Essays in Corporate Finance

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by

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Preface

FOLLOWING SELMA LAGERLÖF'S LEAD, it might be said: "Finally, the long overdue graduate student stood at the podium defending his thesis." Like her famous minister, my personal trail has been meandering, sometimes even idiosyncratic to an outside observer, but on my intellectual odyssey I have explored most parts of the subjects of theoretical economics and econometrics. The itinerant vacillation has generated momentous doubts about the prospects of convergence. But, at last, I have reached my Ithaca. Like any argonaut, I have accumulated intellectual debt and personal IOUs.

First and foremost, I extend my gratitude to Clas Bergström, Department of Finance, Stockholm School of Economics, who caused me to abandon my previous canons by luring me into the field of corporate finance by singing like a siren when my bees wax was, finally, starting to melt. By mixing patience, ardor, scientific curiosity and encouragement in the right proportions, he has been the catalyst of a ketchup effect. Assiduously and very professionally, he has kept me on the right track when my mind has sometimes gone astray, and shown that supervision can be elevated to cooperation on equal footing. Clas is always filled with personal warmth and support, and with friendly criticism, sometimes not that congenial, but always frank. In particular, I thank him for the many, heroic hours of hard work he has put into our joint projects, for endless discussions and numerous mistakes which, eventually, have brought our knowledge to a higher level, for countless meetings and planning sessions, and, last but not least, for a lot of fun. An enduring friendship forged by hard professional work has evolved.

Despite some (understandable) priors against me, Staffan Viotti, Department of Finance, Stockholm School of Economics, took me on board again when I was adrift without any academic affiliation. I am very grateful to him for believing in me and giving me a (last) chance when I needed it most, for his empathy and friendship, and for actively and persistently bringing me back on even keel at a personal and professional level. Part of the treatment has been verbal jabbing, characterized as dancing like a butterfly and stinging like a cobra, sometimes even reaching an apothegmatical level, but never vituperative (he likes fancy words).

Besides Staffan Viotti, Bertil Näslund, Department of Finance, Stockholm School of Economics, and Peter Englund, Department of Economics, University of Uppsala, have been members of my Ph.D. committee with Bertil acting as chairman. I am indebted to all of them for improving my work with valuable, constructive and professional criticism.

I would particularly like to thank my two other collaborators in this intellectual endeavor, Kenneth Högholm, Swedish School of Economics and Business Administration at Vasa, Finland, and Johan Molin, Department of Finance, Stockholm School of Economics. By subscribing to high standards and demonstrating apian tenacity when called upon, they have shown that the tough gets going when the going gets tough.

The Department of Finance at Stockholm School of Economics has provided me with an ambiance conducive to scientific work by its provenly professionalism, its critical mass and its international alignment. By sharing the characteristics of personal generosity, good humor and lack of prestige, Bertil, Clas and Staffan have, jointly, created an institution with a rare positive and amicable spirit. I would like to thank all my friends at the department for many interruptions, ranging from questions about aspirin and Band-Aids to constructive scientific discussions about arcane subjects like Malliavin calculus, Chapter 11, and the rate of convergence of NEK, for a plethora of good laughs, and, not least, for an atmosphere filled with poignant but friendly criticism concerning personal and professional matters. Anybody familiar with the department understands if I single out Kerstin Lindskog who is the natural hub of the department.

I am also indebted to Christopher Sardelis, a kindred spirit and an extraordinary civil servant, who at a pivotal point in time generously helped me to establish a toehold in Stockholm at Riksbanken from where I could leap-frog academically.

Finally, a personal thanks is also extended to Rune Castenäs, a recent sexagenarian and the Director of the Economic Research Institute at the Stockholm School of Economics, for helping me with the intricacies of applied finance in the somewhat uncharted territory of research grants. The generous and steady pecuniary support from Bankforskningsinstitutet is gratefully acknowledged.

A word to the reader of this thesis. It is not a monograph but consists of five separate essays which are self-contained. This explains why a certain amount of overlap exists between them.

Stockholm November 25, 1993

Peter Högfeldt

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Essay 1:

A Theory of Strategic Blocking by Large Shareholders and Arbitrageurs in Takeovers

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Abstract

This paper models the idea that large incumbent shareholders with the option to block a takeover attempt exercise a pivotal influence on the tender offer prices. The strategic interaction between the bidder and the decisive blockholders is modelled as a bargaining game. Equilibrium bid prices and the associated distributions of the takeover gain between the target shareholders and the bidder are derived when the ownership structure is exogenously given as well as when it is partially endogenized by considering the effect of potential arbitrageurs. Precise conditions for the presence of arbitrageurs are determined and a theory of preemptive pricing strategies by the bidder is developed. We also show that the bargaining model contains as a special limiting case a result that is analogous to the atomistic shareholder model in Grossman and Hart (1980). Specifically, when appropriate institutional restrictions are imposed and when the potential effect of arbitrageurs is taken into account, our theory predicts a skewed distribution of the takeover gain heavily in favor of the target shareholders.

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1. Introduction

A common and analytically tractable supposition in the takeover literature has been to postulate that the target firms ownership structure is atomistic. However, the implications derived from atomistic ownership analysis on e.g., equilibrium price and the distribution of takeover gains between the target company and the bidder, do not automatically apply to **all** forms of ownership structures. Specifically, we believe that a non-atomistic target ownership structure where one or several large stockowners who have the capacity to **block** a takeover attempt requires a different price theory than the existing atomistic ones in the literature. We conjecture that assumptions about target **ownership structure** is decisive to any takeover theory.

The necessity of a theoretical analysis of the effects of a non-atomistic ownership structure on the tender offer premium and its distribution is further emphasized by the actual ownership dispersion of listed companies. Well established stylized facts are that in e.g. Japan and Continental Europe the incorporated firms operate with a higher leverage, and are characterized by a much more concentrated ownership structure than companies in the US. and the UK. However, even the US data on ownership reveals that many listed firms are dominated by a few large owners. Our own empirical evidence from the complete sample of Swedish takeovers between 1980 and 1992, reflects a significantly more concentrated target ownership structure.[1]

Given these ownership data it is plausible to conjecture that a model predicated on a non-atomistic ownership structure rather than an atomistic better can explain the pertinent facts about the takeover market. Consequently, the specific purpose of this paper is to develop a takeover theory with explanatory empirical power that delineates the consequences of blocking potential by large equityowners on the equilibrium tender offer price and the distribution of takeover gains between the bidder and the target company. The basic idea is that large shareholders are pivotal in the price determination process. In particular, they exert a strategic influence on the tender offer price since they are vested with the potential to block takeover attempts. Besides pivotal incumbent shareholders, there can also be arbitrageurs present. Arbitrageurs are agents who by buying shares in the market accumulate enough voting power to establish a bargaining position in order to profit from the difference between the price at which they buy and the settlement price at which they ultimately tender.

The potential for strategic blocking by large shareholders in takeover attempts is substantial and manifests itself under different non-atomistic target ownership structures,

[1] The largest shareholder coalition had an average equity fraction of 47.7% ranging from a minimum of 7.1 % to a maximum of 96% and a vote fraction of 54.6% ranging from 7.4% to 95% (dual-class shares are common in Sweden).

and circumstances. The most obvious case is, of course, when a single stockowner controls the simple majority of the equity. But even if the party in actual control of the firm operates with a block of less than 50% of the stocks, a bidder may be forced to negotiate with him. The alternative takeover strategy of acquiring the shares from the fringe of small stockowners over the market may be costly due to disclosure rules, transaction costs and lack of liquidity in the market.

When the fraction of shares needed to accomplish a takeover gain is large, the scope for many blockholders with bargaining position increases. For instance, under a supermajority voting provision amendment to the corporate charter a bidder may face several opponents. For example, a supermajority provision which require shareholder approval by more than 80 percent of the votes for all transactions involving change in control rights may face 5 opponents.

When the bidder wants 100 percent of the shares in the company, a legal supermajority rule called the **Compulsory Acquisition Limit**(CAL) opens up a potential bargaining window. If already more than a certain percentage of the equity is tendered, the bidder has the option to compulsorily acquire the remaining shares at the same price at which he acquired the first ones. In most important European corporate legal systems the CAL is 90%. The motivation behind it is to facilitate takeovers by not making any small stockowner decisive about the fate of the bid. The dual side of this rule is that by controlling a share of the equity corresponding to one minus this limit, the stockowner becomes pivotal to the overall success of the bid, and can bargain with the bidder over the tendering price for his stocks. In particular, under the typical European Compulsory Acquisition Limit, a bidder without toehold but opting for the whole company may face at most ten potential opponents.

Another legal rule which is generally adopted and which is important to model whenever there are different shareholder clienteles (large pivotal versus small shareholders) is the **Equal Treatment Principle** (ETP): the bidder must extend to the rest of the target stockowners a tender offer price that is at least as high as the one he has offered the blockholders. This rule has a profound effect on the price the bidder must pay and is more or less stringently enacted in the major corporate legal systems in Europe and US. The ETP is easy to implement in the bargaining framework, and generates theoretical and empirically testable implications.

To formalize the strategic interaction in this economic environment, we conjecture that, explicitly or implicitly, the bid price and the distribution of takeover gain is, within the legal constraints, the outcome of a bargaining process between pivotal incumbent stockowners, arbitrageurs, and one bidder. Specifically, the model is predicated on the behavioral hypothesis that the decisive agents are acting individually rational by encompassing the fact that their own actions exert a significant influence on the final

price outcome while the fringe of small stockowners price behavior is parametric; they accept the tender bid if they receive an offer at or above their reservation price. In order to obtain specific and closed form solutions to the bargaining game, and isolate the salient parameters, we apply formal bargaining theory as developed by John Nash(1950) and (1953).

We have come across very few papers that apply formal bargaining theory in the analysis of equilibrium tender offer prices. However, as part of an empirical paper that analyzes the price effects of dual-class shares on the Swedish stock market, Bergström-Rydqvist(1992) presents a simple takeover model with a formal bargaining mechanism: a single pivotal inside blockholder negotiates with a bidder. Van Hulles-Sercus(1991) analyzes the relation between two procedures to determine the takeover price: a pure bidding process and a combined bid and bargaining mechanism. The work most related to our analysis of the potential price and distribution effects of arbitrageurs in a takeover attempt is an unpublished part of Grossman-Hart(1987)[2].

There is a current vogue in the literature to call any unspecified mechanism making takeovers possible by splitting the private or synergistic takeover gains a bargaining device, e.g. Israel(1991) and (1992), Perotti-Spier(1992), and Zingales(1991). These papers recognize that the equilibrium price the bidder pays depends on several factors; the target ownership structure, the legal rules surrounding the bid contest, the number of potential rivals as well as the fraction of shares the bidder needs to control in order to accomplish any improvements in the target company. But instead of explicitly modelling the bidding process one postulate a deus ex machina in the form of a general bargaining device. In particular one assumes that the price the bidder must pay to the target shareholders is a weighted average of the expected cash flow under the incumbent regime and the expected cash flow under the bidder where the exogenously specified weight depends on each parties "bargaining strength".

The model in this paper focuses on the bargaining situation in takeovers. However, in contradistinction to the general, unspecified bargaining mechanism in these papers, we specify a particular solution mechanism, and define precisely when a target stockowner is vested with bargaining power. In fact, in our model the bargaining power-- the exogenously specified weight in the previous models-- of the bidder and the target is endogenously determined by the target equity ownership structure, the institutional restrictions like the ETP rule and the CAL proviso, and the presence of arbitrageurs.

The dual of the equilibrium price theory is a theory of how the takeover gain is distributed between the target and the acquirer. Specifically, when appropriate

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[2] Section 4-- "Competition from an Arbitrageur", p 11-21-- in the 1987 working paper is left out in the published version, Grossman & Hart(1988). They reach somewhat different conclusions than we report later in this paper; some commentary as to why the differences occur is also added.

institutional restrictions are imposed or when the potential effect of arbitrageurs is considered, our theory predicts a skewed distribution of the takeover improvement value heavily in favor of the target shareholders that accords with the empirically observed distribution: a 90/10(target/ acquisitor) split of the total value weighted takeover gain in the US takeover data reported by Bradley, Desai and Kim(1988), see also Jensen-Ruback(1983), and a 89/11 division in the Swedish sample.

From a more theoretical perspective, a theory of preemptive pricing strategies by the bidder is developed. We also claim that the Nash bargaining model can be regarded as somewhat more general than Grossman-Harts takeover model with free riding since it contains as a special limiting case a result that is analogous to the impossibility outcome in the latter model. Furthermore, while potential free riding is the pivotal mechanism in the Grossman-Hart model, actual free riding occurs in successful takeovers in the bargaining model.

The paper is organized as follows. Section 2 develops the bargaining model. In section 3 we assume that the target ownership structure is exogenously given and derive the bid prices and distribution of takeover gains where large target shareholders have blocking potential and where the equal treatment principle is enforced. As an extension of our theory, section 4 delineates the potential price and distributional effects of endogenous arbitrageurs. Conclusions and extensions of the paper are briefly discussed at the very end.

2. A Takeover Model with Strategic Blocking

THE STARTING POINT for our takeover analysis is a bidder who is able to create takeover gains by e.g., replacing the targets present managerial team or by creating synergy gains by combining with the target firm. To be more specific, we assume that the bidder has found a takeover gain $\left(y^B - y^I\right) > 0$, where y^B and y^I denotes the expected discounted value of dividend rights under the bidders management and the incumbent, respectively. The bidders ulterior motive behind a takeover attempt may be manifold and the number of shares sought by the bidder varies accordingly. Formally, in order to achieve any takeover gains a shareholder must have more than α of the voting stock where $\alpha \in (0.5,1]$. The lower bound is given by the simple majority rule and the upper bound reflects the fact that some takeover gains can only be realized if the company is wholly owned. If the takeover is aimed at replacing the present stewardship, α is typically equal

to 0.5, while for gains from merger of two firms or from going private a much larger α is probably appropriate[3].

The cardinal idea we want to model is that one or many large target shareholders possess bargaining power if each of them separately has the ability to block a takeover attempt by a bidder. Specifically, by being pivotal to the overall outcome of the takeover attempt, they exercise a significant influence over the tender offer price; if the price is not acceptable, they have the option to defeat the bid. Accordingly, implicitly or explicitly, the bidder **must** reach an agreement on the tender offer price with each of the incumbent stockowners who have bargaining power. In contradistinction to e.g. the Grossman-Hart(1980) and Shleifer-Vishny(1986) models with shareholders who act parametrically, we conjecture that the bid prices are the outcome of strategic interaction between the bidder and these large pivotal blockholders in a bargaining game. Strategic behavior is interpreted to mean that each player in the game rationally considers the effect of his and all other players actions on the resulting price, as well as the influence of the fringe of atomistic stockowners. Individually, atomistic stockowners lack blocking ability, and since formation of a pivotal block of small stockholders is assumed to be prohibitively costly, they act parametrically but have a well-defined reservation price $\bar{p} \in [y^I, y^B]$.

How do we model the bargaining process, and determine the final outcome? Because of its simplicity and general plausibility, the most natural choice is to use the axiomatic Nash bargaining theory. Nash so called split the difference rule is the **unique** bargaining solution concept that satisfies a set of common sense based axioms[4]. To implement the Nash bargaining model in our takeover set-up, we must specify (i) who the players are; (ii) each bargaining participants potential payoff, thereby determining the size of the bargaining pie; (iii) the players payoffs if the bargaining defaults (outside options)[5] ; and (iv) use the Nash solution concept to solve the model under different institutional restrictions.

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[3] There are at least three reasons why ownership of all target shares can be preferable to majority control. First, the operations of the two firms can be restructured without objections from minority shareholders. Second, if the bidder intends to invest heavily in the firm but does not expect that minority shareholders will invest a proportionate amount. Third, with less than 100% of the shares, taxes must be paid on respective firm's profit but, with full ownership, profits and losses can be transferred between the firms so that the sum of tax payments can be reduced.

[4] Even though the Nash solution generates or imposes a specific outcome that is consistent with the axioms but without a delineation of the bargaining process per se, it is de facto consistent with the final result of an explicit and sequential bargaining process; see Rubinstein(1982). In our applications, the axiomatic framework will be fully consistent with Rubinstein's sequential approach.

[5] Since we assume full and common knowledge in our model, there will be no breakdown in the bargaining process. Even though the outside options are never exercised, they are central to the formal specification of the game, and ipso facto to the resulting price settlement schedule.

THE PLAYERS

Starting with the players, we assume that there is only one bidder with toehold e_B in the target firm[6] Our bargaining takeover model is general enough to encompass any of these. The bidder extends a conditional bid for $(\alpha - e_B)$ percent of the shares[7]. At the other side of the bargaining table so to speak, the bidder faces one or several large incumbent target stockowners with potential to block his tender offer, and which he, implicitly or explicitly, must reach an agreement with. Any target stockholder controlling a position of at least the fraction of equity e_L^i where $e_L^i \geq (1-\alpha)$ possesses power to block the bidder's tender offer, i.e. has established a bargaining position. When α is large and close to one, the scope for many blockholders with bargaining position increases.

PLAYERS' PAYOFFS AND THE SIZE OF THE BARGAINING PIE

Let us formalize each player's profit and the size of the bargaining pie. We assume that the bidder not only acquires shares from the blockholder but also has to purchase from the fringe of small target stockholders. Hence we assume that $(\alpha\text{-}e_B) > \sum_1^n e_L^i$, i.e. the block of shares the bidder wants to acquire is greater than the sum of the pivotal blockholders in position. Let p_L^i be the price the pivotal blockholder i obtains and let p $(\geq \overline{p})$ be the price paid to the fringe. The bidders expected net gain (s_B) from a successful takeover bid is given by

$$s_B(\mathbf{p}_L^I; e_B, \mathbf{e}_L^I, y^B, y^I, p) = e_B \cdot (y^B - y^I) + \sum_1^n e_L^i \cdot (y^B - p_L^i) + \left(\alpha - e_B - \sum_1^n e_L^i\right) \cdot (y^B - p)$$

The first term denotes the value appreciation on his own shares, while the second term is the profit on the stock he purchases from the large and pivotal incumbent stockowners, and the last term measures the net gain on the shares he procures from the fringe of small stockowners; $\mathbf{p}_L^I$ is the vector $(p_L^1, p_L^2, \cdots, p_L^n)$, and $\mathbf{e}_L^I = (e_L^1, e_L^2, \cdots, e_L^n)$[8].

