r + z_r > s_a y_i + z_i \\ \\ y_i & , \textit{otherwise.} \end{cases} \quad (1)$$

Proof The characteristics of the optimal bid prices p_a if r is to win a bid for the A-shares are:

$$\begin{aligned} p_{a,r} &\geq p_{a,i}, & (2) \\ p_{a,r} &\geq s_a y_r, & (3) \\ p_{a,r} &\leq s_a y_r + z_r, & (4) \\ p_{a,i} &\geq s_a y_i, & (5) \\ p_{a,i} &\leq s_a y_i + z_i. & (6) \end{aligned}$$

Condition (2) simply says that r outbids i. The lower bound on r's bid price in (3) 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 (4) is r's reservation price, beyond which r's 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, *i.e.*

$$r \text{ wins if } s_a y_r + z_r > s_a y_i + z_i. \quad (7)$$

In Section 4, we refer to this condition as r's success condition. Given (7), the most economical bid that meets all constraints is to offer i's reservation price or the post-bid security value, whichever is the highest:

$$p_{a,r} = \text{Max}(s_a y_r, s_a y_i + z_i). \quad (8)$$

The value of the target company as a whole is then found by adding the post-bid value of the B shares, $(1 - s_a)y_r$:

$$\begin{aligned} V_r^A &= \text{Max}(s_a y_r, s_a y_i + z_i) + (1 - s_a) y_r. \\ &= y_r + \text{Max}(z_i + s_a[y_i - y_r], 0). & (9) \end{aligned}$$

In contrast, if r's success condition, (7), is not met the value of the target company stays at y_i. **QED**

2.2 The double-bid game

Proposition 2 *Under GH assumptions except that each player has potential private benefits of control, upon arrival of the bidder the value of the company in a double-bid game equals*

$$V^A = \begin{cases} y_r + Max(0, s_a(y_i - y_r) + z_i) + Max(0, s_b(y_i - y_r) + z_i) & , \textit{if } y_r + z_r > y_i + 2z_i \\ y_i & , \textit{otherwise.} \end{cases} \tag{10}$$

Proof 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,

$$\begin{aligned} p_{a,r} &\geq p_{a,i}, \\ p_{b,r} &\geq p_{b,i}, \end{aligned} \tag{11}$$

$$\begin{aligned} p_{a,r} &\geq s_a y_r, \\ p_{b,r} &\geq s_b y_r, \end{aligned} \tag{12}$$

$$p_{a,r} + p_{b,r} \leq y_r + z_r. \tag{13}$$

The first four equations are the outbidding and the no-free-riding conditions, two of each. The fifth one provides r's reservation value for the combined bids: 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.

To proceed, note the two advantages of the incumbent over the rival. 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 afford to wait and see whether a winning counterbid is feasible and, if two counterbids are feasible, which of these is the cheaper one. Thus, in its first move r must prevent each of the two possible counterbids, by bidding high for both classes taking into account the following constraints (no free riding, and no loss for i) upon i's rational counterbid:

$$\begin{aligned} \text{bounds on } p_{a,i}\text{: } s_a y_i \leq p_{a,i} &\leq s_a y_i + z_i, \\ \text{bounds on } p_{b,i}\text{: } s_b y_i \leq p_{b,i} &\leq s_b y_i + z_i. \end{aligned} \tag{14}$$

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:

$$p_{a,r} \geq s_a y_i + z_i, \tag{15}$$

$$p_{b,r} \geq s_b y_i + z_i. \tag{16}$$

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

$$y_r + z_r \geq y_i + 2z_i. \tag{17}$$

Thus, compared to (7), to i a dollar of private benefits now provides twice as much firepower as it does to r. If (17) is met, r takes over the target at the lowest prices that satisfy both (15), (16), and the free-rider bounds; that is, the value of the firm becomes

$$\begin{aligned} V_r^{AB} &= p_{a,r} + p_{b,r} \\ &= \text{Max}(s_a y_r, s_a y_i + z_i) + \text{Max}(s_b y_r, s_b y_i + z_i) \\ &= y_r + \text{Max}(0, s_a(y_i - y_r) + z_i) + \text{Max}(0, s_b(y_i - y_r) + z_i). \end{aligned} \tag{18}$$