The corresponding expected net profit function (s_L^i) for the large incumbent shareholder with blocking potential measures the gain on his own tendered position

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[6] This assumption is not as restrictive as it may seem, since even in a bidding contest concerning the right to extend a tender offer a single bidder ultimately prevails.

[7] In Appendix A, we demonstrate-- Lemma 0-- that the bidder always prefers to extend a conditional bid since it is, ceteris paribus, profit maximizing. Accordingly, to only postulate conditional bids is no limitation in the model; actually, our exogenously specified assumption is endogenously enforceable.

[8] For simplicity, all our profit calculations are net and not gross. Given the first invariance axiom of the Nash solution, the gross calculations are just a linear transformation of the net results. All prices are per 100%.

$s_L^i(p_L^i; e_L^i, y^I) = e_L^i \cdot (p_L^i - y^I)\ \forall i$. Consequently, the total size of the pie (S) to be split between the players is

$$S(p; e_B, e_L, y^B, y^I, \alpha) = s_B(\mathbf{p}_L^I) + \sum_1^n s_L^i(p_L^i) = (e_B + e_L)\cdot(y^B - y^I) + (\alpha - e_L - e_B)\cdot(y^B - p)$$

where $e_L = \sum_1^n e_L^i$.

THE PLAYERS OUTSIDE OPTIONS AND THE FORMAL BARGAINING GAME

To complete the formal specification of the bargaining games, we must determine the players' payoffs if the bargaining process ends in default. Since we have assumed that there are no transaction costs, it is natural to presuppose that the players receive a zero net loss in this situation; no successful value increasing takeover occurs. Formally, the net outside options vector is $d = (d_B, \mathbf{d}_L) = (0, \mathbf{0})$ where $\mathbf{d}_L$ is the vector$(d_L^1, d_L^2, \cdots, d_L^n)$, and $\mathbf{0}$ is the n zero vector.

By our definition of who the players are, and their expected profits as well as the total size of the pie to be split in the bargaining, we can formally define the basic Nash bargaining game we have identified as the pairs $\langle S, \mathbf{d}\rangle = \langle (s_B, \mathbf{s}_L^I) \in R^{n+1}; s_B + \sum_1^n s_L^i \le S; s_B \ge 0, s_L^i \ge 0 \forall i$ and $\mathbf{d} = (0, \mathbf{0})\rangle$ where $\mathbf{s}_L^I$ is the vector $(s_L^1, s_L^2, \cdots, s_L^n)$, and $\mathbf{d}$ the (n+1) zero vector. The next step in the development of the model is to apply the Nash solution concept and derive the resulting tender offer prices.

3. General Bargaining Solutions, Equilibrium Prices and Distribution of the Takeover Gain

IN DERIVING THE TENDER offer prices we first allow the offers to be differentiated both within the set of the pivotal blockholders and versus the fringe of small target stockowners. Subsequently, we impose the restriction of equal treatment prices.

DIFFERENTIATED BIDS

If tender offer bids with differentiated prices are allowed, the general Nash bargaining price functionals that n large, incumbent and pivotal blockholders (L), and a bidder (B) agree on are summarized in our first result (all proofs are in appendix A).

Lemma 1:
Under the specified bargaining conditions, the Nash bargaining price that n large, incumbent and pivotal blockholders (L), and a bidder (B) agree on satisfies the following functional expressions for each blockholder with a position $e_L^i \geq (1-\alpha)\ \forall i$, *where* $\alpha \in (0.5, 1]$

$$p_{nL}^{i*}\left(p;\alpha,e_L^i,e_B,n,y^I,y^B\right) = y^I + \frac{\alpha\cdot\left(y^B - p\right)}{(n+1)\cdot e_L^i} + \frac{\left(e_L + e_B\right)}{(n+1)\cdot e_L^i}\cdot\left(p - y^I\right) \text{ where } e_L = \sum_1^n e_L^i.$$

What is the rational behind the result and what properties does the bargaining price functional have? Since each pivotal blockholder has the option to foil the takeover attempt, the successful bidder **must** reach an explicit or implicit agreement on the price each of them will obtain. The Nash bargaining price functional explicitly incorporates the effect of the price paid to the fringe (p) on the size of the pie, and, ipso facto, on the bargaining outcome. The functional is uniquely determined; any other price solution would be blocked by at least one of the bargaining parties. The well-known and characteristic equal split property of the Nash solution concept-- each participant receives a share of equal value of the pie-- is brought forward by the price functional. From Lemma 1 it is easily verifiable that each pivotal blockholders share of the pie $e_L^i\cdot\left(p_{nL}^{i*} - y^I\right)$ is independent of any of his individual parameters and that the shares are equal to each other and are equal to the bidder's share. Although, the existence of this virtue of fairness, it is worth emphasizing that the solution satisfies rather innocuous axioms based on strict individual rationality. It is simply the best mutually beneficial outcome, without any connotations of collective justice or equality.

A feature of the price functional that at first may seem somewhat perplexing is that it is a decreasing and convex function of e_L^i. The closer the incumbents share of the company is to the minimum required to establish a bargaining position, the higher the resulting price the bidder extends to him. Consequently, being pivotal and very large does not really pay off; the same gain could have been obtained through a smaller but

still strategic bargaining position[9]. Stated somewhat differently, the Nash bargaining solution is predicated on the discrete and qualitative characteristic of being pivotal. The question whether one strategic blockholder is more pivotal than another is not a very illuminating question since being pivotal is an absolute, rather than a relative, concept in our analysis.

In order to generate additional insights about the Nash bargaining price solution, we illustrate the bargaining game and the optimal Nash solution in fig 1. For reasons of transparency, we assume a bidder without toehold opting for the whole target company (α = 1), and who faces a single incumbent shareowner with blocking potential. The reservation price of the fringe of small stockowners$(\bar{p})$ varies from y^I to y^B. From the definition of the game $\langle S,d\rangle$, the set S of possible bargaining price outcomes p_L is straightforwardly determined; the shaded area in the figure. In particular, the blockholders no loss condition $(s_L \geq 0)$ implies the lower bound $p_L \geq y^I$, while the corresponding restriction on the bidder $(s_B \geq 0)$ generates the upper boundary $\bar{p}+(y^B-p)/e_L \geq p_L$. Hence, S is the set of bargaining prices p_L that satisfy the inequality $y^I \leq p_L \leq p+(y^B-\bar{p})/e_L$ and where $y^I \leq p \leq y^B$. As $\bar{p}$ traverses from y^I to y^B the upper boundary decreases linearly from its maximum $p_L(y^I)=(y^I+(y^B-y^I)/e_L)>y^B$ to its minimum $p_L(y^B)=y^B$.

From Lemma 1 it is immediate that the Nash bargaining price schedule p_L^* satisfies this general inequality. Specifically, it is linearly decreasing in p, and its negative slope is half the slope of the upper limit on S. The smaller e_L is, the steeper the negative slope of the Nash solution scheme. This is an illustration of the property that $p_L^*(p;e_L,y^B,y^I)=y^I+(y^B-p)/(2\cdot e_L)+(1/2)\cdot(p-y^I)$ is a decreasing function of e_L which in turn reflects the equal split character of the Nash bargaining solution concept. Furthermore, note that all Nash solution schedules for different e_L values pass through the point $(y^B,(y^B+y^I)/2)$.

[9] This is an implication of the equal split characteristic of the Nash bargaining solution: the individual tender offer prices extended to each blockholder are determined or adjusted to satisfy the restriction that the value of each participants share is the same. In particular, since $e_L^i\cdot(p_{nL}^{i*}-y^I)$ $\forall i$ is equal for all i blockholders, the larger the share blockholder i controls, e_L^i, the smaller the price.

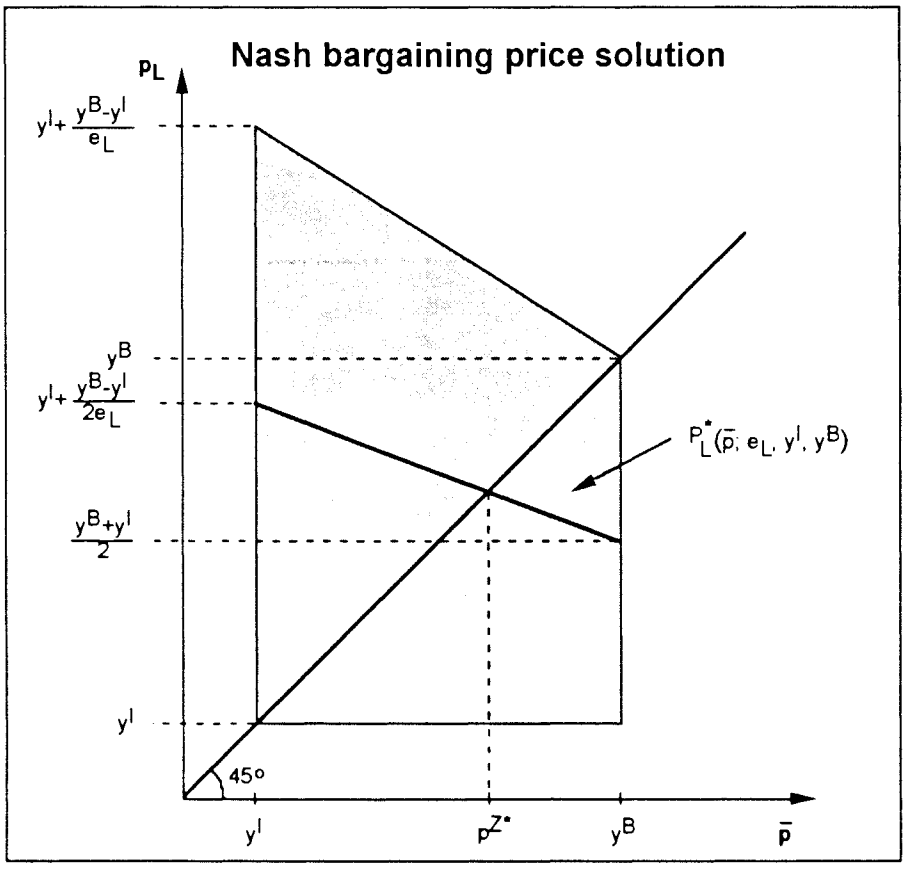

Fig 1: The shaded area illustrates the set of possible outcomes of the bargaining game. The Nash solution is represented by the $P^*_L(\bar{p}; e_L, y^l, y^B)$-line. The intersection of the $P^*_L(\bar{p}; e_L, y^l, y^B)$-line and the 45°-line is the equal treatment price, p^{Z*}.

The illustration demonstrates that depending on the reservation price $\bar{p}$ of the small stockowners, the Nash bargaining price may be either greater than, less than or equal to $\bar{p}$. In particular, if $\bar{p} \in \left(p^{Z^*}, y^B\right)$ the large pivotal blockholder does not extract a better price offer by bargaining with the bidder than the fringe. The reason is that the decisive players act strategically. Specifically, the blockowner incorporates the effect of his own actions as well as the fringe reservation price, and all other parameters on the outcome of the game. Even if the final bargaining price is lower, it is still profitable for the pivotal blockholder to accept the tender offer. Note in particular that even though the small shareholders-free ride ($\bar{p} = y^B$), the takeover attempt succeeds; it is mutually profitable for the bidder and the incumbent. Consequently, the Grossman and Hart(1980) free rider mechanism does not foil the takeover attempt when a large pivotal blockholder who acts strategically is present.

Looking at the other side of the behavioral spectrum, an agent who acts parametrically would not internalize the effect of his or any other players actions on the

price. However, being small with limited action space in an environment with a decisive strategic agent may be profitable since free riding is the only credible strategy available to the parametric agent. In effect, the existence of a large pivotal blockholder who acts strategically and internalizes the effects of all agents actions on the overall outcome of the game, paves the way for a profitable takeover by making price concession strategies credible[10]. However, despite generating these beneficial effects, a large pivotal agent may not have an advantage relative to a small stockowner. Hence, provided that the takeover attempt succeeds, more behavioral flexibility is not always desirable.

BIDPRICES UNDER EQUAL TREATMENT

Without elaborating on philosophical and juristic problems, we interpret the equal treatment principle straightforwardly to have two parts. The first one concerns the equal treatment between different groups of shareholders, small and large ones, while the second applies within the subset of large blockholders. (i) A bidder should extend a tender offer price to the fringe of small stockowners that is at least as high as the one he offers the large pivotal stockowners; i.e. the small ones should not be adversely treated but may be positively discriminated. (ii) The bidder cannot differentiate within the group of large and pivotal blockowners by offering them separate tender offer prices. For the remainder of the paper we assume that both parts of the equal treatment principle is enacted either through public legislation or by provisions in the corporate charter.

To demonstrate how the principle is operationalized in our bargaining framework we start with the simple case with a single blockholder and utilize figure 1. If the equal treatment principle applies, the bidder and the pivotal blockholders rationally internalize into the bargaining game the effect of extending the same offer to the fringe of small stockowners on the size of the pie to be split, and, ipso facto, on the resulting price. In mathematical terms, they agree on a bargaining price that correspond to the fix point of the Nash bargaining prices schedules in Proposition 1. In terms of fig 1, the fix point is located at the intersection of the 45^0-line and the Nash bargaining price schedule. Or formally, evaluate the Nash price functional from our example--

[10] The mechanism in our paper is different from the one in Grossman-Hart(1980). We allow actual free riding to occur while they show that potential free riding derails a takeover attempt if the ownership structure is fully atomistic. Furthermore, we do not postulate the option of value extraction as a circumventing avenue. Instead, the introduction of a large pivotal blockholder who acts strategically attenuates the misalignment of incentives causing the free rider problem. Expressed somewhat differently, while a small parametric agent cannot credibly commit to a lower price than the free riding price, the strategic agent can. Credibility emanates from the fact that a self interested strategic agent chooses the most profitable action that is possible to implement, i.e. the Nash bargaining solution. We alluded to this result in the introduction; see also Shleifer-Vishny(1986b).

$p_L^*(p;e_L,y^B,y^I) = y^I + \frac{(y^B - p)}{2\cdot e_L} + \frac{1}{2}\cdot(p - y^I)$-- at $p = p_L^*(p;e_L,y^B,y^I)$; solve and use the notation $p_L^{Z^*}$ for the solution: $p_L^{Z^*} = y^I + (y^B - y^I)/(1+e_L)$. Note that this price is higher the smaller the pivotal blockowner is, i.e. this property that emanates from the equal split character of the Nash bargaining solution carries over to the equal treatment realm.

In order to derive the general equal treatment price schedule with n incumbent blockholders, we impose the restriction that each pivotal stockowner should be offered the same price, p_{nL}^{**}. However, it is important to note that we still treat them as different entities and not as a single bargaining unit. Using the appropriate Nash products from Lemma 1, we derive the price functional

$$p_{nL}^{**} = y^I + \frac{\alpha\cdot n\cdot(y^B - p)}{(n+1)\cdot e_L} + \frac{n\cdot(e_L + e_B)}{(n+1)\cdot e_L}\cdot(p - y^I) \text{ where } e_L = \sum_1^n e_L^i$$

By evaluating the above expressions at $p = p_{nL}^{**}$, we superimpose the part of the ETP that says that the same tender offer price must be extended also to the fringe of small equityowners. Hence, we determine the overall equal treatment price; call it $p_{nL}^{Z^*}$.

Proposition 1:

In equilibrium a bidder extends an equal treatment tender offer for $(\alpha - e_B)$% of the outstanding shares to the equityowners in the target firm at price

$$p_{nL}^{Z^*}(\alpha, e_L/n, e_B, y^I, y^B) = y^I + \frac{\alpha\cdot(y^B - y^I)}{(\alpha + (e_L/n) - e_B)}$$

$$\text{where } \forall i = 1,2,\cdots,n; e_L^i \geq (1-\alpha); e_L = \sum_1^n e_L^i; \text{ and } 0 < e_L \leq 1.$$

Since the Nash bargaining price solution is a fix point, it is obvious that the pivotal blockholders and the bidder are simultaneously and rationally incorporating the effects of all players actions on the outcome of the game. In particular, the restriction that their agreed upon price must be extended to all target shareholders is embodied in the solution.

The price functional of proposition 1 can be related to the work we referred to in the introduction. In these papers, instead of explicitly modelling the bidding process, one postulates a deus ex machina in the form of a general bargaining device. In particular, they assume that the price the bidder must pay the target shareholders is a weighted average of the expected cash flow under the incumbent regime and the expected cash

flow under the bidder where the exogenously specified weight depends on each parties "bargaining strength". The equilibrium price in these models is given by $p^* = \lambda \cdot y^I + (1-\lambda) \cdot y^B$, where the exogenously determined λ and $(1-\lambda)$ are referred to as the bidders and targets bargaining power, respectively. In our model $\lambda = [(e_L/n) - e_B]/[\alpha - (e_L/n) - e_B]$; . λ is endogenously determined by the ownership structure, the legal rules surrounding the takeover as well as the number of shares the bidder wants to acquire.

When is this tender offer price a valid equilibrium price? We have previously assumed that the reservation price of the fringe of small shareholders varies from y^I to y^B. A discussion of the feasibility of the equal treatment price is therefore called for.

Case 1: At one extreme, if the bidder, in order to accomplish any takeover gains, has to acquire 100% of shares in the target company ($\alpha = 1$), there is no room for free riding. By definition free riding cannot take place in this case, since all shareholders must tender their shares before the gains can be realized. Without any mechanism for the elimination of the minority, any atomistic stockholder becomes pivotal. But, due to the legal rule of compulsorily acquisition, which is in effect in most corporate legal systems, we assume that no individual small shareholder has bargaining power to negotiate for a higher bid. The bidder can compulsory acquire outstanding shares if shareholders representing e.g., 90% of votes and equity accept the offer. Therefore, the small shareholders accept any offer above y^I, because accepting given a tiny premium is better than takeover failure and no premium. It is rational for them to accept the equal treatment price $p_{nL}^{Z^*} \geq y^I$ since no better offer exists when free riding is not a viable option. Hence, in this equilibrium the fringe free rides on the pivotal and strategically acting parties in the bargaining model. Somewhat more drastically stated, enforcement of the equal treatment principle is in effect a ticket to free riding.