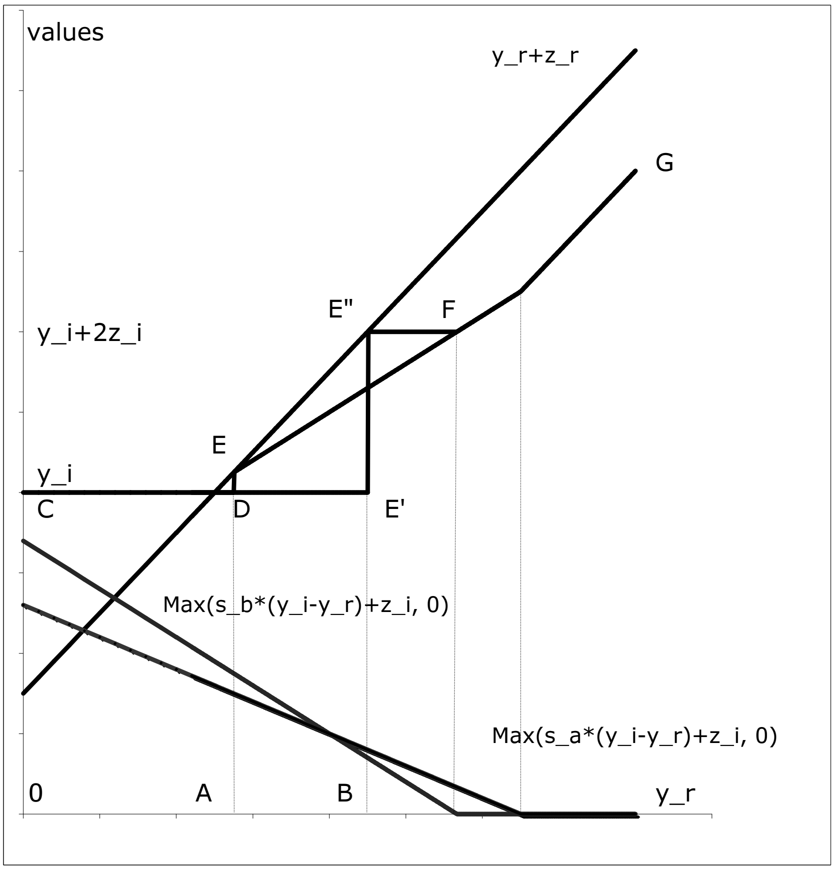
QED

Figure 1 shows the differences between the two charters' implied takeover values as a function of y_r. For the same s_a (set at 0.4) etc, the double bid generates a higher hurdle value for y_r because of the double-firepower effect: a single-bid takeover would have been possible as of $y_r = OA$, the double bid requires $y_r = OB$. For lower y_r, the company's value remains at y_i. The takeover value with a single bid goes from point D to point F and G via E, the double-bid value via E' and E". So the advantage of the double bid is that, when it does kick in, the value is higher: the target's value immediately rises from y_i to $y_i + 2z_i$ because both "options" in Equation (18) start "in the money". For higher values of y_r its value remains at this plateau until one of the options peters out (the one with the largest s), as of which point there is no more gain relative to the single-bid game. The graph also reminds us that when y_r is exactly at the break-even value, all value is extracted from the rival. Thus, for the critical value $y_r = OA$ the single-bid charter with this particular s_a (0.4, here) is value-maximizing while for $y_r = OA$ the double-bid charter with that s_a is.

2.3 A generalization 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 broaden our approach and verify to what extent a multiple-class

Figure 1: **Single- and double-bid IPO values as a function of y_r.**



Key to Figure 1 A single-bid takeover becomes feasible as of $y_r \geq OA$, the double bid as of $y_r \geq OB$. For lower y_r, the company's value remains at y_i. The takeover value with a single bid goes from point D tot point F and G via E, the double-bid value via E' and E".

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 games 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 analyzed, 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 a 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.

* * *

These caveats have 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 proceeds from selling the securities in the open market ("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 of three charter does best: 1S1V, the dual-class with a single-bid structure, or the double-bid one.

The assumption implicitly 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, while we initially provide a GH-HR type perfect-foresight analysis (Section 3), we then 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 (Section 4).

3 GH-HR perfect-foresight 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, if optimal, 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.

3.1 Scenario 1: The incumbent provides larger security benefits

Mathematically, the GH-HR perfect-foresight 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 (see (8)), which also means that the requirements in terms of z_r become tougher.

Proposition 3 *Under the assumptions of this paper, if $y_i > y_r$ the optimal cash distribution rule and the resulting value of the company upon arrival of the bidder are given by*

$$\text{if } z_r < z_i : \qquad V = y_i \text{ for any } s_a; \tag{19}$$

$$\text{if } z_i \leq z_r \leq z_i + (y_i - y_r) : \qquad 0 \leq s_a^* = \frac{z_r - z_i}{y_i - y_r} \leq 1 \Rightarrow V_r^{A*} = y_r + z_r; \tag{20}$$

$$\text{if } z_i + (y_i - y_r) \leq z_r \leq 2z_i + (y_i - y_r) : \qquad s_a^* = 1 \Rightarrow V_r^{A*} = y_i + z_i; \tag{21}$$

$$\text{if } z_r > 2z_i + (y_i - y_r) : \qquad V_r^{AB*} = y_i + 2z_i \text{ for any } s_a. \tag{22}$$

There is no take-over in the first case under any charter. 1S1V is optimal only in case 3. In case 2 the single-bid dual-class charter is optimal, in case 4 the double-bid dual-class one.

Proof We discuss the cases on the basis of ascending z_i:

- $z_r < z_i$. This implies that, even with $s_a = 0$, r's reservation price remains below i's. There is no bid, and the firm's market 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 $s_a = 0$, r's success condition (7) 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 r's success condition (7) holds as an equality: $s_a^* = (z_r - z_i)/(y_i - y_r)$. Of course, this makes sense only as long as $(z_r - z_i)/(y_i - y_r) \leq 1$, *i.e.* as long as $z_r \leq z_i + y_i - y_r$, which therefore becomes the upper bound on z_r for this type of solution. In short, in this domain we get a rent-extracting solution,

$$\text{if } z_i \leq z_r \leq z_i + y_i - y_r \text{ then } 0 \leq s_a^* = \frac{z_r - z_i}{y_i - y_r} \leq 1 \Rightarrow V_r^{A*} = y_r + z_r. \tag{23}$$

  The last result follows from plugging the optimal s_a into (9).

- $z_i + (y_i - y_r) \leq z_r \leq 2z_i + (y_i - y_r)$. The bounds on this fourth z_r domain are, respectively, the value where the s_a^* of the previous domain hits the bound $s_a^* \leq 1$, and the value that makes a double-bid takeover more attractive to r, as we shall see. 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 are stuck in the corner ($s_a^* = 1$), where r merely matches i's corresponding reservation price:

$$\text{if } z_i + (y_i - y_r) \leq z_r \leq 2z_i + (y_i - y_r) \text{ then } s_a^* = 1 \Rightarrow V_r^{A*} = y_i + z_i. \tag{24}$$

  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 r's preferred solution. In the value formula (18), 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 does dominate the outcome of the single-bid solution, $y_i + z_i$.[3]

$$\text{if } z_r > 2z_i + (y_i - y_r) \text{ then } V_r^{AB*} = y_i + 2z_i \text{ for any } s_a. \tag{25}$$

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

QED

In the first case, no bid is possible under any charter. Case 2 allows the owner to extract all rent with a dual-class structure and a single-bid take-over rule; with the optimal charter, r then just breaks even. Only in case 3 the optimal charter is a pseudo-1S1V one: $s_a = 1 = v_a$ would perform equally well as a two-class/single-bid structure with $s_a = 1 > v_a > 1/2$ that we consider here. Case 4, lastly, would mean that a dual-class, double-bid charter is optimal. Thus, the finding at this stage is that while in one domain quasi-1S1V does no harm from the founder's point of view, in two others it does.

3.2 The rival provides the larger security benefits

In the case $y_r > y_i$ there is no unique, immediately obvious *a priori* ranking of the domains of single- v. double-bid games. It is possible to identify five relevant types of charters/games, and fifteen relevant domains for the parameter combinations (y, z). In some domains, there are two games/charters that provide the same optimal outcome. The optimal dual-class charter now is a pseudo-1S1V one only if both contenders generate the same social value:

Proposition 4 *Under the assumptions of this paper, if $y_i > y_r$ the optimal cash distribution rule and the resulting value of the company upon arrival of the bidder are given by Table 2. For 1S1V to be as good as the best dual-class charter from the founder's point of view, one needs equal social value ($y_r + z_r = y_i + z_i$). In all other cases the founder selects a dual-class charter.*

Proof We start with a separate analysis of single- and dual-bid games, and afterwards identify the relevant domains where each solution is relevant. First assume a charter that allows a single bid. Equation (9) shows that, with $y_r > y_i$, the firm's value is now negative in s_a, so we would like to set s_a at a lower bound. The lower bound is provided either by the constraint $s_a^* \geq 0$ or r's success condition for single or double bids.

- *Case a.* The corner solution $s_a = 0$ restricts the general no-loss set, (7), to the subset $z_i < z_r$, where r does keep some profit. Thus, in a single-bid game,

$$\text{if } z_i \leq z_r \text{ then } s_a^* = 0 \Rightarrow V_r^{A(a)} = y_r + z_i \ . \tag{26}$$

  Given that, by assumption, the A shares have at least half of the votes, the solution $s_a = 0$ is far from 1S1V.

- *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 success condition 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,

$$\text{if } z_r \leq z_i \leq z_r + (y_r - y_i) \text{ then } 0 \leq s_a^* = \frac{z_i - z_r}{y_r - y_i} \leq 1 \Rightarrow V_r^{A(b)} = y_r + z_r. \tag{27}$$

  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 $s_a = 1$, r's success condition 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 maximization requires s_a to be set as low as possible rather than fixed at unity.

Now consider the double bid. Considering the value formula (18) 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 $y_r > y_i$. First we note that the general success condition for double bids, (17), limits the admissible values for z_i for all three cases:

$$y_r + z_r \geq y_i + 2z_i \Rightarrow z_i \leq \frac{y_r - y_i + z_r}{2}. \tag{28}$$

We now look at each of the three cases:

- *Case c.* When both of the "Max" terms in the value formula (18) are in the money, (18) 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. The value of s_a has no impact on the value

- *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-maximizing double-bid charter in this case is $s_a = 0$ (if the first Max is positive), or $s_a = 1$ (if the second Max is positive).[4] In either case the value formula (18) reduces to $V_r^{AB(d)} = y_r + z_i$.

[4]For instance, set $s_a = 0$. This means that A's pre- and post-takeover value as a claim on cashflows is zero.

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	$V^{AB} = y_r + z_i$	$V^{AB} = y_r + z_i$	$(V^{AB} = y_r + z_i)$			
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	$V^{AB} = y_r + z_i$	$V^{AB} = y_r + z_i$	$V^{AB} = y_r + z_i$			
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 cell 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 (18) 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.

- *Case e.* When both of the "Max" terms in the value formula (18) 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 $z_i < (y_r - y_i)/2$.

Thus, r needs to offer no more than z_i for the voting rights so as to forestall a counterbid by i for the A shares. The condition $z_i < (y_r - y_i)/2$ implies $y_r > y_i + 2z_i$, implying in turn that the security value of the B-shares (y_r) does exceed i's reservation value ($y_i + z_i$). Thus, r offers the post-bid 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 at the post-bid security value.