Case 2: At the other extreme, the reservation price is the post-takeover value of the firm: y^B. This reservation price is valid whenever the small shareholders have the option to stay as minority shareholders, i.e. $\alpha < 1$. Due to potential free riding by the target firm's atomistically small shareholders, the smallest tender offer price they will accept is the full improvement value after a successful takeover attempt by the acquisitor. In case of a lower bid it pays to remain as a minority shareholder by taking advantage of the improvement which the bidder can accomplish, see Grossman and Hart (1980). However, with a reservation price $\overline{p} = y^B$, the enactment of the equal treatment principle results in two separate regions with disparate equilibrium schedules. Equality between

the average position of the pivotal blockholders (e_L/n) and the size of the bidder toehold (e_B) delineates the borderline.

A. If $e_B \geq (e_L/n)$, i.e. the size of the bidder toehold equals or is larger than the average position of the pivotal blockholders, it is immediate from the price functional $p_{nL}^{Z^*}$ that it generates a bargaining price that is at or above y^B. Such a tender offer price is of course welcomed by the fringe.

B. Where the bidder toehold is smaller than the blockholder average, $e_B < (e_L/n)$, the equal treatment price $p_{nL}^{Z^*}$ is below the reservation price y^B. This will not be accepted by the fringe of small stockowners. In this case, the bidder extends a new tender offer price $p_{nL}^{Z^-}$ to the large pivotal owners and to the fringe of small shareholders their reservation price y^B. The price functional $p_{nL}^{Z^-}$ is predicated on the general solution under the differentiated price functional of Lemma 1. However, with the ETP restriction that all large blockowners should receive identical price offers imposed and that the fringe should receive $\bar{p} = y^B$[11]. Hence, consistent with the ETP all the pivotal players are treated alike while the fringe enjoys positive price discrimination. According to our tendering rule, the small stockowners accept the offer since they are indifferent between tendering or not.

Throughout the rest of the paper we will stick to the price $p_{nL}^{Z^*}$. From Proposition 1, we immediately observe that, in contradistinction to the corresponding equilibrium price schedule under differentiated bids, under the ETP the average blockholder position (e_L/n) replaces the individual one (e_L^i) as a decisive equilibrium factor. In other worlds, the implementation of the ETP implies that the effect of the large pivotal stockholders on the bargaining price is **not** measured by their individual weights separately or by their total weight $e_L = \sum_1^n e_L^i$, but by their average size $(e_L/n) = \left(\sum_1^n e_L^i\right)/n$. If the set of pivotal incumbents had been measured as one agent by their total share of the voting shares, the resulting bargaining price would have been lower. Once again, being small but pivotal is an advantage when bargaining under Nash conditions. Consequently, the

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[11] The result is:

$$p_{nL}^{Z^-}(e_B, e_L, y^B, y^I, n) = y^I + \frac{n \cdot (e_L + e_B)}{(n+1) \cdot e_L} \cdot (y^B - y^I) < y^B$$

and where $e_L = \sum_1^n e_L^i$ and a price $p = y^B$ to all other shareowners in the target firm.

pivotal shareholders have no private incentive to form a bargaining coalition to negotiate as one party. This result is sometimes called *The Paradox of Bargaining*. Specifically, addition of a small pivotal blockholder decreases the average e_L/n. Accordingly, under equal treatment all target shareholders should welcome the addition of new and small blockholders with a bargaining position and with a share e_L^1 less than the current average e_L/n.[12]

An interesting implication of the Nash bargaining price solution under the equal treatment restriction that also provides a check on the correctness and reasonableness of the model is captured by the following statement.

Corollary 1:

Assume that the target firm is owned by atomistically small stockowners. As the trigger limit for blocking approaches 0%-- $\eta \to 0$ -- any atomistic stockowner becomes pivotal, and the Nash bargaining price converges to $p_{\infty L}^{Z^*}$. At this price no profitable and successful takeover attempts are possible in the model. Or more formally:

$$p_{\infty L}^{Z^*}(\alpha, e_B, y^B, y^I) = \lim_{n\to\infty}\left\{ p_{nL}^{Z^*} = y^I + \frac{\alpha\cdot(y^B - y^I)}{(\alpha + (e_L/n) - e_B)} \right\} = y^I + \frac{\alpha\cdot(y^B - y^I)}{(\alpha - e_B)} \quad where\ e_L = \sum_I^n e_L^i$$

This result is the analog in our model to the Grossman-Hart(1980) impossibility theorem, but our mechanism is different since in the limit there is no room for any free riding. In effect, any agent becomes pivotal in the limit because he can block the takeover attempt. This extremely strong bargaining position enables each individual to extract the full synergistic gain from the potential takeover. Hence, it is intuitively plausible that the endeavor fails. If the bidder has not established any toehold, the bargaining model implies that in the limit the only acceptable tender offer price is the free riding price $p = y^B$. Accordingly, besides being in line with economic intuition, the corollary also demonstrates that a Grossman-Hart-like impossibility result without imposing the free riding mechanism is valid in the limit under the equal treatment proviso. However, in contradistinction to the Grossman-Hart parametric economic environment our model is

[12] We have assumed that the ownership structure of the target firm is exogenously given. However, the Paradox of Bargaining implies that there are incentives for decisive owners to split their shares into several blocks of minimum but still pivotal size. Furthermore, two or more non-atomistic but not pivotal shareowners have the incentive to act as one decisive agent. But the transaction costs may be prohibitively costly. A proper analysis of these incentives is beyond the present model, but a new emerging literature on monitoring addresses the issue of how an ownership structure develops endogenously; see e.g. Admati, Pfleiderer and Zechner (1993): "Large Shareholder Activism, Risk Sharing, and Financial Market Equilibrium.", *Working Paper, Stanford University.*

predicated on strategic behavior[13]. Moreover, our limiting result may also be interpreted as providing a general rationale for a compulsory acquisition limit.

What implications does the equilibrium price solution under Nash conditions has for the relative distribution (T/B) of the takeover gain between the target shareholders (net of the value appreciation on the bidder toehold) and the acquisitor? A precise answer is provided by the following statement.

Corollary 2:

The equilibrium prices imply the following distribution of the takeover gain, $(y^B - y^I)$, *between the target net of the value appreciation of the bidder's toehold (T) and the acquisitor (B):*

$$T/B = \frac{\alpha \cdot (1-(e_L/n)) + (e_L/n) - e_B}{\alpha \cdot (e_L/n)}.$$

In particular, when the bidder wants to acquire 100% of the shares: $T/B = \frac{(1-e_B)}{(e_L/n)}$.

Two immediately verifiable traits are that the target shareholders, ceteris paribus, obtain a smaller relative share of the takeover gain the larger the bidder's toehold and the larger the average size of the pivotal blockholders' position. The first effect is immediate since the target gain is computed net of the value appreciation of the bidders toehold are. The second consequence emanates from the fact that a higher pivotal average results in a lower equal treatment price, see proposition 1, which implies that the cost of the shares the bidder procures decreases.

4. Blocking by One or Many Outside Arbitrageurs: The Complete Bid Case

IN THE PREVIOUS MODEL, the target ownership structure was assumed to be exogenously given. The agents in the economy were the bidder, the pivotal incumbent blockholders and the fringe of small stockowners. In this section, we endogenize the ownership structure by appending a new type of individuals to the cast: arbitrageurs. Their presence is endogenous in the sense that in the preceding models there may exist

[13] Logical problems in the limit with the Grossman-Hart free riding result are explored in Bagnoli-Lipman(1988) and Holmström-Nalebuff(1991). We have not analyzed whether our model in the limit is immune to their criticism.

unexploited profit opportunities that are his raison d'être. They have no initial position in the target firm, and no interest in running the company or in seeking synergistic gains. They are only motivated by exploiting a potential takeover price differential, and secure a profit from their speculation. In particular, by purchasing shares from the fringe of small stockowners at price p they assemble pivotal positions with blocking potential. By bargaining with the bidder, they may profit from their operation by obtaining a higher price for the block p_A than they paid when accumulating.[14]

In this section, we demonstrate that the potential effect of arbitrageurs is significant. We start by studying how the actual presence of arbitrageurs in a model without any large incumbent blockholders changes the equilibrium tender offer price, and, ipso facto, the relative distribution of the takeover gain. Step by step we generalize the model, and close the section by allowing both pivotal incumbents and potential arbitrageurs to interact; we derive our most pertinent conclusions when the equal treatment principle is enforced.

Imagine the following scenario. A bidder extends a conditional tender offer for 100% of the shares ($\alpha = 1$) at a price p for the target company which is exclusively owned by atomistic stockowners. Since each equityholder owns a position that is less than η-- the smallest percentage of the equity needed to block a takeover attempt-- nobody possess bargaining power. By extending an offer for η % of the stock at a price at or just above p, an arbitrageur can accumulate enough shares to establish a pivotal bargaining position. The original bidders tender offer fails unless he gets the arbitrageurs consent in a bargaining about the price. If the negotiation results in a price well above p for the arbitrageurs shares, he can pocket a profit.

The bargaining game between an arbitrageur and the bidder is different from our previous game. The arbitrageurs net gain is $s_A(p_A, p; e_A) = e_A \cdot (p_A - p)$, where $e_A = \eta$ is the size of the smallest block necessary to establish a bargaining position, p_A is the agreed upon bargaining price, and p is the price at which the arbitrageur purchases the equity from the fringe of small stockowners. The bidders net profit is $s_B(p, p_A; e_A, e_B, y^B, y^I) = e_B \cdot (y^B y^I) + e_A \cdot (y^B - p_A) + (1 - e_A - e_B) \cdot (y^B - p)$. The first term measures the value appreciation on his toehold, while the last two captures his net gain on the shares he procures from the arbitrageur and the fringe of small stockowners respectively. The size of the bargaining pie is $S(p; e_B, y^B, y^I) = s_A + s_B = e_B \cdot (y^B - y^I) + (1 - e_B) \cdot (y^B - p)$. Since the arbitrageur makes a

[14] The model presupposes that the arbitrageurs are outsiders, but an alternative would have been to assume that the non-atomistic but still not pivotal target shareholders would be the arbitrageurs, i.e. inside instead of outside arbitrageurs. We have not explored this alternative.

loss of $e_A \cdot (y^I - p)$ if the bargaining defaults, the outside option vector is d = $(d_A, d_B) = (e_A \cdot (y^I - p), 0)$. The formal definition of the bargaining game with one arbitrageur is $\langle S, \mathbf{d} \rangle = \{(s_A, s_B) \in R^2; s_A + s_B \leq S; s_A \geq 0, s_B \geq 0,$ and $\mathbf{d} = (e_A \cdot (y^I - p), 0)\}$.

GENERAL BARGAINING SOLUTIONS WITH POTENTIAL ARBITRAGEURS: DIFFERENTIATED BID PRICES

In order to understand the effects of arbitrageurs on the bargaining tender offer price as transparently as possible, we temporarily impose an implicit restriction on the arbitrageurs: there is no competition between them. It is as if they have decided in unison to only allow m of them to enter, and each holds a fraction $e_A = \eta$ of the shares in the target firm. m is the smallest integer less than or equal to $1/\eta$, i.e. m is the maximum number of possible arbitrageurs who can accumulate the minimum position needed to block the takeover attempt, and establish a bargaining position. For this economic environment, our next result gives an affirmative answer to questions like, When will arbitrageurs be present, and What are the price effects of their profit seeking activity?

Proposition 2:
At most m arbitrageurs will be present if a bidder opting for the whole company, offers a price $p \in [y^I, y^I + (y^B - y^I)/(1 + e_A - e_B))$ *where* $e_A = \eta$. *The bidder extends to each of the arbitrageurs an offer at the price*

$$p_A^*(e_A, y^I, y^B, m) = y^I + \frac{(y^B - p)}{(m+1) \cdot e_A} + \left(\frac{e_B + m \cdot e_A}{(m+1) \cdot e_A} \right) \cdot (p - y^I).$$

In economic terms, the strategically acting and non competitive arbitrageurs open up a window for profitable speculation if $p \in [y^I, y^I + (y^B - y^I)/(1 + e_A - e_B))$. If the arbitrageur purchases the shares at a price p> $y^I + (y^B - y^I)/(1 + e_A - e_B)$, substitution into the Nash bargaining functional directly informs us that the resulting bargaining price is below p_A^*. The very reason behind this outcome is that the acquisitor must extend the same price to the fringe as the arbitrageurs do to obtain the remaining shares. This restriction on the fringe reservation price is already incorporated into the bargaining solution.

What will be the effect on the tender offer price if the arbitrageurs are competing? An arbitrageur will secure a profit as long as the price he pays the atomistic owners belongs to the interval $y^I + (y^B - y^I)/(1 + e_A - e_B)$. In particular, he makes zero profit when $p = p_A^* = p_A^{Z^*} = y^I + (y^B - y^I)/(1 + e_A - e_B)$, i.e. $p_A^{Z^*}$ corresponds to the fix point of the p_A^* price schedule. By the logic of competition, the arbitrageurs will close the arbitrage window by driving the price they extend to the fringe of small stockowners to $p_A^{Z^*}$. But then, however, there will be no room for them; it is as if they stampede themselves out of the market.

But even if they ultimately will not be present, the potential effect of them is powerful. If the bidder initially extends a price p in the interval $\left[y^I, y^I + (y^B - y^I)/(1 + e_A - e_B)\right)$ for all outstanding equity, they will not tender to him since the potential arbitrageurs offer more. Consequently, the potential effect of arbitrageurs is that the bidder offers at least $p_A^{Z^*}$.

This price will also constitute a unique rational expectation equilibrium price in the model[15]. By initially offering $p_A^{Z^*}$ to the shareholders of the target company, the bidder is certain to get their approval since this price is above their reservation price[16]. This price settlement strategy will also be preemptive in the sense that there will be no room for any arbitrageurs. In effect, we have derived the following formal result.

Proposition 3:

If the target firm is completely owned by atomistic shareholders, and competitive arbitrageurs are potentially present, the unique rational expectation equilibrium price that the bidder extends is

$$p_A^{Z^*}(e_A, e_B, y^B, y^I) = y^I + \frac{(y^B - y^I)}{(1 + e_A - e_B)} \text{ where } 0 < (e_B = \eta) \leq 1.$$

The price strategy is preemptive: no arbitrageurs will be present.

Two implications of this result are worth noticing. In this case, the bidder's cost of acquiring the target company is the same as under the preconditions in Proposition 2, but the relative distribution between the original target shareholders and the acquisitor is

15 The uniqueness comes from the linearity of the Nash bargaining solution schedule; it has only one fix point.

16 In accordance with rational economic behavior under the twin assumptions of atomistic ownership structure and CAL, the small stockowners will tender at a price at or above y^I, the current value of the shares.

different. Under the preemptive strategy the target stockholders also receive the part that the arbitrageurs get when they are non competitive. Hence, the fringe gains from the preemptive pricing policy while the bidder is indifferent; in both cases the overall relative distribution is $T/B = (1 - e_B)/e_A$, see Corollary 2.

Moreover, while enactment of the equal treatment principle would have an effect on the tender offer prices and the relative distribution of the takeover gain if the arbitrageurs are non competitive, it will have no effect if they are (potentially) competing. The reason being that the endogenously determined equilibrium price in the previous proposition already satisfies the equal treatment principle; it is a fix point solution. Furthermore, the fringe obtains a share of the takeover gain, and are not left without any net gain as in the non competitive model. Consequently, enforcement of the principle will not introduce any economic forces that will upset the established equilibrium. At least in this model, the effect of competition among potential arbitrageurs is a perfect substitute for the ETP. Hence, there is no need to impose the ETP in this model since it is already operationalized by competition. We conclude this subsection by stating this result somewhat more formally.

Corollary 3:
Under the same conditions as above, enactment of the equal treatment principle will have no effect: the unique rational expectation equilibrium stays the same.

GENERAL BARGAINING SOLUTIONS WITH POTENTIAL ARBITRAGEURS AND PIVOTAL INCUMBENT BLOCKHOLDERS: EQUAL TREATMENT BID PRICES

As a final variation on our bargaining theme, let us mix our two basic models by allowing competitive arbitrageurs into the model with only pivotal incumbent blockholders and a fringe of small stockowners. We assume that an arbitrageur does only purchase shares from the small shareowners, and that the equal treatment principle is enacted[17]. What will the price and distributional consequences of potential arbitrageurs be in this model?

[17] This presupposition can be rationalized by the fact that large blocks are often larger than the smallest size needed for an arbitrageur to be pivotal; he has no incentive to buy a larger share of the company. If $e_L^i = \eta$ there is no profit opportunity for the arbitrageur. Implicitly, we assume that it is prohibitively expensive to split a large block in parts that are pivotal. In particular, control benefits may be lost in the process. Generally, the assumption is also in accordance with observed empirical behavior.

Definition

A takeover economy has ***arbitrage potential*** *if (i)* $(1-e_L-e_B)\geq\eta$ *where* $e_L=\sum_1^n e_L^i$ *is the total size of the n pivotal owners blocks; and (ii)* $\bar{e}_L=\left(\sum_1^n e_L^i\right)/n>\eta$.

From Proposition 1, it is evident that the average size of the pivotal block position, and the bidder toehold determine the bargaining price under equal treatment. There is room for at least one arbitrageur if the two stated conditions are fulfilled. The first one is a feasibility criterion that simply states that there is actual room for more pivotal players in the game. The second one is an economic requirement: an arbitrageur will only enter if he lowers the previous average $\bar{e}_L$, thereby forcing the bidder to raise his original tender offer price. If the bidder initially offers the price $p_{nL}^{Z^*}=y^I+\left(y^B-y^I\right)/\left(1-\bar{e}_L-e_B\right)$, and the two conditions are satisfied, the arbitrageur extends a slightly higher price to the fringe of small stockowners. They accept since it is better than the bidders offer. From his new pivotal position, the arbitrageur can ascertain a higher bargaining price form the bidder, and secure a profit from the price differential.

The strategically acting blockholders rationally considers this positive price effect of potential arbitrageurs when evaluating the acquisitor's tender offer price, i.e. their rationally expected price $p_{LA}^{Z^*}=y^I+\left(y^B-y^I\right)/\left(1-\bar{e}_{LA}-e_B\right)$ where $\bar{e}_{LA}$ is the new average including the arbitrageurs. Accordingly, they will reject the original but lower offer, $p_{nL}^{Z^*}$. Since the bidder ultimately has to pay the tender offer price $p_{LA}^{Z^*}$, he may as well extend it initially. All target shareholders accept since they have no prospect of any more profitable takeover option. Accordingly, this price constitutes the full rational expectation equilibrium of the model, and is a preemptive price strategy; even if no arbitrageurs will actually be present, their potential effect is incorporated in equilibrium.

In order to state this result formally, we need some notation. Let g be the largest integer less than or equal to $(1-e_L-e_B)/\eta$ where $e_L=\sum_1^n e_L^i$. g is the maximum number of possible arbitrageurs who can establish a position in the target firm. Including the g arbitrageurs, the new average ownership share among the pivotal becomes $\bar{e}_{LA}=\left(\sum_1^n e_L^i+g\cdot\eta\right)/(n+g)$.

Proposition 4:

In a takeover model with arbitrage potential, and where the target firm is owned by a fringe of atomistic shareholders and n pivotal blockholders $(e_L^i \geq \eta)$, *the unique and preemptive rational expectation equilibrium tender offer price with the equal treatment principle enforced is*

$$p_{LA}^{Z^*} = y^I + \frac{(y^B - y^I)}{(1+\bar{e}_{LA} - e_B)} \text{ where } \bar{e}_{LA} = \frac{\left(\sum_1^n e_L^i + g \cdot \eta\right)}{(n+g)} < \bar{e}_L = \frac{\left(\sum_1^n e_L^i\right)}{n}.$$

The final corollary presents the ranking of the three equilibrium tender offer prices that we have analyzed in this and the previous section as well as their associated relative distributions of the takeover gain between the target shareholders and the acquisitor (T/B). The highest possible price under equal treatment is the preemptive equilibrium price $p_A^{Z^*}(e_A, e_B, y^B, y^I) = y^I + (y^B - y^I)/(1 - e_A - e_B)$ where $e_A = \eta$, see proposition 3. This is the equilibrium price in the model with a completely atomistically owned target firm, and where the potential arbitrageurs are competitive. From Corollary 2, we infer that the relative distribution in this case is $(1 - e_B)/e_A$. Next in order are the equilibrium prices in the takeover model that incorporated the effects of n pivotal blockholders in target firm as well as of the potential arbitrageurs. From the preceding proposition, we know that the economy with arbitrage potential has, ceteris paribus, a higher equilibrium price than the one without, i.e. $p_{nL}^{Z^*} < p_{LA}^{Z^*}$. Ipso facto, the relative distributions ranks as $(1 - e_B)/e_L < (1 - e_B)/\bar{e}_{LA}$. These rankings are summarized in the next result.

Corollary 4:

If $\bar{e}_L > \bar{e}_{LA} > e_A = \eta$, *the equilibrium prices and the relative distributions of the takeover gain between target shareholders and the acquisitor satisfy the following inequalities under preemptive pricing strategies*

$$p_{nL}^{Z^*} < p_{LA}^{Z^*} < p_A^{Z^*} \text{ or explicitly } y^I + \frac{(y^B - y^I)}{(1+\bar{e}_L - e_B)} < y^I + \frac{(y^B - y^I)}{(1+\bar{e}_{LA} - e_B)} < y^I + \frac{(y^B - y^I)}{(1+\bar{e}_A - e_B)}$$

$$\text{and } \frac{T}{B} = \frac{(1-e_B)}{e_L} < \frac{T^{LA}}{B^{LA}} = \frac{(1-e_B)}{\bar{e}_{LA}} < \frac{T^A}{B^A} = \frac{(1-e_B)}{e_A}.$$

Hence, under preemptive pricing strategies, the potential effect on equilibrium prices and the relative distributions of the takeover gain can be significant. In particular, the wider

the potential window for arbitrageurs, the larger the gain for the target shareholders. Stated somewhat differently, we have completely and succinctly determined the effects of a specific but general ownership structure-- n large pivotal blockholders and g potentially pivotal arbitrageurs-- on the tender offer prices in equilibrium and the resulting relative distributions. Furthermore, since the rankings are simple and critically dependent on only two parameters that measures ownership structure, $\bar{e}_L$ and e_B, they are suitable for empirical testing.

5. Conclusions

THIS PAPER HAS MODELLED one simple but powerful idea: large blockholders vested with the potential to foil a takeover attempt have a bargaining position versus the acquisitor, and, ipso facto, exercise a significant and strategic influence on the resulting equilibrium tender offer price. To exploit it as efficiently and transparently as possible, we have used a simple modelling structure. The result is a rather complete theory of the effect of ownership structure on the equilibrium tender offer price and the associated relative distribution of the takeover gain. In particular, the theory of preemptive pricing that encompasses the potential effect of endogenous arbitrageurs is a novel contribution. An important lesson from the analysis is that the legal underpinnings or restrictions of the takeover market like the Compulsory Acquisition Limit, the Equal Treatment Principle as well as the bidform have a decisive influence on the final equilibrium prices and distributions. Accordingly, we believe that explicit modelling of these parameters and analysis of their interaction are necessary features of any advanced takeover theory with explanatory power.

A characteristic feature in our model is the explicit modelling of institutional restrictions like the ETP rule and the CAL proviso. We demonstrate that these regulations have profound effects on the outcome of the bargaining game. A valid inference from our analysis with general implications is, that in order to improve our empirical understanding of takeovers and the takeover process, it is decisive to explicitly model the regulatory framework and delineate its consequences on the tender offer price and distribution of the takeover gain.

When appropriate institutional restrictions are imposed and when the potential effect of arbitrageurs is taken into account, our theory predicts a skewed distribution of the takeover gain heavily in favor of the target shareholders. In a companion empirical paper, Bergström, Högfeldt and Högholm(1993), we show that the model exhibits explanatory power in a test on Swedish takeover data. In particular, the models predictions on the distribution of the takeover gain between stockholders of target and acquiring firms is not rejected.

APPENDIX A

FORMAL PROOFS OF RESULTS

WE STATED AS an assumption that the bidder extends a **conditional** complete bid. The next lemma formally proves that the bidder in a choice between an unconditional and a conditional bid regime always prefers the conditional alternative since it constitutes the profit maximizing choice. Hence, our exogenously specified assumption is actually endogenously enforceable.

Lemma 0:
Postulate a takeover model with one pivotal incumbent shareholder, an ocean of atomistic ones, and an outside bidder. Under Nash conditions, the rational, profit maximizing and external bidder always prefers a conditional tender offer to an unconditional if $p \geq y^I$.

Proof: If the bidder extends an unconditional tender offer, his position, in case of disagreement, is less favorable than the corresponding position of the conditional alternative; the payoff of the blockholder stays the same. Assuming that the fringe proffer their shares but the bargaining defaults, the offeror's closing position does not give him control, and is worth-- outside option-- $d_B^u = (1-e_L)\cdot(y^I - p)$; in effect, he makes a loss of this size. According to the Nash bargaining distribution with outside option vector $\mathbf{d} = \left((1-e_L)\cdot(y^I - p), 0\right)$-- the general split the difference rule, the bidders and the large incumbent blockholders profit functions in the unconditional case are, respectively

$$s_B^u(e_L, p; y^B, y^I) = (1/2)\cdot\left(y^B - p + e_L\cdot(p - y^I)\right) + (1/2)\cdot(1-e_L)\cdot(y^I - p)$$

$$s_L^u(e_L, p; y^B, y^I) = (1/2)\cdot\left(y^B - p + e_L\cdot(p - y^I)\right) - (1/2)\cdot(1-e_L)\cdot(y^I - p)$$

The bidders profit is higher if he extends a conditional tender offer than an unconditional since

$$s_B^*(e_L, p; y^B, y^I) - s_B^u(e_L, p; y^B, y^I) = \left[(1/2)\cdot\left(y^B - p + e_L\cdot(p - y^I)\right)\right] - \left[(1/2)\cdot\left(y^B - p + e_L\cdot(p - y^I)\right) + (1/2)\cdot(1-e_L)\cdot(y^I - p)\right] =$$

$$-(1/2)\cdot(1-e_L)\cdot(y^I - p) \geq 0 \text{ if } p \geq y^I.$$

Thus, assuming that the bidder prefer the conditional alternative also in the indifference case, and given our maintained assumption that $y^I \leq p \leq y^B$, he will never issue an unconditional bid. **QED**

Proof of Lemma 1:

In this case, the Nash product is

$$\arg\max_{p_L^i}\left[e_b\cdot(y^B-y^I)+\sum_1^n e_L^i\cdot(y^B-p_L^i)+\left(\alpha-\sum_1^n e_L^i-e_B\right)\cdot(y^B-p)-0\right]\cdot\left[e_L^1\cdot(p_L^1-y^I)-0\right]\cdots\left[e_L^n\cdot(p_L^n-y^I)-0\right]$$

Somewhat simplified, the FOC:S are $\left(e_L=\sum_1^n e_L^i\right)$

$$e_L^i\cdot(p_L^i-y^I)=\left[e_b\cdot(y^B-y^I)+\sum_1^n e_L^j\cdot(y^B-p_L^j)+(\alpha-e_L-e_B)\cdot(y^B-p)\right]\ \forall i$$

Note that for each i, the RHS of the FOC, which represents the bidders profit, is identical. In economic terms, this illustrates the well known property of the Nash bargaining solution that each participant in the bargaining game receives a share of equal value of the pie to be split:

$$\forall i,j\ e_L^i\cdot(p_L^i-y^I)=e_L^j\cdot(p_L^j-y^I)=\left[e_b\cdot(y^B-y^I)+\sum_1^n e_L^k\cdot(y^B-p_L^k)+(\alpha-e_L-e_B)\cdot(y^B-p)\right]$$

Using this substitution, the RHS term $\sum_1^n e_L^k\cdot(y^B-p_L^k)$ equals $e_L\cdot(y^B-y^I)-n\cdot e_L^i(p_L^i-y^I)$. Further simplification and solving for p_L^i in the FOC yields the result. **QED**

Proof of Corollary 1:

If any atomistic stockholder is pivotal, i.e. has bargaining power, $e_L=\sum_1^n e_L^i=(1-e_B)$, and the number of pivotal players $n\to\infty$. By using the n player result from Proposition 1, we obtain

$$p_{\infty L}^{Z^*}(\alpha,e_B,y^B,y^I)=\lim_{n\to\infty}p_{nL}^{Z^*}=\lim_{n\to\infty}\left\{y^I+\frac{\alpha\cdot(y^B-y^I)}{(\alpha+(1-e_B)/n-e_B)}\right\}=y^I+\frac{\alpha\cdot(y^B-y^I)}{(\alpha-e_B)}\ \text{where } e_L=\sum_1^n e_L^i$$

The targets net gain is $(\alpha\text{-}e_B)\cdot\left(p_{\infty L}^{Z^*}-y^I\right)+(1-\alpha)(y^B-y^I)=(y^B-y^I)$, i.e. by exhausting the full net gain the incumbent shareholders render the takeover attempt non-profitable for the bidder. Note that if $e_B=0$ then $p_{\infty L}^{Z^*}=y^B$. **QED**

Proof of Corollary 2:

When the bidder issues a bid for $(\alpha - e_B)\%$ of the target shares, his profit function is $s(p_L^{z^*}) = (\alpha - e_B)\cdot(y^B - p_L^{z^*}) + e_B \cdot (y^B - y^I)$ which after evaluation yields

$$s(p_L^{z^*}) = (y^B - y^I)\cdot\{(\alpha\cdot(e_L/n))/(\alpha + (e_L/n) - e_B)\}$$

The target's gain is $T(p^{z^*}) = (\alpha - e_B)\cdot(p_L^{z^*} - y^I) + (1-\alpha)\cdot(y^B - y^I) =$

$$(y^B - y^I)\cdot\{(\alpha\cdot(1-(e_L/n)) + (e_L/n) - e_B)/(\alpha + (e_L/n) - e_B)\}$$

Consequently, the quotient of target gain over bidder profit (T/B) becomes

$$\frac{T}{B} = \left\{\frac{\{(y^B - y^I)\cdot(\alpha\cdot(1-(e_L/n)) + (e_L/n) - e_B)\}}{(\alpha + (e_L/n) - e_B)}\right\} \Bigg/ \left\{\frac{(y^B - y^I)\cdot\alpha\cdot(e_L/n)}{(\alpha + (e_L/n) - e_B)}\right\}$$

$$\Leftrightarrow$$

$$\frac{T}{B} = \frac{\alpha\cdot(1-(e_L/n)) + (e_L/n) - e_B}{\alpha\cdot(e_L/n)}$$

which in the special case of $\alpha = 1$ becomes $\frac{T}{B} = \frac{1-e_B}{(e_L/n)}$. **QED**

Proof of Proposition 2:

To demonstrate the validity of the first art of the claim, form the Nash product with m arbitrageurs when $s_A^i(p_A, p; e_A) = e_A \cdot (p_A - p)\forall i;\ i = 1,2,\cdots,m;$

$$s_B(p, p_A; e_A, y^B, y^I, m) = e_B \cdot (y^B - y^I) + m\cdot e_A \cdot (y^B - p_A) + (1 - m\cdot e_A - e_B)\cdot(y^B - p);$$

and $d = (\mathbf{d_A}, d_B) = (e_A^1 \cdot (y^I - p), \cdots, e_A^m \cdot (y^I - p), 0)$:

$$\prod_{i=1}^{m}(s_A^i - d_A^i)\cdot(s_B - d_B) = [e_A \cdot (p_A - p) - e_A \cdot (y^I - p)]^m \cdot [e_B \cdot (y^B - y^I) + m\cdot e_A \cdot (y^B - p_A) + (1 - m\cdot e_A - e_B)\cdot(y^B - p)]$$

By comparing the Nash product to the one in the proof of Lemma 1 when $\alpha = 1$, $e_L^i = e_A = \eta\ \forall i$; $m\cdot e_L = e_L$; and $m = n$, it is immediate that they are identical. Accordingly, even if both the size of the bargaining pie, and the outside option vector

have changed, the Nash bargaining price functional in the model with endogenous arbitrageurs has the same structural form as in the previous model of exogenous, large and pivotal blockholders, i.e. we can use our prior results. Hence, from Lemma 1 we infer that the Nash bargaining price functional with m arbitrageurs is

$$p_{mA}^{i^*}\left(p;e_A,e_B,m,y^I,y^B\right)=y^I+\frac{\left(y^B-p\right)}{(m+1)\cdot e_A}+\frac{(m\cdot e_A+e_B)}{(m+1)\cdot e_A}\cdot\left(p-y^I\right)\ \forall i=1,2\cdots,m \text{ where } e_A=\eta$$

When is it profitable for an arbitrageur to establish a bargaining position? Such a scheme is only profitable if the arbitrageurs can buy their shares from the fringe of small stockowners at a price p less than the resulting bargaining price p_{mA}^*. From the Nash bargaining price functional, we immediately deduce that $p_{mA}^* > p$ if and only if $p \in \left[y^I, y^I+\left(y^B-y^I\right)/\left(1+e_A-e_B\right)\right)$. If $p=y^I+\left(y^B-y^I\right)/\left(1+e_A-e_B\right)$ is substituted into the price functional, the fix point solution of the Nash bargaining price solution with m pivotal blockholders is generated. Stated somewhat differently, it corresponds to the bargaining price solution if the ETP is imposed. Consequently, arbitrageurs will only be present under the stated condition. **QED**

Proof of Proposition 3:

Use the proof of Proposition 2.

Proof of Corollary 3:

Follows immediately since $p_A^{Z^*}$ is a fix point solution.

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Essay 2:

Strategic Blocking, Arbitrageurs and the Division of the Takeover Gain

Empirical Evidence From Sweden

by

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Abstract

This paper develops and tests a theory that explains the skewed distribution of the takeover gain heavily in favor of the target shareholders by considering the effects of a concentrated target ownership structure; legal restrictions like the equal treatment principle and the compulsory acquisition proviso; as well as the potential presence of arbitrageurs. The cardinal idea is that large incumbent shareholders with the option to block a takeover attempt exercise a strategic influence on the tender offer prices. If appropriate institutional restrictions are imposed and if the potential effect of arbitrageurs is taken into account, the theory's predictions of the distribution of the synergy gain between the target firm and the acquirer are not rejected in tests on Swedish data. However, since the theory incorporates institutional characteristics that are pertinent, especially for European takeover markets, we expect it to possess explanatory power over a wider empirical range. Conducting more general regression tests of how the target ownership structure affects the distribution of the takeover gain, we show that a bargaining parameter derived in our model has a significant explanatory effect, in particular when the total takeover gain is positive.

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1. Introduction

ONE OF THE MOST WELL-DOCUMENTED results in the empirical literature on takeovers is that the distribution of the synergy gain is heavily skewed in favor of the shareholders of the target corporation, see e.g. Jensen & Ruback (1983). There even seems to exist a remarkable stability across national markets. For example, from a sample of US takeover data, Bradley, Desai and Kim(1988) report a 90/10 split of the value-weighted takeover gain while this paper in a similar study on Swedish data observes a 89/11 division. The disparate hypotheses in theoretical literature trying to explain these empirical regularities are of two basic varieties.