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, from thee founder's point of view. Specifically, 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, in that domain, another charter is available that produces a higher value. **QED**.

We note that the double-bid contest with premia for both shares, case c, is preferred only for high values of z_r (where the double-firepower feature comes in handy), while the bid with a zero premium over the current security value, case e with $V^{AB} - y_i$, is not used at all. Case d is potentially more popular but does not add any value 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.

3.3 Social value versus IPO value

From the above, under a perfect-foresight the founder would only exceptionally chose a 1S1V charter. Is this socially recommendable? In this section we compare the social-value criterion, which we take to be $(z_r + y_r) - (z_i + y_i)$, to r's success condition.

- Under 1S1V, where $s_a = 1$, there is no distinction between r's condition for success, (7), and the total value criterion.
- For dual-bid charters the difference between r's condition for success, (17), and the total value criterion is easily identified as:

$$\begin{aligned} r\text{'s success condition:} \qquad & (y_r + z_r) > (y_i - 2z_i) \\ \Leftrightarrow \qquad & (z_r + y_r) - (z_i + y_i) > z_i. \end{aligned} \tag{29}$$

  It follows that all takeovers of this type do add value. However, some takeovers that would have taken place under 1S1V are now impossible, and this is especially a problem when the incumbent has large private benefits. The source of the inefficiency here is that one dollar of private benefits has more firepower to the incumbent than to the rival, who has to spread her resources for two battles.
- For single-bid games, lastly, we again start from r's condition for success, (7), and then

rearrange to bring out the difference with the total-value criterion:

$$\begin{aligned} r\text{'s success condition:} \qquad & (s_a y_r + z_r) - (s_a y_i + z_i) > 0 \\ \Leftrightarrow \qquad & (z_r + y_r) - (z_i + y_i) > \begin{cases} (z_i - z_r)\left(\frac{1}{s_a} - 1\right) \\ \\ (y_r - y_i)(1 - s_a) \end{cases} . \end{aligned} \tag{30}$$

It follows that takeovers that are possible only under a dual-class charter are socially undesirable. Bad takeovers of this type all have $s_a < 1$ and either $z_r > z_i$ or $y_i > y_r$; and given that either of these holds, a smaller s_a increases the amount of social loss that is compatible with a private gain. Equally obvious, when $z_r < z_i$ or $y_r > y_i$, some socially desirable takeovers will not take place, and the lower s_a the higher the missed social gain can be. The source of the inefficiency is that some of the value added leaks away to the B shares (when $y_r > y_i$), which stops some socially desirable takeovers, or that the B-shares cross-subsidize socially undesirable takeovers (when $y_r < y_i$).

The takeover is, notably, value-reducing in case 2 of Proposition 3. Even though, in case 2, 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, $y_r + z_r < y_i + z_i$). Worse, if $y_i - y_r > z_i$, this solution may entail a drop not just in social value but even in post-takeover 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. Here is founder's interest deviates from the interest of not just society but even of the shareholders he sells to.

All these results rely on the perfect-forecast condition. When the founder knows only approximately what the rival's characteristics are, a tailor-made charter will sink the take-over when the rival does not meet the critical standards implicit in the charter. We accordingly proceed to the imperfect-foresight case, Section 4. The numerical results provided in that section also shed light on how wide the gap between social and private interest may be.

4 Optimal sharing & voting structure under uncertainty

In this section we more realistically view y_r and z_r as random variables, given the information available at the time the charter is designed. The values for y_i and z_i, in contrast, are taken to be deterministic because the entrepreneur appoints a known party as the initial management team. The problem now is

$$\max_{s_a, v_a} \int_{z_r=0}^{\infty} \int_{y_r=0}^{\infty} V(y_r, z_r; s_a, v_a, y_i, z_i) f(y_r, z_r) \mathrm{d}y_r \mathrm{d}z_r. \tag{31}$$

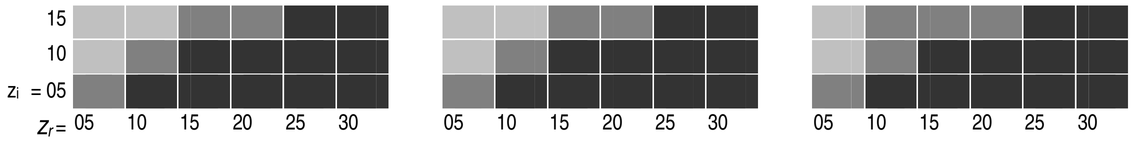
Note that this is *not* just an expected value of the values derived in the preceding sections. The previous results, so to speak, allow the founder to quickly revise the charter as soon as a rival shows up. Here, in contrast, the owners can no longer raise the lower bound if and when they see that the bidder is exceptionally strong; nor is any softening of the conditions possible anymore if the rival turns out to be somewhat weaker than expected: now the idea of bidding would be dropped. So in either case there now is an opportunity loss, relative to the perfect-foresight case.