One line of thought suggests that successful tender offers do not create additional value but merely generate a redistribution of wealth from the equityowners of the bidding firm to the shareholders of the target company that explains the skewed distribution. The culprit in these zero-sum theories is the management team of the acquiring corporation. The team's incentives are not properly aligned with the stockowners interests. In particular, the empire building ambitions of loosely supervised management teams may be the driving force behind takeover attempts, see Morck, Shleifer & Vishny (1990), and the phenomenon is expected to be most prevalent in industries with excess cash flows, see Jensen(1986). Another possibility is that the acquiring firm's management overestimates the value of controlling or merging with the target firm, see Roll (1986).

A basic tenet of the other group of theories is that takeovers produce synergies but due to different economic mechanisms the target shareowners obtain the lion's share. Rational free riding by small target shareholders along the lines of Grossman & Hart(1980) implies a skewed distribution of the takeover gain in favor of the target firm. Fishman(1988) offers competition among bidders as an explanation while Harris(1990) suggests that defensive measures by the target management cause the distribution to be lopsided. According to Stulz, Walking & Song(1990), the takeover premium is high since the bidder faces an upward-sloping supply curve for shares in the target firm because of heterogeneous beliefs or transaction costs.

However, while interesting in their own right, these theories do not explicitly consider the effect on the distribution of the takeover gain of key institutional facts like the ownership structure of the target firm and the legal rules regulating the takeover process. The theory presented in this paper attempts to overcome this shortcoming by exploiting the simple but profound concept of **blocking**. The cardinal idea is that the **ownership structure** of the target firm is a crucial parameter in explaining the skewness of the distribution of the takeover gain since large equityowners may have the option to block a tender offer. The blocking potential implies that the bidder **must** reach an explicit or implicit agreement with these pivotal agents. Consequently, they exert a strategic influence on the tender offer price and, ipso facto, on the distribution of the takeover

gain. Furthermore, besides the pivotal incumbent shareholders, there may also be arbitrageurs present. They are persons or institutions with no interest in running the firm but by buying shares in the market they accumulate enough equity to establish a blocking position. They profit from the difference between the price at which they buy and the settlement price at which they ultimately tender to the bidder.

The potential for strategic blocking by large shareholders in takeover attempts is substantial and manifests itself under different non-atomistic target ownership structures and circumstances. The most obvious case is, of course, when a single stockowner controls the simple majority of the equity. But even if the party in actual control of the firm operates with a block of less than 50% of the stocks, a bidder may be forced to negotiate with him. The alternative takeover strategy of acquiring the shares from the fringe of small stockowners over the market may be costly due to disclosure rules, transaction costs and lack of liquidity in the market.

Furthermore, if the bidder opts for 100 percent of the shares in the company, a legal rule called the **Compulsory Acquisition Limit**(CAL) opens up a window for blocking by large shareholders at the same time as it closes this possibility for small equityowners. If already more than a certain percentage of the equity is tendered, normally 90% in the European corporate legal systems, the bidder has the option to compulsory acquire the remaining shares at the same price at which he attained the first part. The motivation behind it is to facilitate takeovers by not making any small stockowner decisive about the fate of the bid. The dual side of this rule is that by controlling a share of the equity corresponding to one minus this limit, i.e. at least 10% in e.g. Sweden and the UK, the stockowner becomes pivotal to the overall success of the bid, and forces the bidder to reach an agreement with him. In particular, due to the concentrated ownership structure that characterize publicly listed corporations, especially in Continental Europe and in Scandinavia, the CAL provision implies that an acquirer may face **more than one** (max 10) large incumbent shareholder or potential arbitrageur with blocking capability.

Besides the CAL rule, another generally enacted legal restriction in Europe as well as in the US that affects the distribution of the takeover gain is the **Equal Treatment Principle** (ETP): the bidder must extend to the rest of the target stockowners a tender offer price that is at least as high as the one he has offered the large pivotal blockholders. Accordingly, it is essential to consider the effects of both the CAL and the ETP in a theory of the takeover gain distribution that is predicated on the existence of a concentrated target ownership structure with different shareholder clienteles, e.g. large pivotal versus small shareholders. Stated somewhat differently, the characteristic feature of the theory developed in this paper is that it carefully models how institutional parameters like **the legal framework** and the assumptions about **the ownership**

structure of the target corporation interact in determining the distribution of the takeover gain with the blocking idea as the crucial common element.

To formalize the strategic interaction in this economic environment, we conjecture that, explicitly or implicitly, the bid price and the distribution of takeover gain is, within the legal constraints, the outcome of a **bargaining** process between pivotal incumbent stockowners and arbitrageurs with blocking potential, and one bidder. Specifically, the model is predicated on the behavioral hypothesis that the decisive agents are acting individually rational by encompassing the fact that their own actions exert a significant influence on the final price outcome while the fringe of small stockowners price behavior is parametric; they accept the tender bid if they receive an offer at or above their reservation price. In order to obtain specific and closed form solutions to the bargaining game, and isolate the salient parameters, we apply the Nash bargaining solution concept. The result is a theory that given the legal framework determines the equilibrium tender offer premium and thereby the distribution of the takeover gain as a simple function of only two ownership parameters-- **the average ownership share of the pivotal agents** and **the size of the bidder toehold--** and **the synergy gain.**[1]

To empirically evaluate the model, we test its predictions of the distribution of the takeover gain on Swedish data consisting of takeovers taking place between 1980 and 1992.[2] In Sweden, the typical takeover sequence starts when the management of the acquiring firm initializes a negotiation with their corresponding number in the target firm. If no agreement is reached, the bidder withdraws. However, if the two parties accord, the large incumbent blockholders are asked to accept the terms of the bid. If they do not concur, the offer is either renegotiated or the bidder withdraws. But if the large pivotal shareholders accept the terms, a public tender offer conditional on 90% acceptance rate is made; due to the combination of tax and control reasons, the majority of such offers are for **all** outstanding shares. Furthermore, because of the equal treatment principle, an identical tender offer price is extended for all shares of the same class.[3] If 90% or more tender, the remaining shares are compulsory acquired by the CAL rule. Otherwise the bid fails and may be withdrawn or revised.

Taken as a whole, the Swedish institutional environment provides a suitable testing ground for a theory predicated on blocking potential by large pivotal shareholders. In fact, despite strong parameterization, the theory's implications of the takeover gain are **not rejected,** i.e. the ownership structure of the target firm as well as specification of the

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[1] The theory does not explain how a certain ownership structure has evolved but take it as exogenously given.

[2] This is an appropriate confrontation of our theory since especially the data on ownership of publicly traded corporations is very reliable in Sweden.

[3] However, the takeover bid may be differentiated between voting and non-voting shares, or between shares that are unrestricted or restricted with respect to foreign ownership.

legal framework are essential in explaining the empirically observed skewness of the distribution of the synergy gain heavily in favor of the target shareholders.

We also perform a more general regression analysis of how the ownership structure of the target firm is related to the division of the takeover gain along the lines of Stulz, Walking and Song (1990). In the Appendix, we demonstrate that the target shareholders' gain is related to ownership parameters if the total takeover gain is positive. If the total gain is negative, size related variables affect the distribution. For the whole sample, the gain accruing to the target shareholders is negatively related to the size of bidder's toehold. In particular, the target's gain is increasing in the size of a bargaining parameter derived in the theoretical model of this paper. Regarding takeovers where the bidder already owns a high stake of the target, the bargaining parameter allowing for potential arbitrageurs seems to possess a greater explanatory power. As a whole, the more elaborate empirical testing gives further evidence in support of the general hypothesis that ownership structure parameters are important as well as in the specific conjecture that the blocking potential of large target shareholders has a decisive distributive impact.

The rest of the paper is organized as follows. The next section develops the formal bargaining model and derives the bid price and distribution results to be tested. Part 3 provides a detailed description of our data base on Swedish takeovers as well as a discussion of how empirical measurement problems are handled in the study. The results from two different sets of tests of the theory on Swedish data are reported in section 4. Finally, the paper concludes with a summary.

2. The Model

CONSIDER THE FOLLOWING stylized takeover scenario with two corporations: a target and an acquiring firm. The market value of dividend rights of the target firm is y^I under the incumbent management team. A bidding firm with toehold (e_B) in the target, can generate a synergy gain if the operations of the firms are merged. Therefore it extends a tender offer, and if the takeover attempt succeeds, the market value of the target increases to y^B. To keep the analysis as simple and transparent as possible, we assume that all information in the model is common knowledge; there are no taxes and transaction costs; no private benefits of control; there is only one bidder; and only takeovers with positive synergy occurs.[4]

[4] The most restrictive presupposition is perhaps that we assume a single bidder. However, even in a bidding contest concerning the right to extend a tender offer a single bidder ultimately prevails. Hence, to focus on how the tender offer premium is determined and not on the bidding contest, we make this assumption. However, the model with arbitrageurs presented below introduces elements of competition.

In general, a party obtains control of a firm if it commands fifty percent or more of the equity. However, since the purpose of this paper is to confront our theory with Swedish data on takeovers and because most tender offers in Sweden are bids for all outstanding shares, we assume that the positive synergy gain is not realized unless the bidder owns **all equity**.[5] There are at least three general reasons why ownership of all target shares is more beneficial than just operational control. (i) If full ownership is established, the operations of the two firms can be restructured without any objections from minority shareholders. (ii) With a controlling interest of less than 100% of the shares, taxes must be paid separately on both firm's profits whereas with full ownership profit and losses can be transferred between the firms in order to minimize the total sum of tax payments. (iii) Finally, if the acquirer intends to invest heavily in the firm but does not expect the minority shareholders to invest a proportionate amount, he may prefer full ownership.

The procurement of 100% of the equity is facilitated by the legal rule of Compulsory Acquisition Limit(α). It gives the bidder the mandate to purchase the remaining outstanding shares if more than α has been tendered. In effect, the provision implies that no small shareholder can block the bid, but any large shareowner who controls ($1-\alpha$) or more of the equity has this option, i.e. unless the bidder offers a high enough premium to the pivotal shareowners the tender offer foils. Formally, a large equityholder has blocking potential if he owns a share of the firm(e_L^1) that is equal to or larger than ($1-\alpha$). Due to the CAL provision, the atomistic shareowners who act parametrically cannot individually affect the outcome of the bid. Moreover, there is no room for free riding since all shareholders must tender before the gain materializes. This implies that their reservation price is y^1, i.e. they tender at any price slightly above this level. Expressed somewhat differently, this legal rule opens up a window for blocking of the takeover attempt by the large equityowners at the same time as it closes the free rider option for the small shareholders.

The focus of the model is on how the interaction of the bidder and the large pivotal equityowners of the target firm determines the equilibrium tender offer price and thereby the distribution of the takeover gain. We assume that each of these players is individually rational and acts strategically, i.e. he rationally and simultaneously considers the effect of his own actions as well as those of all other agents on the final price. In particular, since the Equal Treatment Principle is assumed to be enacted, they fully consider the effect of the bidder having to pay the small shareholders the same price as the one he extends to the large pivotal ones. The strategic interaction between the pivotal agents is modelled as a bargaining game using the Nash split the difference rule as the solution concept. Besides satisfying a set of common sense based axioms, it has the benefit of generating

[5] The model does not only apply to this special case but can be developed into a more general theory, see Bergström, Högfeldt and Högholm(1992).

simple and closed form solutions for the resulting tender offer price and the distribution of the takeover gain. Successively, we derive the equilibrium tender offer prices for three games with different sets of players: the bidder faces (i) only one or (ii) several incumbent pivotal blockholders; or (iii) he encounters simultaneously potential arbitrageurs and at least one residing strategic blockholder.[6]

THE BIDDER BARGAINS WITH ONE INCUMBENT SHAREHOLDER WITH BLOCKING POTENTIAL

If there is only one incumbent shareowner(e_L) with blocking capability $(e_L \geq (1-\alpha))$ who bargains with the acquirer over the tender offer price (p_L), the (net) gain on his position if an agreement is reached and the takeover attempt succeeds is $s_L(p_L; e_L, y^I) = e_L \cdot (p_L - y^I)$. The acquiring firms (net) profit from a realized takeover is $s_B(p_L; e_B, e_L, y^B, y^I) = e_B \cdot (y^B - y^I) + e_L \cdot (y^B - p_L) + (1 - e_B - e_L) \cdot (y^B - p_L)$. The first term on the right hand side is the value appreciation on the bidding firms toehold in the target firm while the other two are the gains on the shares bought from the pivotal incumbent and the fringe of small shareowners respectively. As evident from the last expression, by requiring that the atomistic equityowners obtain the same price as the large blockholder (p_L), we have imposed the Equal Treatment Principle. Consequently, we have incorporated both the CAL and the ETP rules in the formalization of the bargaining problem.

Adding up the two net profits, we get the size of the total gain (the pie) to be split in the bargaining by determining the tender offer price or $s(p_L; e_B, e_L, y^B, y^I) = (y^B - y^I)$ $-(1 - e_B - e_L) \cdot (p_L - y^I)$ where $(y^B - y^I)$ is the (total) synergy gain generated by the change of management team, and $(1 - e_B - e_L) \cdot (p_L - y^I)$ is the spillover: the part of the gain that accrues to the small shareholders. Accordingly, the bidder and the pivotal incumbent stockowner bargain over the division of a pie that equals the synergy gain less the spillover to the fringe. Applying the Nash bargaining solution concept, we derive the tender offer price that both parties accept as the best possible to agree upon as

$$p_L^{Z^*}(e_B, e_L, y^B, y^I) = y^I + \frac{(y^B - y^I)}{(1 + e_L - e_B)} \text{ where } e_L \geq (1-\alpha)$$

[6]The bilateral bargaining game is somewhat similar to the model for takeover premiums of voting and restricted voting shares in Bergström and Rydqvist (1992).

A characteristic feature of the Nash solution is that the resulting bargaining price is such that it splits the pie in shares of equal value. As easily verified, substitution of $p_L^{Z^*} = p_L$ into the two parties expressions for their (net) profit yields $s_B\left(p_L^{Z^*}\right) = s_L\left(p_L^{Z^*}\right)$.[7]

The bargaining price has several interesting properties. Despite its simplicity it is the result of a strategic interaction between two rational parties that encompasses the effect of ETP, i.e. the resulting price is extended to all target shareholders, and the CAL. The tender offer premium $\left(p_L^{Z^*} - y^I\right)$ is determined as a share $\left(1/(1+e_L - e_B)\right)$ of the synergy gain $\left(y^B - y^I\right)$ which depends on only two parameters that measures the ownership structure of the target firm: the size of the pivotal blockowners position (e_L) and the bidder toehold (e_B). A larger toehold implies a higher premium while the opposite is true if the pivotal incumbent owns a larger share of the equity.[8] The small shareholders accept the offered premium since it surpasses their reservation price. Accordingly, the bargaining price incorporates a theory of how the ownership structure of the target firm and the legal framework interact in determining the tender offer premium and thereby the distribution of the takeover gain.

THE BIDDER FACES SEVERAL INCUMBENT PIVOTAL SHAREHOLDERS

If more than one incumbent shareowner have blocking opportunity, we impose the ETP restriction that also the pivotal shareholders are offered the same price, i.e. the bidder cannot price discriminate between the large equityowners. However, it is important to treat the decisive incumbent shareholders as different entities and not as a single bargaining unit. This is done because of a property of the Nash bargaining solution that is sometimes called the Paradox of Bargaining. The Nash theory does not distinguish between how pivotal a negotiating party is; it only differentiates between being pivotal or not since all decisive player obtains an equal share of the bargaining pie.

Due to the imposition of the ETP, it is straightforwardly proven, using the same technique as in the previous configuration, that the equilibrium tender offer price if the bidder faces n pivotal incumbent shareholders is

$$p_{nL}^{Z^*}\left(e_B, \bar{e}_L, y^B, y^I\right) = y^I + \frac{\left(y^B - y^I\right)}{\left(1 + \bar{e}_L - e_B\right)} \text{ where } \bar{e}_L = \left(\sum_1^n e_L^i\right)\Big/n \text{ and } \forall i\ e_L^i \geq (1-\alpha)$$

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[7] A formal proof solves for the bargaining price p_L that maximizes the Nash product $(s_B(p_L) - d_B)\cdot(s_L(p_L) - d_L)$ where d_B and d_L are the so called outside options of the bargaining parties, i.e. the gain if no agreement is reached. They are assumed to be zero in the present problem.

[8] The last effect may be counterintuitive since more is expected to be better in a negotiation. But the Nash split the difference rule does not consider **quantitative** differences since it is exclusively predicated on the **qualitative** characteristic of being pivotal or not being pivotal. Hence, a larger pivotal shareholder does not receive more in the Nash bargaining situation than a smaller one; they obtain identical amounts.

In comparison with the bargaining situation when the bidder only faces one opponent, the significant difference is that the **average** size $(\bar{e}_L)$ of the pivotal blockholders position becomes a decisive ownership parameter instead of the **total** share (e_L). An important implication of the result is that a lower average blockhold amounts to a higher tender offer premium, i.e. all incumbent stockowners should welcome a small but pivotal new blockowner that causes the average to go down.

THE BIDDER ENCOUNTERS MANY RESIDING STRATEGIC AGENTS AND POTENTIAL ARBITRAGEURS

As an extension we partially endogenize the ownership structure by introducing competitive arbitrageurs into the model.[9] Their presence is endogenous in the sense that in the preceding models there may exist unexploited profit opportunities that motivate their entrance. An arbitrageur has no initial position in the target firm, and no interest in obtaining control; he is only motivated by exploiting a potential profit. We assume that the arbitrageur only purchases shares from the small shareholders, and thereby establishes a pivotal position with blocking potential. By bargaining with the bidder, he may profit from his operation by obtaining a higher price for his block than he paid when accumulating it. An alternative economic interpretation of their activity is that they compete with the bidder over pivotal equity positions in the target firm but not over control, i.e. the model incorporates a partial bidding contest by considering the effects of potential arbitrageurs.

What will be the price and distributional consequences of potential arbitrageurs in the model? When will there be room for potential arbitrageurs? If $(1-e_L-e_B)\geq\alpha$, where e_L is the total share of the outstanding shares controlled by the pivotal incumbent equityowners, there is actual room for arbitrageurs. Let g be the largest integer less than or equal to $(1-e_L-e_B)/\alpha$, i.e. g is the maximum number of possible arbitrageurs who can establish a position in the target firm. Including the g arbitrageurs, the new average ownership share among the pivotal shareholders becomes $\bar{e}_{LA}=(e_L+g\cdot\alpha)/(n+g)$. After substitution of this average into the previously derived tender offer price with many pivotal incumbent agents we obtain

$$p^{z^*}_{LA}(e_B,\bar{e}_{LA},y^B,y^I)=y^I+\frac{(y^B-y^I)}{(1+\bar{e}_{LA}-e_B)} \text{ where } \bar{e}_{LA}=\left(\sum_1^{n+g}e^i_L\right)\Big/(n+g) \text{ and } \forall i\, e^i_L\geq(1-\alpha)$$

This price schedule incorporates not only the effects of existing player's actions on the outcome of the bargaining situation, but it is also **preemptive** in the sense that by offering this price there is no economic room for arbitrageurs anymore. Specifically,

[9] The subject matter of this section is more fully analyzed in Bergström, Högfeldt and Högholm(1992).

given the ownership structure of the target firm, if the acquirer initially offers this bidprice, the arbitrageurs cannot lower the average ownership share of the pivotal blockholders in order to get a higher tender offer price in the final bargaining with the bidder. The acquirer is indifferent between paying this bidprice up front or later when the arbitrageurs have entered and forced him anyhow to extend this price. Accordingly, the preemptive bargaining price is higher than the comparable tender offer price when no threat of arbitrageurs exists; ipso facto, the small stockowner also accepts the offer since it is greater than their reservation price. The important message of this general theory of the tender offer premium is that while arbitrageurs may not actually be present, they indirectly exert a significant pressure on the premium by the threat of their potential presence. Consequently, the theory may explain why we empirically seldom observe them in action.

The dual side of the theory of how the tender offer price is determined by bargaining between a bidder and pivotal shareholders is a theory of the distribution of the synergy gain $(y^B - y^I)$ between the acquiring and the target (net of the value appreciation on the bidder toehold) firm. The acquirer's takeover profit (B^{LA}) comes from the value improvement on his pre-takeover position in the target firm $(e_B \cdot (y^B - y^I))$ and the gain on the shares he acquirers $((1-e_B)\cdot(y^B - p_{LA}^{Z^*}))$. After substitution of the expression for the bargaining price we derive his profit from the successful takeover attempt as

$$B^{LA}(\bar{e}_{LA}, e_B, y^B, y^I) = e_B \cdot (y^B - y^I) + (1-e_B)\cdot(y^B - p_{LA}^{Z^*}) = (y^B - y^I)\cdot\frac{\bar{e}_{LA}}{(1+\bar{e}_{LA} - e_B)}$$

The bidder obtains, ceteris paribus, a larger share of the synergy if either he has a larger toehold or the average size of the pivotal blockholder's positions increases. The first effect is immediate since it stems from the value appreciation on his toehold. The second consequence occurs because a larger blockholder average holding results in a lower tender offer price.

The target equityowner's gain (T^{LA}) can after substitution for the preemptive bargaining price be written as

$$T^{LA}(e_B, \bar{e}_{LA}, y^B, y^I) = (1-e_B)\cdot(p_{LA}^{Z^*} - y^I) = (y^B - y^I)\cdot\frac{(1-e_B)}{(1+\bar{e}_{LA} - e_B)}$$

It is easily verified that the effects on the incumbent shareholders wealth of changes in the bidder toehold and the average blockholding position of the pivotal shareowners are, as expected, opposite the corresponding comparative statics result of the acquirer.

Finally, the theory predicts the relative distribution of the takeover gain between the target and the acquiring firms as[10]

$$\frac{T^{LA}(e_B, \bar{e}_{LA}, y^B, y^I)}{B^{LA}(e_B, \bar{e}_{LA}, y^B, y^I)} = \frac{1 - e_B}{\bar{e}_{LA}}$$

Our most general theory of the tender offer premium generates the implication that the relative distribution of the takeover gain is determined by only two parameters that measures the ownership structure of the target firm: the size of the bidder toehold and the average size of the pivotal blockhold position including the potential effects of arbitrageurs. In comparative statics terms, the theory predicts that a larger toehold as well as a greater pivotal average decreases the targets share of the synergy gain. The first prediction is consistent with empirical results reported by Stulz, Walking and Song(1990). However, since the theory captures a complex interaction between economic and legal aspects, and results in strong implications about the effect of target ownership structure on the distribution of the takeover gain, it is worthwhile to confront it with empirical data.

3. The Data

DURING THE PERIOD 1980-1992, we register a total of 253 takeover bids for publicly traded firms quoted on the Stockholm Stock Exchange or on Over The Counter Market; see Table 1 for summary information. In 212 cases the bidder achieved his objective. In our analysis, we focus on the 185 non-partial takeover bids (73% of all tender offers). However, 170 (92%) of the 185 bids that reached the public tender offer stage were successfully completed. 124 were full cash bids, while 61 involved pure exchanges of different financial instruments (shares, convertible loans etc.) or a mix of cash and financial claims. Of the 185 offers, 49 (26%) concerned single class target firms, and 136 (74%) dual-class firms. In the latter subgroup, the tender offer price was equal in 61 cases and differentiated between voting and restricted voting shares in 44. Summing up the information, the typical tender offer in Sweden is an undifferentiated and non-partial cash takeover bid for a dual-class target firm.

In order to empirically implement the theoretical model predicated on strategic blocking and confront it with Swedish data, we need two sets of empirical information. (a) Data on equity and vote ownership of large pivotal blockholders as well as of bidder toehold. (b) Estimates of the empirical counterpart of the division of the synergy gain between the target shareholders and the bidder.

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10 The corresponding relative distribution result for the situation when the effect of potential arbitrageurs is not considered is $T^{Ln}/B^{Ln} = (1 - e_B)/\bar{e}_L \leq T^{LA}/B^{LA}$.

TABLE 1. Descriptive statistics of takeover bids for publicly traded corporations in Sweden from 1980 to 1992.

	SUCCESSFUL	UNSUCCESSFUL	TOTAL
PARTIAL BIDS	42	26	68
NON-PARTIAL BIDS	170	15	185
SUM	212	41	253

NON-PARTIAL TAKEOVER BIDS DIVIDED INTO DIFFERENT CATEGORIES

CASH BIDS	MIXED BIDS	
124	61	
SINGLE-CLASS TARGET FIRM	**DUAL-CLASS TARGET FIRM**	
49	136	
	EQUAL BID	**DIFFERENTIATED[a]**
	61	44

a. The remaining 31 observations could not be classified (3 cases) or the bidder held all A shares prior to the bid and extended an offer exclusively for B shares (28 cases)

SHAREHOLDER OWNERSHIP DATA

We collected data on the ownership distribution of equity and votes of the target and the acquiring firm from Aktiemarknadsbevakning for the time period 1980-1984, and from Sundqvist for 1985 to 1991. In turn, these sources are based on the records of a public authority(VPC) which registers all shareholders owning at least 500 shares. Following the guidelines of Sundqvist, equityowners were grouped into pre-established coalitions of family members, partnerships, known agreements among shareholders and "power spheres" of related firms, i.e. cross-ownership networks. To obtain as accurate and up-to-date data as possible, we also used information generated by the rules concerning disclosure of substantial changes in ownership of shares.[11]

We immediately infer from Table 2 that the degree of ownership concentration of the target firms in Sweden is very high. The largest shareholder coalition controlled an average equity fraction of 47.7%, ranging from a minimum of 7.1% to a maximum of 96 %, and an average share of the voting rights of 54.6%, varying from 7.4% to 95%; dual-

[11] The rules force a shareholder to publicly disclose his holdings when reaching the 10% limit. Beyond this threshold, every accumulated change in ownership of more than 2% must be announced.

class shares are common in Sweden. Of comparative interest is an average holding of 15.4% of the largest shareowner in sample of 456 US corporations reported by Shleifer & Vishny(1986b).[12]

TABLE 2 Equity (e_i) and vote (v_i) ownership of the five largest shareholders of the target firm prior to the tender offer.

EQUITY OWNERSHIP	e_1	e_2	e_3	e_4	e_5
MEAN	.477	.123	.059	.039	.027
MINIMUM	.071	.008	.002	.001	.001
MAXIMUM	.960	.392	.183	.124	.124
STANDARD DEVIATION	.206	.079	.039	.027	.020
# OF CASES	185	170	161	148	146
VOTE OWNERSHIP	v_1	v_2	v_3	v_4	v_5
MEAN	.546	.137	.055	.033	.020
MINIMUM	.074	.005	.002	.001	.001
MAXIMUM	.950	.460	.256	.145	.142
STANDARD DEVIATION	.217	.105	.043	.029	.021
# OF CASES	185	170	161	155	155

Due to the compulsory acquisition limit, a target shareowner controlling at least 10% of the equity has the strategic opportunity to block a takeover attempt. Table 3 reports the equity ownership of shareholder coalitions (the bidder excluded) who have this option: n is the actual number of blocking parties while g is the number of (theoretically) possible arbitrageurs. In 124 (67%) tender offers there were at least one shareholder who possessed such a prerogative. At least two pivotal equityholders were present in 55 (30%) of the takeover situations, while more than three had the blocking potential in 18 (10%) cases. In three cases as many as four decisive shareowners existed. As expected, the number of potential arbitrageurs exceeds the actual number of residing, pivotal blockholders. In fact, the average number of all agents with actual or potential blocking capability surpasses five.

[12] While interesting in their own right, the ownership distribution data is assumed to be exogenously given in the present study. However, in recent years, models have been developed that generate a better understanding of the mechanisms that determine the structure of corporate ownership. For example, theories predicated on misalignment of incentives (e.g. Jensen & Meckling(1976), Jensen(1986), and Shleifer & Vishny (1986)); on signalling arguments (e.g. Leland & Pyle (1977)); on incomplete contracting approach (e.g. Grossman & Hart(1986)); and on anticipation of future takeovers (e.g. Israel(1991) and (1992)); have been presented in the finance literature. For an overview and an empirical study on Swedish data of the theories, see Bergström & Rydqvist(1990).

TABLE 3: Equity ownership of the five largest shareholders who also control at least 10% of the voting equity, and the number (n) of pivotal shareholders in the target firm prior to the tender offer (the bidder's toehold excluded). g is the (theoretical) number of potential arbitrageurs.

EQUITY OWNERSHIP	e_1	e_2	e_3	e_4	n	g[a]
MEAN	.324	.151	.102	.072	1.60	3.54
MINIMUM	.056	.069	.050	.064	1.00	0.00
MAXIMUM	.900	.306	.173	.124	4.00	8.00
STANDARD DEVIATION	.211	.058	.038	.054	.803	1.94
# OF CASES	124	55	18	3	124	124

a The maximum, theoretically possible number of arbitrageurs (g) is calculated according to the formula $g = \max i \in N; i \leq (1 - e_L - e_B)/0.10$ where e_B is the size of the bidder toehold, and e_L is the sum of all pivotal blockholders positions.

Although, the table informs us that there were as many as 61 observations where no ownership coalition had blocking potential, it is important to note that formation of a two-party coalition was sufficient to reach the 10 percent threshold in 20 cases. Three members were required in 8 situations while the remaining 19 cases call for a syndicate of four or more partners; due to lack of shareholder data, we could not classify 14 cases. Consequently, 2/3 of the tender offers may be the result of negotiated agreements between an acquirer and pivotal blockholders and/or large minority blockowners. The rest of the bids in the sample are not (directly) negotiated. But considering how relatively easy it is to form coalitions controlling at least 10% of the voting shares as well as the ample room for arbitrageurs, it is apparent that the empirical data on ownership structure provides support for the cardinal blocking idea on which the theory is founded and the related insight that the acquirer generally (explicitly or implicitly) faces more than one bargaining party.

Another prevalent phenomena in the Swedish market for corporate control is that the bidder often has a considerable toehold in the target firm.[13] The average equity position of a bidder is 31%, ranging from 0% to a maximum of 96%.[14] In 58 (31%) cases, the bidder already had operational control (> 50%) prior to the tender offer. The bidder's pre-takeover toehold in the target firm was less than 50% in 66 (36%) cases with an average position of 28%. Finally, the acquirer had no toehold in 61(33%) of the 185 observations.

[13] Recently, the bidder's pre-takeover ownership of the targets equity has been theoretically analyzed by Chowdry & Jegadesh(1988) and by Ravid & Spiegel(1991); and empirically studied by e.g. Stulz, Walking, and Song (1988), van Hulle, Vermaelen, and de Wouters (1988), Franks & Harris (1989).

[14] Based on a sample of US takeover data, Bradley, Desai & Kim (1988) reported an average bidder toehold of 9.8%.

TABLE 4. The average share of a pivotal blockholder excluding ($\bar{e}_L$) and including ($\bar{e}'_L$) potential arbitrageurs.

AVERAGE PIVOTAL SHARE	$\bar{e}_L$	$\bar{e}'_L$
MEAN	.195	.146
MEDIAN	.150	.113
MINIMUM	.000	.000
MAXIMUM	.900	.500
STANDARD DEVIATION	.214	.078
# OF CASES	185	185

Besides the magnitude of the bidder toehold, our theory pinpoints the average size of the pivotal blockholders position ($\bar{e}_L$) as a quintessential explanatory variable. Table 4 shows that the median share is 15%, excluding the arbitrageurs, and 11.3% including them, i.e. even without considering the effect of arbitrageurs the average blockhold is relatively close to the theoretical minimum of 10% given by the Compulsory Acquisition Limit. However, by including the arbitrageurs the median average decreases by 24%.

ESTIMATES OF THE DISTRIBUTION OF THE SYNERGY GAIN: CUMULATIVE ABNORMAL RETURNS

In order to empirically measure the distribution of the takeover gain, we estimated cumulative abnormal returns (CAR) around the announcement day of the tender offer for 149 target firms and 94 acquiring firms, leaving us with 94 matching pairs for which share price data were available for both companies. The FIDO tape at the Stockholm School of Economics provided the necessary data. The announcement day was identified from the daily newspaper Svenska Dagbladet. Using the market model as the benchmark, we computed cumulative abnormal returns over the event window (-5,+5) or formally

$$CAR = \sum_{n=-5}^{+5} R_{jn} - \left(\alpha_j + \beta_j \cdot R_{mn}\right)$$

R_{jn} is the return of share j between trading day n and n-1, R_{mn} is the return on a value-weighted index composed of all listed firms (Affärsvärldens Generalindex); while α_j and β_j are market model parameters estimated by the trade-to-trade method during the time period -180 to -20 days before the announcement day. The width of the event window was set by considering that it has to be wide enough in order to gauge any anticipatory price behaviour (leakage of information) before the announcement, but also narrow enough not to capture any information not associated with the takeover event. However, to obtain a set of data that is as accurate and reliable as possible, we must confront three conspicuous measurement problems caused by (i) infrequently traded classes of shares;

by (ii) the existence of non-traded classes of shares; and by (iii) the fact that CAR estimates for different takeovers are not directly comparable because of the substantial disparity in the size of the two firms involved in takeover attempts, i.e. some standardization is needed. Let us approach them sequentially.

THIN TRADING

The fact that most Swedish stocks are thinly traded causes a measurement problem of systematic character. In particular, the covariances of infrequently traded shares with the market portfolio are significantly underestimated, resulting in beta estimates that are biased downwards. To circumvent this potentially severe problem, we employed the trade-to-trade adjustment for the market model of Dimson (1979).[15]

Suppose that stock j was traded at time t. Let d_{jt} denote the number of trading days between time t and the previous transaction in firm j's stock; i.e. $d_{jt} = 1$ if the stock was traded the day before (t-1), $d_{jt} = 2$ if the stock was traded at time t and t-2 etc. By the trade-to-trade method, we estimate the market model by weighted least squares with weights equal to $1/\sqrt{d_{jt}}$ or formally

$$R_{jt}/\sqrt{d_{jt}} = \alpha_j/\sqrt{d_{jt}} + \beta_j \cdot R_{mt}/\sqrt{d_{jt}} + \varepsilon_{jt}/\sqrt{d_{jt}}$$

However, when infrequent trading is a problem, there exists no estimation procedure that completely handles the problem. Due to the significant differences in the frequency of trading between classes of shares in Sweden, we decided to only use the most frequently traded class as a proxy when calculating the firms systematic risk. For some companies, the turnover of the most traded class of shares is approximately 1 000 times faster than for the least traded class. The theoretically correct operation would have been to obtain separate estimates for each class of shares, and then form a weighted sum that measures the total systematic risk of the corporation. Although, this procedure considers differences in the risk level between voting and non-voting shares, restricted and unrestricted equity etc., the measurement error caused by infrequent trading is probably larger than the possible benefit of using all classes of shares.

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15 Several approaches for estimating risk of infrequently traded shares have been suggested in the literature. Some researchers have introduced lagged market returns as additional independent variables in their market model, e.g. Ibbotson(1975) and Schwert(1977). Others prefer to calculate the returns on a trade-to-trade basis, and then regress them on a market movement estimated over precisely the same trade-to-trade time intervals, see e.g. March(1979) and Schwert(1977). Scholes and Williams(1977) have shown that it is possible to combine these ideas and use non-synchronous plus synchronous market returns as explanatory variables for trade-to-trade returns.

NON-TRADED DUAL-CLASS SHARES

Because only one class of shares in a dual-class target company is publicly traded, we can not observe the change in the total value of the firm brought about by the tender offer in 42 cases; 24 were equal bids while the acquirer placed differentiated bids in the remaining cases 18. One instrumental way around this measurement problem is to make the somewhat arbitrary assumption that despite differing voting rights the two classes of shares would trade at the same price if both were publicly exchanged. Accordingly, for the subgroup of non-differentiated tender offers we measured the cumulated abnormal return of the whole firm by the CAR of the traded class. However, if different tender offer prices were extended for A- and B-shares, but only the latter type of equity was traded in the stock market, we calculated the CAR of the target corporation by the adjustment formula

$$CAR_T = \left[(p_A/p_B)\cdot(1+CAR_B)-1\right]\cdot s_A + CAR_B\cdot(1-s_A)$$

where CAR_B is the estimated cumulative abnormal return on the B-shares; s_A is the A-class' fraction of the outstanding equity while p_A and p_B are the bid prices of the two classes of shares. In effect, we utilize the price differential in the tender offer bid and the estimated CAR_B for the B-shares to infer the cumulative abnormal returns for the A-shares, and thereby obtaining an estimate of CAR_T.