Although an analytical solution of Equation (31) under e.g. normal, lognormal or uniform distributions is not overly difficult, it is tedious and hard to survey, so we prefer to present numerical results. We choose normal distributions for y_r and z_r. We normalize y_i to unity and consider expected values for y_r that range from relatively weak to strong— 0.9, 1, 1.1 — with standard deviations of 0.3. Our values for the incumbent's private benefits z_i are set at either 0.05, 0.1 or 0.15. For the rival's private benefits z_r, we choose distributions with mean values of 0.05, 0.1, 0.15, 0.2 and 0.25, and a standard deviation of 0.03. The reason for including distributions with higher means for z_r is that especially the interested rival management teams will be the ones that hope on larger synergy gains, allowing for the potential extraction of larger private benefits. This gives us in total $3 \times 3 \times 5 = 45$ different combinations of distributions,[5] each with its optimal choice of voting structure and its resulting value of the target firm. We solve numerically, by discretizing and assigning to each point in the (y_r, z_r) grid the corresponding joint normal probability value. For each distribution we calculate values of about 40,000 grid points. Then we maximize the IPO value of the firm— the proceeds to the founder, when the firm is floated—by varying/optimizing the proportion of cash flow rights assigned to each class of securities.

Figure 2 shows what charter maximizes the IPO value under what parameter constellations. In the vertical dimension we array the three values of z_i, horizontally the six values of z_r, both as percentages of y_i. The values of y_r/y_i are 0.9 (leftmost graph), 1 (middle) and 1.1 (rightmost). A dark-gray cell indicates that a double-bid charter dominates, the medium grey marks a clear dominance of a single-bid charter with $s_a < 1$, and the light gray signals a signal-bid charter that has only a marginal advantage ($< 0.25\%$) over 1S1V. We find that the double-

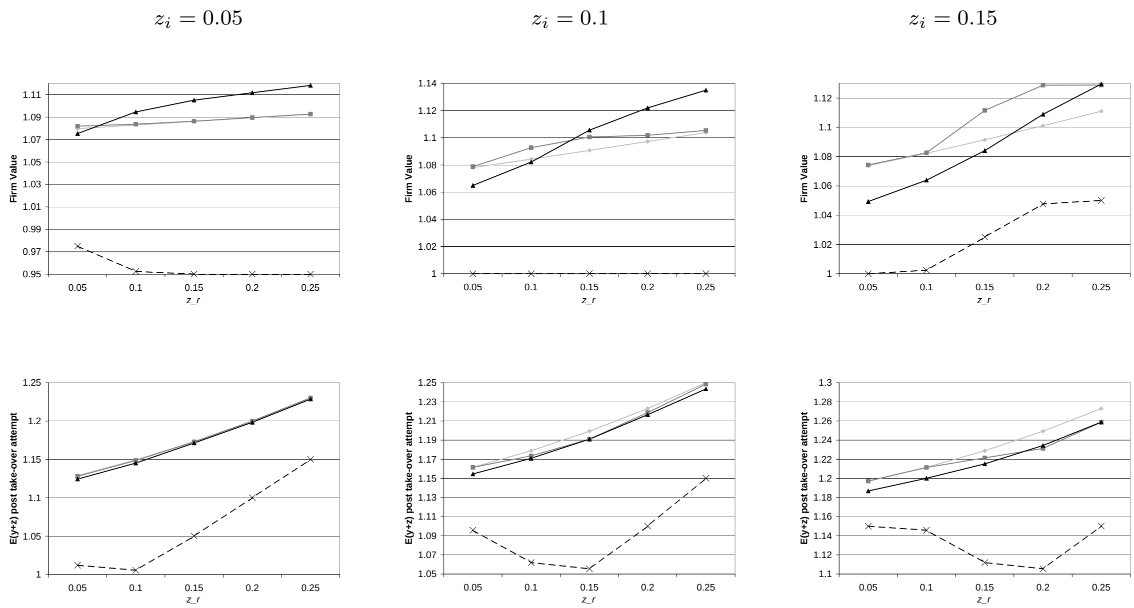
[5]The issue is of course not to cover all possible distributions, but to allow for various combinations of characteristics for both the rival and incumbent management teams. We have conducted a sensitivity analysis by changing standard deviations and extending the range for y_r's, however, the pattern of the results does not change. We therefore omit these simulations from the discussion.

Figure 2: **Optimal charter class for various parameter constellations.**



Key to Figure 2 In the vertical dimension we array the three values of z_i, horizontally the six values of z_r, both as percentages of y_i. The values of y_r/y_i are 0.9 (leftmost graph), 1 (middle) and 1.1 (rightmost). A dark-gray cell indicates that a double-bid charter dominates, the medium grey marks a clear dominance of a single-bid charter with $s_a < 1$, and the light gray signals a signal-bid charter that has only a marginal advantage ($< 0.25\%$) over 1S1V.