The drawback of this procedure is that it overestimates the target firm's part of the synergy gain if there is a market premium on voting over non-voting shares. We also accounted for this differential by adjusting the CAR estimates of the dual-class firms by the empirically observed average premium of voting shares of 14% in the Swedish stock market. The effects of the disparate adjustment methods are presented when we report the results of our empirical tests.

STANDARDIZATION OF SIZE: VALUE-WEIGHTED CAR'S

The often substantial differences in size of the two firms engaged in a takeover situation make the cumulative abnormal returns a less useful measure in a cross-sectional analysis. To make the CAR estimates more cross-sectionally comparable, we standardize them by dividing by the sum of the pre-bid value of the target and acquiring firms, i.e. the value-weighted cumulative abnormal returns or VCAR. The standardization also mitigates the heteroscedasticity problem when testing the model in the next section.

TABLE 5: Standard as well as value-weighted Cumulative Abnormal Returns around the announcement day of public tender offers.

ABNORMAL RETURNS	CAR_T	CAR_B	$VCAR_T$	$VCAR_B$	TOTAL
MEAN	.167	.006	.046	.004	.037
MINIMUM	-.130	-.198	-.039	-.122	-.136
MAXIMUM	.678	.188	.231	.134	.229
STANDARD DEVIATION	.132	.077	.043	.054	.066
# OF CASES	149	94	94	94	94

CAR_T = Cumulative abnormal return of the target firm.
CAR_B = Cumulative abnormal return of the acquiring company.
$VCAR_T$ = Value-weighted CAR_T.
$VCAR_B$ = Value-weighted CAR_B.
TOTAL = Sum of $VCAR_T$ (adjusted for bidder toehold) and $VCAR_B$.

Table 5 reports the estimated CAR:s and VCAR:s of 149 target and 94 bidding firms; the 94 matching pairs of targets and bidders constitutes the data base for our tests. We observe that the value appreciation of the shares of the target company is on average 16.7%.[16] If we account for the average voting premium, we get a slightly lower abnormal return (15.9%) for the target. The corresponding CAR estimate for the bidding corporation is much smaller; on average 0.6%.[17] One reason behind this low figure is that the acquiring firms are much larger. The value-weighted gain is 4.6% (4.3% when adjusting for the voting premium) for the target and 0.4% for the bidder. Avoiding double accounting of the bidder toehold, we obtain an average total value-weighted synergy gain of 3.7% (3.4% vote-premium adjusted), i.e. the combined pre-takeover value of the corporations appreciates on average by close to 4% around the announcement day. The shareholders of the target firm get on average 89% of the takeover gain while the acquiring company only obtains 11% of the synergy; the split is 88/12 if the estimates are adjusted for the vote premium.[18]

Finally, since the tests of the theory are predicated on the estimates of CAR and VCAR it is important to assess how reliable they are. The fact that 124 observations in our sample are cash bids allows us to compare the takeover premium implicit in the cash offer with the corresponding estimated figure applying the CAR method. Calculated as the cash tender offer price relative to the share price 10 trading days prior to the announcement, the average premium is 28.1%. The comparable average cumulative abnormal return estimate is 18.1%, implying a substantially discounted share price

[16] The numbers are similar to results from empirical studies of other stock markets, e.g. 36% in Belgium [van Hulle, Vermaelen & de Wouters (1988)]; 17% in Canada [Eckbo (1986)]; 22% in France [Eckbo & Langohr (1988)]; 23% in UK [Franks & Harris (1989)]; and 28% in the US [Bradley, Desai & Kim (1988)].
[17] The comparative number in a sample of US takeover data is 0.97%, see Bradley, Desai & Kim(1988).
[18] Bradley, Desai & Kim (1988) report a total takeover gain amounting to 7.4 % of the combined pre-takeover equity value, and a 90/10 split in favor of the target shareholders.

relative to the cash offer. The differential may be caused by measurement errors but it may also reflect the fact that the payment is received in the future and conditional on the success of the takeover, see Samuelson & Rosenthal(1986). Consequently, the CAR returns may underestimate the takeover gain. To handle the measurement problems, we therefore differentiate between cash premium and cumulative abnormal returns estimates when testing the implications of the theory.

4. Empirical Implementation and Testing

THE PRIMARY OBJECTIVE of this paper is to test the implications of our most general takeover model that predicts the combined impact of both pivotal incumbent shareholders and potential arbitrageurs on the bid price and the distribution of the takeover gain. But in order to investigate and isolate the potential effects of arbitrageurs, we also test the less general model without the arbitrageurs. We derive two groups of tests of the implications of the theory-- a simple test of differences and a battery of regression tests-- and discriminate between three different estimates of the value appreciation of the firms: standard and vote premium adjusted cumulative abnormal returns as well as cash premiums.

A natural starting point would be to regress the bid premium-- $\left(p_{LA}^{Z^*} - y^I\right)$-- on the explanatory variable--$\left(y^B - y^I\right)/\left(1 + \bar{e}_{LA} - e_B\right)$-- which consists of two ownership parameters ($\bar{e}_{LA}$ and e_B) and the synergy gain $\left(y^B - y^I\right)$, and use the data set of all non-partial bids, a total number of 185 observations. This would be a direct test of the general bargaining price model. However, such a test is associated with a a severe estimation problem. Since neither the premium[19] nor the total synergy gain is directly observable, we would have to use, at least partly, the same proxy to obtain the empirical counterparts of the theoretical parameters on both sides of the equation, i.e. the estimates would not be independently observed or generated as proper testing procedures require. To avoid this problem, we have instead chosen to test the implications of the theory on the **division of the takeover gain** since it eliminates the synergy term in the explanatory variable. But when estimating the ratio of the target's gain over the bidding firm's we lose information because we only have 94 matching observations of both firms.

[19] This occurs since not all tender offer bids are cash bids.

THE DIFFERENCE TESTS

Our theory implies that the change in the value of the acquiring firm, B^{LA}, equals that of the target firm, T^{LA}, weighted by the factor $\bar{e}_{LA}/(1-e_B)$ or formally

$$\frac{\bar{e}_{LA}}{(1-e_B)} \cdot T^{LA} = B^{LA}$$

This very simple equation says that, in relation to the target firms value appreciation, the bidding firm receives a share of the synergy gain that is determined by two parameters measuring the ownership structure of the target: the average pivotal blockholding position ($\bar{e}_{LA}$) and the size of the bidder toehold (e_B). To test if this implication of our theory is consistent with Swedish takeover data, we need estimates of the change of value of the two firms. Let $m_T(m_B)$ be the market value of the target(bidding) firm prior to the takeover. Since $CAR_T(CAR_B)$ measures the percentage stock price reaction around the announcement of the takeover bid in the target(acquiring) firm, the change in the wealth of the target shareholders, net of the value appreciation of the bidder's toehold, and of the bidding firm's equityowners can be written as

$$\hat{T}^{LA} = m_T \cdot CAR_T(1\text{-}e_B) + \varepsilon_T$$

$$\hat{B}^{LA} = m_B \cdot CAR_B + \varepsilon_B$$

where ε_T and ε_B are estimation errors with mean zero. However, the errors may be heteroscedastic because of the huge differences in size between the two firms engaged in the takeover attempt as well as across pair of observations. We try to account for this problem by standardizing the estimates of the cumulative abnormal returns; divide each observation by the sum of the pre-bid market value of the two firms $(m_T + m_B)$ or

$$\frac{\hat{T}^{LA}}{m_T + m_B} = VCAR_T \cdot (1\text{-}e_B) + \varepsilon_{VT}$$

$$\frac{\hat{B}^{LA}}{m_T + m_B} = VCAR_B + \varepsilon_{VB}$$

where $\varepsilon_{VT} = \varepsilon_T/(m_T + m_B)$ and $\varepsilon_{VB} = \varepsilon_B/(m_T + m_B)$.

Inserting the empirical estimates of the increase in the wealth of target shareholders (net of the acquiring firm's capital gain on toeholding) and of the bidding firms equityowners in the expression $[\bar{e}_{LA}/(1\text{-}e_B)] \cdot T^{LA} = B^{LA}$, we derive, after using the expectation operator, the empirically testable implication of our model $E(\bar{e}_{LA} \cdot VCAR_T) = E(VCAR_B)$. Given that the sample is fairly large, the t-distribution is approximately normal. Hence, the hypothesis that there is no difference between the two expectations can be tested within a standard t-test procedure. In particular, it is a test of the implication of our model that the lopsided division of the takeover gain in favor of

the target shareholders is determined by two ownership structure parameters: the average equityholding of the pivotal target shareowners accounting for the effect of potential arbitrageurs, and the size of the bidder toehold.

TABLE 6. Test of the theory's predictions on the split of the takeover gain on Swedish cross-sectional takeover data: the t-test.

	NO ARBITRAGEURS			WITH ARBITRAGEURS		
	CAR[1]	**PREM[2]**	**CARV[3]**	**CAR[1]**	**PREM[2]**	**CARV[3]**
MEAN	.0052	.0070	.0044	.0024	.0037	.0021
STANDARD DEVIATION	.0055	.0570	.0553	.0536	.0542	.0536
t-VALUE[4]	.9076	1.186	.7779	.4406	.6721	.3861
DEGREES OF FREEDOM	93	93	93	93	93	93

1. Cumulative abnormal returns used as proxies for the value appreciation of the target firm.
2. Cash premium used for cash bids and CARS for mixed bids as proxies of the change of target firm value.
3. CAR'S adjusted for voting premium used a proxies.
4. The critical t-value is ≈ 2 (df = 93 and 5% significance level).

Table 6 exhibits the results from the t-test on 94 matched pairs of observations both including and excluding the potential effects of arbitrageurs. We cannot reject the implication of our theory that the relative distribution of the takeover gain between the shareholders of the target and the acquiring firms is determined by the average size of the pivotal blockholders equity position and the bidder toehold. Rejection of the null hypothesis does not depend on whether we use the cash premium or the cumulative abnormal returns as a proxy for the targets share of the synergy gain. Furthermore, the test is insensitive to which of the two different methods we use to compute the abnormal returns for non-traded A-shares. Even without considering the effects of arbitrageurs on the average blockhold, we cannot reject our null hypothesis. However, the test seems though to be in favor of the model with arbitrage potential. By lowering the average size of a pivotal equityowners position, the arbitrageurs make the theory's prediction of the distribution of the takeover gain considerably more in line with the empirically observed skewness in favor of the target shareholders.

The drawback of the t-test is, however, that it is rather weak. Specifically, by construction it does not depend on the direction of the relationship between the division of the gain and the two ownership variables $\bar{e}_{LA}$ and e_B, which is an important implication of our theory.

THE REGRESSION TESTS

To derive a stronger test that clearly differentiates between the dependent and independent variables of our theory, in particular that the ownership structure parameters

constitute the explanatory variables, we use another implication of our theory. It states that the target equityowners' share of the total takeover gain is determined by the two ownership structure parameters $\bar{e}_{LA}$ and e_B according to the expression

$$\frac{T^{LA}}{(y^B - y^I)} = \frac{1 - e_B}{1 + \bar{e}_{LA} - e_B}$$

The explanatory parameters on the right hand side, which we denote τ', can be directly observed from our data on ownership. The effect of potential arbitrageurs is accounted for via $\bar{e}_{LA}$. The left hand side of the expression is not directly observable. Using estimates of the value-weighted cumulative abnormal returns we compute a simple proxy for the share of the total synergy that accrues to the equityowner of the target firm as

$$\hat{T} = \frac{(1 - e_B)VCAR_T + \varepsilon_{VT}}{\left[(1 - e_B)VCAR_T + \varepsilon_{VT}\right] + (VCAR_B + \varepsilon_{VB})}$$

To test the implication of the bargaining model that the distribution of the takeover gain is determined by ownership structure parameters of the target firm, we regress the target's share of the takeover gain, $\hat{T}$, on the variable τ' which includes the two explanatory parameters $\bar{e}_{LA}$ and e_B: $\hat{T} = \alpha + \beta' \cdot \tau' + \varepsilon$. If our bargaining theory (including the potential effects of arbitrageurs) of the distribution of the takeover gain is correct, we would expect to find that the intercept equals zero while the regression coefficient β' is one.

Theoretically, the target equityowners share of the total gain is a positive number. However, because of less than perfect empirical estimation procedures we sometimes obtain negative value-weighted returns for the bidder as well as negative total returns. In the latter situation, the estimated share of the target firm, $\hat{T}$, becomes negative and does not make sense. But any arbitrary adjustment formula that generates positive numbers introduces systematic errors that makes the interpretation of the tests very difficult. To handle the problem we decided to use only the 49 cases where the estimates of both the target and the bidding firm's returns are positive, i.e. we include only observations where the targets share of the total synergy gain is between 0 and 1.[20] Despite losing the additional information from 45 takeovers, it is a necessary price to pay in order to perform regression tests that constitutes a tougher confrontation of the theory with the information in the remaining data.

[20] We also conducted the test allowing for small negative bidder returns, giving us a total of 58 observations, but found almost identical results as when using our strict cutting off points [0,1].

TABLE 7. Results of tests of different models that regress the target firms share of the synergy gain on ownership structure parameters.

	CONSTANT	β′	β	F-VALUE	R^2
THE DIVISION OF THE TAKEOVER GAIN USING CAR ESTIMATES					
MODEL 1	-.544	1.197	-	4.89	.094
	(.228)	(.032)		(.032)	
		(.560)[a]			
MODEL 2	1.21	-	-.934	12.90	.215
	(.000)		(.001)	(.001)	
THE SPLIT OF THE SYNERGY GAIN ESTIMATED BY CAR ADJUSTED FOR VOTING PREMIUM					
MODEL 3	-.276	.855	-	2.31	.048
	(.554)	(.136)		(.136)	
		(.763)[a]			
MODEL 4	1.24	-	-.981	13.80	.209
	(.000)		(.001)	(.001)	
THE CASH PREMIUM IS USED TO ESTIMATE THE DIVISION OF THE TAKEOVER GAIN					
MODEL 5	-.488	1.171	-	4.72	.091
	(.276)	(.035)		(.035)	
		(.647)[a]			
MODEL 6	1.23	-	-.915	12.44	.209
	(.000)		(.001)	(.001)	
THE DEPENDENT VARIABLE IS TRANSFORMED(LOGIT)					
MODEL 7	-2.23	2.533	-	2.87	.057
	(.075)	(.097)		(.097)	

β′ is the regression coefficient of the model including the potential effects of arbitrageurs.
β is the regression coefficient of the model not including the arbitrageurs.
R^2= squared multiple R
prob-values in parentheses; test of the null hypothesis that the coefficient = 0
a. prob-values for test of the null hypothesis that the coefficient = 1

Table 7 reports the results from the regressions using three different estimates of the takeover gain. Models 1 to 4 use standard and vote premium adjusted CAR estimates while models 5 and 6 are based on cash premiums. According to the implications of our theory there should be a positive relationship between the targets share of the synergy gain and the ownership structure of the target. Model 1 displays the results for the case where the effects of arbitrageurs on the average blockhold is included. As shown in the table, we have a significant model and a significant coefficient with a positive sign. In particular, we can neither reject the hypothesis that the intercept is zero (prob-value =

.228), nor that the regression coefficient equals one (prob-value = .560).[21] This implies that our **most general** theory which accounts for the effects of potential arbitrageurs on the tender offer price and the distribution of the takeover gain is **not rejected** when tested on Swedish takeover data. However, the **less general** theory (Model 2) which does not consider the effect of arbitrageurs is **rejected**; the level of the intercept is significantly different from zero and the regression coefficient is strongly negative.

We also infer from the table that the regression results are quite insensitive to measurement problems caused by the existence of non-traded A-shares. When adjusting the CAR estimates of the dual-class firms by the empirically observed average premium of voting shares (Models 3 and 4) we obtain results that are very similar to the corresponding ones when using the bid price differential between A and B shares to obtain the CAR estimates (Models 1 and 2). Furthermore, as evident from the regressions using cash premiums (Models 5 and 6), the results are very much in line with the previous ones. Consequently, overall the regressions results are insensitive to whether we employ CARs or the cash premiums in our calculations. Specifically, the implications of our theory that accounts for the effects on the distribution of the takeover gain of potential arbitrageurs is not rejected.

Although this is good news regarding the empirical validity of the theory, there exists a problem of limited variability of the dependent and the independent variable since both are truncated. The observations of the ratio of the target gain over the synergy varies only between zero and one while the explanatory variable realizes values between a half and one. Since the dependent is, evidently, not normally distributed, as proper test procedures under OLS require, the regression test is weak. In particular, the estimates of residual variance becomes larger than under the assumed ideal conditions of normality. To circumvent this problem, at least partially, and generate a more normally distributed dependent variable, we transformed it according to

$$\text{logit}(T) = \frac{1}{2} \cdot \log[T/(1-T)]$$

However, while this procedure handles one conspicuous problem it creates another one. Due to the transformation we cannot compare the intercept and the regression coefficient with the corresponding ones in our previous regression models, but we still ought to find a significant positive coefficient[22]. As can be seen in Table 7 (Model 7), the sign is as expected for the model including potential arbitrageurs.

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[21] But we can reject the hypothesis that the regression coefficient is zero (prob-value = .032)

[22] An alternative method to deal with the normality problem would be to use the Mean Gini Regression analysis, which does not require normally distributed variables. The problem with this method is to test the coefficients. Another possibility would be to use non-parametric tests.

The overall conclusion from the two sets of tests of the theoretical model's implications on the takeover gain is that accounting for the effect of potential arbitrageurs is essential. Even after a careful and precise handling of disparate estimation and testing problems, we cannot reject our theory's main implication that the ownership structure of the target firm, accounting for the effect of arbitrageurs, is an important determinant of the distribution of the takeover gain.