Figure 3: **Comparison of voting structures. The rival management team is expected to generate LESS benefits to security holders than the incumbent management team.** ($y_r = 0.9 < y_i = 1$)



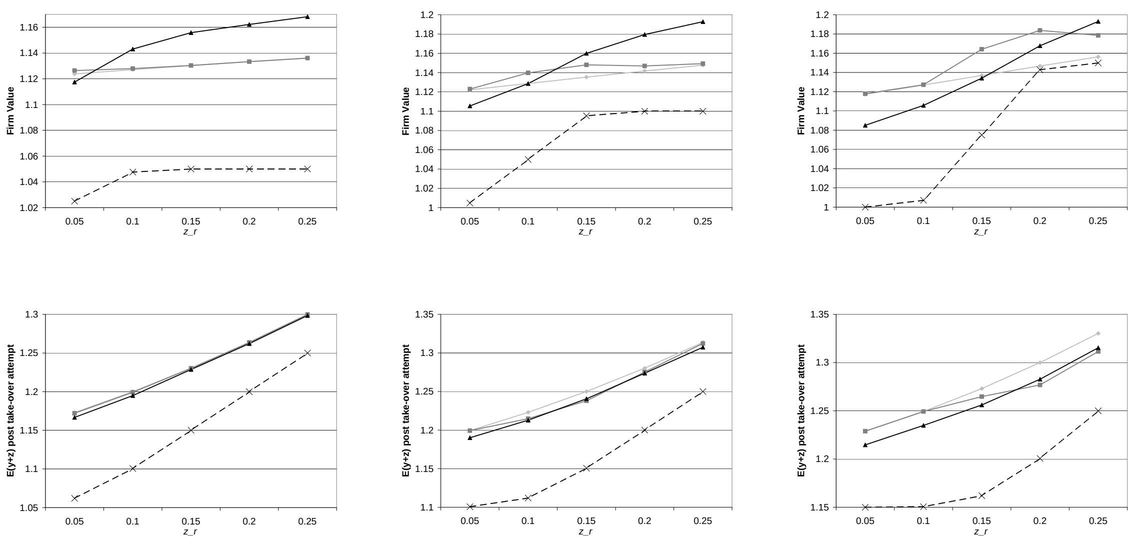
Key to Figure 3 Top row: Firm value when entrepreneur maximizes IPO value. Lower row: Expected $y + z$ after the take-over stage. Characteristics of the incumbent management team are deterministic: $y_i = 1$ and z_i set at either 0.05 (left column), 0.1 (middle column) or 0.15 (right column). Management characteristics for the rival: normally distributed y_r with mean of 0.9 and standard deviation of 0.3. Normally distributed z_r's with means of 0.05, 0.1, 0.15, 0.2, 0.25 and 0.3 each time with a standard deviation of 0.03. Light line connecting ◯ : 1s1v; darker line connecting ⊓ : single-bid case; darkest line connecting △ : double-bid case; broken line marked with ×: separation of votes and cash rights ($s_a = 0$).

bid charter is attractive when r has large private benefits relative to i's—the cases where the double-firepower effect comes in handy. When both players have similar private benefits, in contrast, the single-bid charter tends to win (recall that, in our simulations, the security values are similar), but the gain relative to 1S1V becomes small when i is the player with the higher private benefits.

Figure 2 does not show us the size of the value effects from choosing the optimizing charter

Figure 4: **Comparison of voting structures. The rival management team is expected to generate an EQUAL amount of benefits to security holders as the incumbent management team.** ($y_r = 1 = y_i$)

$z_i = 0.05$ $z_i = 0.1$ $z_i = 0.15$



Key to Figure 4 Top row: Firm value when entrepreneur maximizes IPO value. Lower row: Expected $y + z$ after the take-over stage. Characteristics of the incumbent management team are deterministic: $y_i = 1$ and z_i set at either 0.05 (left column), 0.1 (middle column) or 0.15 (right column). Management characteristics for the rival: normally distributed y_r with mean of 1 and standard deviation of 0.3. Normally distributed z_r's with means of 0.05, 0.1, 0.15, 0.2, 0.25 and 0.3 each time with a standard deviation of 0.03. Light line connecting $\bigcirc$: 1s1v; darker line connecting $\sqcap$: single-bid case; darkest line connecting $\triangle$: double-bid case; broken line marked with $\times$: separation of votes and cash rights ($s_a = 0$).

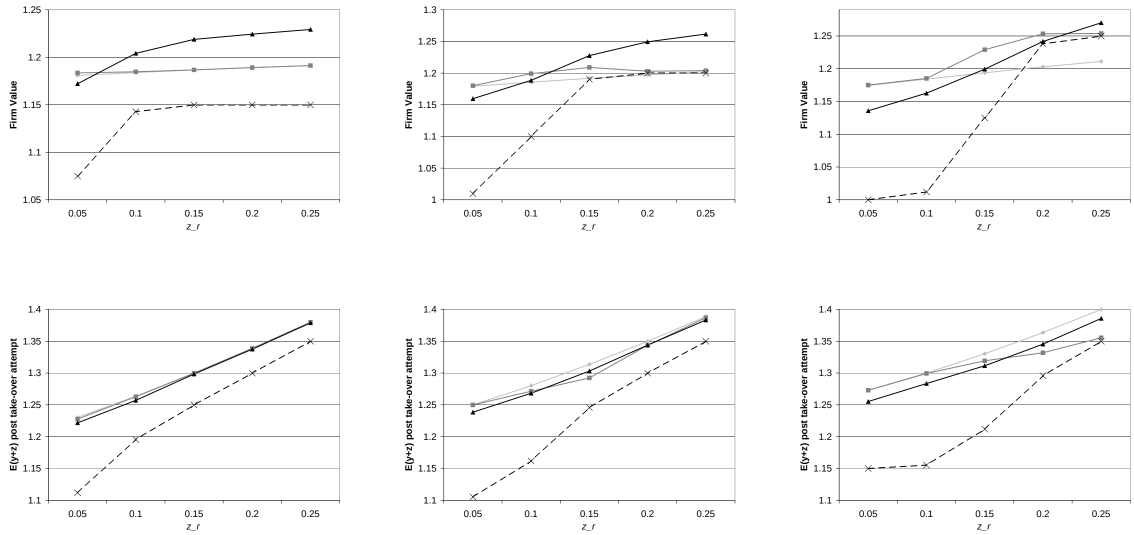
instead of 1S1V, nor what the optimizing s_a's are. These and related results are presented in Figures 3-5 and Figure 6, respectively. The graphs in Figure 3 are all characterized by $\mathrm{E}(y_r) < y_i$, those of Figure 4 by $\mathrm{E}(y_r) = y_i$, and those of Figure 5 by $\mathrm{E}(y_r) > y_i$. The IPO values are shown in the top rows of each figure, the post take-over $y + z$ values in the lower rows, each of these for four charters: the optimized single-bid (squares), optimized double-bid (triangles), 1S1V (circles), and *Adminstratiekantoor* (stars; recall this has $s_a = 0$ and $v_a = 1$, as recommended in GH, 1989). 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 $z_i = 0.15$. Within each of the resulting 15 graphs, the mean z_r then varies along the x-axis from 0.05 to 0.25.

There are obvious general patterns for the optimized IPO values (in the top rows), like values that increase when we move from Figure 3 to Figure 5 (higher y_r) or when we go from the left column to the right one (higher z_i)[6], and steeper connecting lines when we move to

[6] 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.

Figure 5: **Comparison of voting structures. The rival management team is expected to generate MORE benefits to security holders than the incumbent management team.** ($y_r = 1.1 > y_i = 1$)

$z_i = 0.05$ $z_i = 0.1$ $z_i = 0.15$



Key to Figure 5 Top row: Firm value when entrepreneur maximizes IPO value. Lower row: Expected $y + z$ after the take-over stage. Characteristics of the incumbent management team are deterministic: $y_i = 1$ and z_i set at either 0.05 (left column), 0.1 (middle column) or 0.15 (right column). Management characteristics for the rival: normally distributed y_r with mean of 1.1 and standard deviation of 0.3. Normally distributed z_r's with means of 0.05, 0.1, 0.15, 0.2, 0.25 and 0.3 each time with a standard deviation of 0.03. Light line connecting ◯ : 1s1v; darker line connecting ⊓ : single-bid case; darkest line connecting △ : double-bid case; broken line marked with ×: separation of votes and cash rights ($s_a = 0$).

the right within each of the graphs (higher z_r). Our main interest, however, is the comparison across different voting structures.

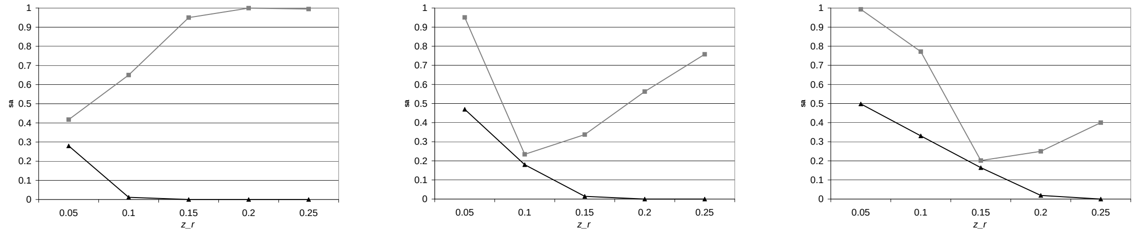
We have already noted that double bids dominate for $\mathrm{E}(y_r) > y_i$, and single ones for $\mathrm{E}(y_r) \leq y_i$. The value effects from choosing the optimizing charter instead of 1S1V range from trivial to a few percentages. Only when the rival is stronger in both security benefits and private ones do we get premia of 4-6 percent (Figure 5, top row). Pure separation of cash flows and voting rights always underperforms, and usually rather badly so.

Of interest is also what the optimal solution would be from the perspective of a social planner, and to what extent the entrepreneur's private choices deviate from the social optimum. Any serious misalignment will be a source of concern and might trigger additional regulation of the take-over market, which in turn would limit the set of options for the entrepreneur and potentially leads to privately sub-optimal investments. An obvious candidate objective function for the social planner would be to maximize the expected post-take-over total value, $y + z$. The great argument in favor of 1S1V is that this charter will achieve that, as it allows

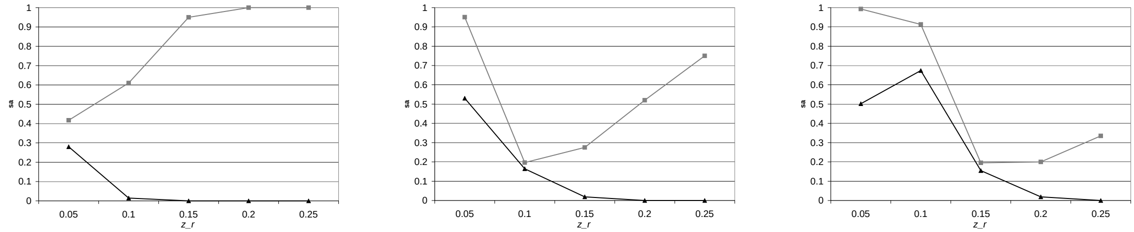
Figure 6: **Values for s_a for single bid and dual bid cases**

$z_i = 0.05$ $z_i = 0.1$ $z_i = 0.15$

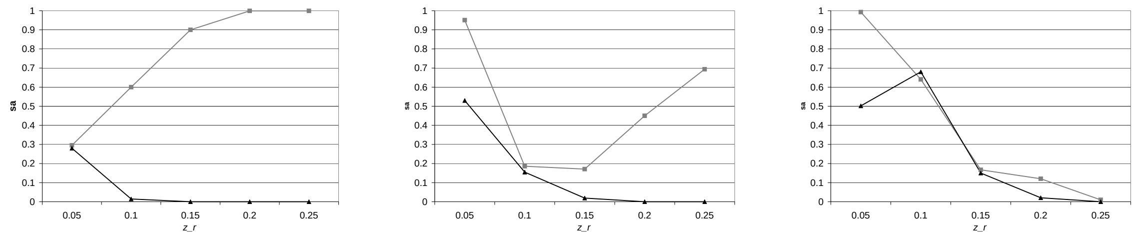
$y_r = 0.9$



$y_r = 1.0$



$y_r = 1.1$



Key to Figure 6 Top row: Values for s_a if $y_r = 0.9 < y_i = 1$ and corresponding to graphs in Figure 3. Middle row: Values for s_a if $y_r = 1 = y_i$ and corresponding to graphs in Figure 4. Bottom row: Values for s_a if $y_r = 1.1 > y_i = 1$ and corresponding to graphs in Figure 5. Characteristics of the incumbent management team are deterministic: $y_i = 1$ and z_i set at either 0.05 (left column), 0.1 (middle column) or 0.15 (right column). Management characteristics for the rival: normally distributed y_r with mean of 0.9/1.0/1.1 and standard deviation of 0.3. Normally distributed z_r's with means of 0.05, 0.1, 0.15, 0.2, 0.25 and 0.3 each time with a standard deviation of 0.03. darker line connecting $\sqcap$: single-bid case; darkest line connecting $\triangle$: double-bid case.

only for a take-over when $y_r + z_r > y_i + z_i$. We saw that 1S1V was never optimal for the entrepreneur, so the issue is how significant the resulting conflict between private and social interests may be.

The lower rows of graphs in Figures 3 to 5 plot the social values corresponding to each of the four charters. One comforting observation is that, across charters and disregarding the *Administratiekantoor*, the differences in social values $y + z$ are nowhere as large as the differences in pre-bid market values (the graphs in the top row). The source of any deviation between private and social value is, of course, private benefits. We observe that there seems to be no important link between the level of the rival's z_r and the size of any social value lost by the entrepreneur's preferred charter. For the incumbent, however, there is no such mechanism. For low values of z_i the impact of the founder's choice on social value similarly tends to be small or insignificant, irrespective of whether the z_r's and y_rs are large or not. While the potential amount of social value lost grows the larger z_i and the effect strengthens for higher y_rs, the differences typically amount to only half of the differences between IPO charters.

Lastly, it is also worthwhile to infer from Figure 6 under what conditions the dual-class single-bid case closely resembles a *de facto* 1S1V structure ($s_a \approx 1$) or pure separation of cash flow and votes ($s_a \approx 0$). The graphs in Figure 6 plot the optimal s_a values for the single- and double-bid cases, with the top, middle and bottom rows corresponding to E(y_r)'s of 0.9, 1.0 and 1.1, respectively as in Figures 3, 4 and 5. There are cases where the optimal a single-bid s_a comes close to a 1S1V structure—notably when z_r is large comparatively to z_i—but in those cases the double-bid charter does far better, as we saw. There are actually far more cases where the double-bid charter optimally goes for $a_s = 0$. This is not the *Adminstratiekantoor* solution, as the double-bid charter gives vital voting rights to both classes of shares. Single-bid with $s_a \approx 0$, lastly, is never optimal, in line with our earlier finding that the *Administratiekantoor* always underperforms relatively badly.

Of course, all these results depend on the parameters chosen for the simulation, and especially the levels of the private benefits. We believe that the levels chosen here (up to 15 % for the incumbent, and 25 % for the rival) are reasonable for large listed companies in Western economies, but there is no way to prove this. Subject to this caveat we conclude that for low z_i's, *ceteris paribus*, the social planner's optimal $y + z$ seems to be be closely matched by any charter except for pure separation of cash flows and votes. Only for higher initial z_is does the charter's impact become noticeable from the social point of view. But, we repeat, the impact of the charter on social value is far smaller than the impact on post-bid security value or initial market value.

5 Conclusions

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 maximizing 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 from the bidder, 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 maximizing expected firm value across a distribution of possible rivals. We find that 1S1V never comes out as the founder's first choice. However, we also show that the impact of the charter on social value is less important. Even for high z_i, where the impact is greatest, the effect remains small relative to the impact on IPO value or post-takeover value. We also explore the gains from issuing more than two classes of shares.

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