5. Conclusions

THIS PAPER HAS exploited a simple but powerful idea. Large blockholders, irrespective if they are residing incumbent owners or potential arbitrageurs, vested with the potential to foil a takeover attempt have a bargaining position versus the acquirer, and, ipso facto, exercise a significant and strategic influence on the tender offer premium and thereby on the distribution of the takeover gain. The unique feature of the theory is that it explicitly models the interaction between the ownership structure of the target firm and the legal framework represented by the Compulsory Acquisition Limit rule and the Equal Treatment Principle. Accounting for these important legal institutions as well as the effect of potential arbitrageurs, the theory predicts a distribution of the takeover gain heavily in favor of the target shareholders. When elaborately tested on Swedish takeover data the implication of the most general version of the theory including the arbitrageur effect is not rejected. The general message of the paper is that the ownership structure of the target firm as well as the legal restrictions of takeovers are important determinants of the distribution of the synergy gain. The results of the more general regression tests reported in the Appendix give further support to this claim.

APPENDIX

FURTHER EMPIRICAL RESULTS

BASED ON THE FORMAL THEORY derived in this paper about the distribution of the takeover gain and how it depends on the ownership structure of the target firm, we test three implications from the equation determining the gain of the target shareholders (T^L):

$$T^L(e_B, \bar{e}_L, y^B, y^I) = (1 - e_B)\cdot\left(p_L^{Z^*} - y^I\right) = \left(y^B - y^I\right)\cdot\frac{(1 - e_B)}{\left(1 + \bar{e}_L - e_B\right)} = \left(y^B - y^I\right)\cdot\gamma.$$

The *bargaining parameter* γ succinctly captures how the ownership distribution of the shares of the target firm affects the division of the takeover gain; in particular, the magnitude of the bidder toehold (e_B), and the average size of the positions of the large shareholders with blocking potential ($\bar{e}_L$). Concerning the effect of the bidder toehold on the distribution of the takeover gain, we immediately deduce the first hypothesis from the equation.

H1: For a given takeover profit, the gain of the target shareholders is a decreasing function of the magnitude of the bidder's toehold.

This occurs because of the value appreciation on the shares the bidder already owns in the target firm; the more he owns, the larger his share of the gain.

Furthermore, the equation is predicated on the *presence* of large pivotal blockholders who explicitly or implicitly negotiate with the bidder over the tender offer price. From the bargaining theory, we know that it is not the absolute size of their holdings which is important but the fact that they are decisive, which suggests our next implication.

H2: For a given synergy gain, the target's value appreciation increases if a large shareholder is present.

However, to get results comparable with Stulz, Walking & Song (1990), we also use the size of the total holdings of the large blockholders as an explanatory variable, hence, giving us the alternative hypothesis.

H2': For a given takeover gain, the target's abnormal return is an increasing function of the total size of the large shareholders positions (e_L).

Finally, the theory predicts that the magnitude of the bargaining parameter γ is important which implies

> **H3:** For a given takeover gain, the target's gain is an increasing function of the bargaining (ownership distribution) parameter γ. If the effect of potential arbitrageurs is also accounted for, the target's value appreciation increases, ceteris paribus.

To summarize, the target's gain is a function of the size of the bidder's ownership in the target, and the presence of large blockholders. We expect the gain to be a *decreasing* function of the *bidder's toehold*, an *increasing* function of the *presence* of large blockholders, and an *increasing* function of a *bargaining parameter* γ.

Assuming that the gain of the target shareholders depends linearly on the explanatory variables, we can regress it on a constant, the ownership variables, the total gain and other explanatory variables. Following the methodology in Stulz, Walking and Song (1990), we normalize the value appreciation by the size of the target equity to avoid heteroscedasticity. Consequently, the normalized measure of the target shareholder gain is the target's abnormal return (adjusted for the bidder's toehold) associated with the takeover. The normalized total gain is in the same unit as the standardized target gain, simply implying that if target shareholders captures all the gain, the estimated coefficient for the normalized total gain should be one. Following the methodological lead of Stulz, Walking and Song (1990), we allow for a *different* effect of *positive* and *negative* total gains on the abnormal return of the target shareholders; it does not have to be positively correlated with a negative total gain. We estimate and test a general, linear regression model

$$t_i = a + b' \cdot x_i + c' \cdot y_i + d^+ \cdot g_i^+ + d^- \cdot g_i^- + u_i \qquad \text{(A1)}$$

where t_i is the normalized gain of the target; x_i is a vector of ownership variables; y_i is a vector of other variables effecting the target shareholder's gain, $g^+(g^-)$ is the normalized total gain (positive or negative); d is a dummy; and u_i is a normally distributed error term.

One problem with this method is the restriction that the variance of the error term is the same whether the normalized total gain is positive or negative. More generally, the effect of the other independent variables on the normalized return of the target shareholders is assumed to be the same irrespective if the total gain is positive or negative. To differentiate completely and allow for this possibility, we also use and test a slightly different interactive model:

$$t_i = a + b' \cdot x_i + Dc' \cdot x_i + d' \cdot y_i + De' \cdot y_i + f' \cdot D + h' \cdot g_i + Di' \cdot g_i + u_i \qquad (A2)$$

where D is a dummy variable with value 1 if the normalized total gain is positive, 0 otherwise.

In order to assure that the regression coefficients on the ownership variables are not biased, we have to control for other variables which, potentially, may affect them. For example, the absolute size of the target and the bidder may influence the fraction of shares held by the bidder or by one large shareholder, i.e. target size might be correlated with blockholders positions; see Demsetz and Lehn (1985). It is also plausible to assume that size of the bidding firm might be correlated with the magnitude of its holdings. In our regression model, we control for both of these size effects and use their market value prior to the takeover sequence as proxies.

The size of the two parties may also directly affect the distribution of the takeover gain. As argued by Asquith, Bruner and Mullins (1983), their *relative size* may influence their returns. Relative size may proxy for the contingency-pricing effect of stock, see Hansen (1987); the larger the relative size of the bidder, the less valuable the contingency (option) pricing effect of the stock and, accordingly, the lower the premium accruing to the target shareholders. The relative size may also proxy for the potential of other bidders, that is, the greater the relative size of the bidder, the larger the probability that there are potential bidders of sufficient size to acquire or compete for the target firm. Size may also affect the bargaining power of the two parties. If the bidder is large relative to the target firm, the bidder may be able to extract a larger share of the takeover gain. As a control variable, we, therefore, following the lead of Stulz, Walking and Song, include the relative size of the bidder to the target firm as an alternative explanatory variable.

Empirical results

Table 1 presents the results from a cross-section regression using our data base on Swedish takeovers and applying different specifications of the first regression model; equation (A1). M1 is the full model developed by Stulz, Walking and Song where the explanatory variables are the magnitude of the bidder toehold, the size of the total equity holding of large shareholders, the market value of the bidder and the target, and the normalized total gain, but excluding the bargaining variable. We immediately infer that the regression coefficients are insignificant for large blockholders equity holdings[23], for

[23] We also tried alternative specifications of the models using a dummy for large blockholders holdings and with large blockholders average equity holding instead of their total holdings. Neither of the models did perform any better than the above presented versions.

Table 1. Cross-sectional regressions using the cumulative abnormal return (adjusted for bidder toehold) of the target as the dependent variable. Test of different models based on equation (A1).

	M 1	M 2	M 3	M 4	M 5	M 6
Constant	0.176	0.162	0.177	0.160	0.160	0.159
e_B	-0.188	-0.169	-0.196	-0.173	-0.182	-0.168
	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)
e_L	-0.030		-0.029		-0.028	
	(.566)		(.578)		(.596)	
MVT	-0.003		-0.002		-0.003	
	(.658)		(.742)		(.594)	
MVB	0.003	0.002	0.002	0.002	0.003	0.002
	(.138)	(.071)	(.197)	(.115)	(.113)	(.092)
TGN	-0.030		-0.127	-0.079	-0.162	-0.076
	(.264)		(.258)	(.011)	(.383)	(.013)
TGP	0.042	0.042	-0.053		-0.098	
	(.003)	(.001)	(.621)		(.615)	
γ			0.122	0.057		
			(.373)	(.001)		
γ'					0.162	0.052
					(.472)	(.001)
R^2	.295	.302	.315	.322	.312	.319
F-ratio	6.81	12.07	7.93	12.04	7.87	11.91
	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)

e_B = Bidder ownership prior to the takeover
e_L = Ownership of large blockholders prior to the takeover
MVT = Market value of target equity
MVB = Market value of bidder equity
TGN = Total gain if negative
TGP = Total gain if positive
γ = Normalized bargaining variable excluding the effect of arbitrageurs
γ' = Normalized bargaining variable including the effect of arbitrageurs

R^2 = adjusted R-square
prob-values in parentheses

the market value of the target and the total gain if negative. Model 2 is a reduced version of Model 1, including only significant variables[24].

Moreover, hypothesis H1 is not rejected by the data; the coefficient of the bidder toehold is significantly negative[25] (across all models)[26]. The market value of the bidder is significantly positively related to the gain of the target shareholders for all models[27]. The total gain has a significant impact on the target shareholder's gain if positive, but no effect if negative (Model 1 and 2). In Model 3 and 4, we have included the bargaining variable without potential arbitrageurs (γ). Model 3 is the full version while Model 4 only includes significant variables. As deduced from Model 4, the bargaining variable has a significant positive effect on the target shareholder's gain, and the variable seems to have explanatory power (higher adjusted R^2 compared to Model 1 and 2). In Model 5 and 6, we also include the effect of potential arbitrageurs (γ'), and get results that are quite similar to those not including arbitrageurs. Overall, the results are consistent with our expectations, except for large blockholders, where the coefficient is insignificant over all models. This result might be caused by the fact that we treat large blockholders as one group, instead of dividing them into managerial and institutional holdings as Stulz, Walking and Song did in their US sample. They found (for multiple bidding cases, ***not*** for single bidders) a significant positive coefficient for managerial holdings, and a significant negative coefficient for institutional holdings for the multiple-bidder sample. Accordingly, hypothesis H1 and H3 are not rejected by the data.

In Table 2, we report the comparative results using different specifications of the second regression model; equation A2. In these models, we have included a dummy variable for the total gain[28], and a variable gauging the relative size of the bidder to the target. Comparing the results in Table 2 with the corresponding ones in Table 1, we infer that the same explanatory variables have significant influence on the cumulative abnormal return of the target shareholders: bidder toehold, the market value of the bidding firm, the total gain and the bargaining parameters. However, one interesting result reported in Table 2 is that the ownership variables affect the distribution of the takeover gain ***only*** when the total gain is positive.

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[24] The dimension of the model was reduced using partial correlation of single variables.

[25] Stulz, Walking and Song found the same negative effect in their US sample.

[26] We also estimated the corresponding models using the square root of bidder and large shareholders ownership, implying that the effect of ownership variables are non-linear. The sign of the coefficients were the same, but the coefficients were less significant and the adjusted R-square slightly lower.

[27] This result is consistent with the result for the single bidder sample in Stulz, Walking and Song.

[28] As stated earlier, the dummy variable takes a value 1 if the total gain is positive and a value 0 otherwise.

Table 2. Cross-sectional regressions using the target cumulative abnormal return (adjusted for bidder toehold) as the dependent variable. Test of different models based on equation (A2).

	M 7	M 8	M 9	M 10	M 11	M 12
Const	0.054	0.041	0.091	0.037	0.079	0.037
e_B	-0.033		-0.080		-0.083	
	(.707)		(.406)		(.453)	
De_B	-0.210	-0.191	-0.171	-0.197	-0.185	-0.177
	(.047)	(.000)	(.126)	(.000)	(.145)	(.000)
e_L	0.014		-0.053		-0.021	
	(.887)		(.642)		(.847)	
De_L	-0.090		-0.017		-0.066	
	(.435)		(.896)		(.597)	
MVT	-0.009		-0.009		-0.009	
	(.375)		(.358)		(.400)	
DMVT	0.012		0.014		0.014	
	(.340)		(.284)		(.299)	
MVB	0.006	0.005	0.006	0.005	0.006	0.005
	(.015)	(.006)	(.020)	(.004)	(.019)	(.004)
DMVB	-0.006	-0.004	-0.006	-0.004	-0.007	-0.004
	(.080)	(.147)	(.082)	(.098)	(.071)	(.152)
RS	0.001	0.002	0.002		0.002	
	(.564)	(.000)	(.280)		(.357)	
TG	-0.039		-0.222	-0.068	-0.347	-0.069
	(.391)		(.164)	(.013)	(.404)	(.012)
D	0.169	0.145	0.132	0.148	0.153	0.144
	(.015)	(.000)	(.081)	(.000)	(.048)	(.000)
DTG	0.065		0.158		0.515	
	(.376)		(.519)		(.308)	
γ			0.273			
			(.225)			
$D\gamma$			-0.184	0.139		
			(.552)	(.000)		
γ'					0.395	
					(.450)	
$D\gamma'$					-0.576	0.127
					(.368)	(.000)
R^2	.373	.390	.370	.397	.364	.398
F-ratio	5.616	10.906	4.895	10.778	4.802	10.812
	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)

e_B = Bidder ownership prior to the takeover
e_L = Ownership of large blockholders prior to the takeover
MVT = Market value of target equity
MVB = Market value of bidder equity
RS = Relative size (bidder/target)
TG = Total gain
D = Dummy = 0 if total gain is negative, 1 otherwise
γ = Normalized bargaining variable excluding the effect of arbitrageurs
γ' = Normalized bargaining variable including the effect of arbitrageurs
R^2 = adjusted R-square; prob-values in parenthesis.

Again, bidder toehold has a significant negative effect on the abnormal return of the target.[29] Bidder size also seems to have a significant effect, especially when the target gain is negative. As inferred from Table 2, the effect is significantly positive when the total gain is negative. When the gain is positive, the effect of the bidder size variable is of a much smaller magnitude. In Model 8 (the model excluding the bargaining variable), relative size and the dummy variable for the total gain have significant effect on the abnormal return. The positive coefficient for the relative size variable indicates that relatively smaller target firm's may be able to extract a larger share of the gain since other bidders may be forthcoming. This result is consistent with the one found by Peterson and Peterson (1991) in their study of 272 US mergers between 1980 to 1986.

In Model 10 and 12, we substitute the relative size variable with the total gain and the bargaining variable. The coefficient for the bargaining variable is of the expected sign, and the effect seems to be the same whether including potential arbitrageurs or not. It also seems evident that the larger the bidder, and the larger the negative total gain, the greater the target firm's abnormal return, while the effect of the ownership variables is significant only when the total gain is positive.

Finally, in Table 3 we report the results when including a dummy variable which equals 0 if the bidder takes over or establishes control of the firm, and equals 1 if the bidder has control of it prior to the takeover transaction. The motivation for this discriminatory procedure is that the ownership structure, and, ipso facto, the distribution of the takeover gain, for the two configurations is rather different, especially with respect to the presence of large blockholders. It is immediately observable from the regression results of Models 13 and 14[30], that the control variable is significantly negative, and that it also effects the level of the coefficient for ownership variables.

In order to further analyze the difference between takeovers involving a bidder with or without control prior to the takeover sequence, we divide the sample into two groups. In the first group, consisting of 58 observations, the bidder's fraction of the votes is less than 50 % prior to the event. An interesting observation for this subgroup (Model 15 and 16) is that the coefficient for the bidder toehold is non-significant (but still negative). The other ownership variable, the bargaining parameter, is though still significant and positive as expected. The effect of the bargaining parameter is the same whether including potential arbitrageurs or not.

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[29] Bidder ownership is significant when the total gain is positive. When the total gain is negative, bidder ownership has no impact on the distribution of the gain.

[30] These models are the same as the reduced models in Table 2, except for the variable DMVB, which became slightly insignificant when including the control variable.

Table 3. Cross-sectional regressions using the cumulative abnormal return of the target (adjusted for bidder toehold) as the dependent variable, and differentiating between the situation when the bidder already has control of the firm and the case when he has not.

	M 13	M 14	M 15	M 16	M 17	M 18	M 19	M 20
Constant	0.069	0.066	0.066	0.066	0.033	0.033	0.145	0.135
De_B	-0.136	-0.121	-0.081	-0.075	-0.306	-0.287		
	(.013)	(.025)	(.395)	(.427)	(.001)	(.001)		
e_B							-0.151	-0.137
							(.057)	(.075)
MVB	0.003	0.003	0.003	0.003	0.003	0.003		
	(.029)	(.018)	(.093)	(.089)	(.224)	(.210)		
TG	-0.060	-0.063	-0.057	-0.059	-0.082	-0.080		
	(.029)	(.024)	(.187)	(.181)	(.008)	(.010)		
D	0.107	0.107	0.102	0.103	0.207	0.192		
	(.000)	(.000)	(.013)	(.013)	(.000)	(.001)		
$D\gamma$	0.118		0.116		0.122		0.065	
	(.003)		(.051)		(.054)		(.013)	
$D\gamma'$		0.111		0.106		0.168		.096
		(.002)		(.049)		(.050)		(.010)
Control		-0.048	-0.046					
		(.075)	(.093)					
R^2	.400	.403	.187	.188	.424	.416	.209	.224
F-ratio	10.902	11.037	3.627	3.639	6.146	5.979	4.565	4.905
	(.000)	(.000)	(.007)	(.007)	(.000)	(.000)	(.020)	(.016)
N	94	94	58	58	36	36	28	28

e_B = Bidder ownership prior to the takeover
MVB = Market value of bidder equity
TG = Total gain
D = Dummy = 0 if total gain is negative, 1 otherwise
γ = Normalized bargaining variable excluding the effect of arbitrageurs
γ' = Normalized bargaining variable including the effect of arbitrageurs
Control = Dummy = 1 if the bidder already has control; 0 otherwise

R^2 = adjusted R-square
prob-values in parentheses

In the subgroup consisting of takeovers where the bidder already has control, we have 36 observations. The regression results (Models 17 and 18) shows that the coefficients for ownership variables are significant and of expected sign. However, a striking observation for this subgroup is that the level of the bargaining variable seems to be different whether including arbitrageurs or not. Comparing the results of the two subgroups, it is clear that ownership structure variables have a better explanatory power when the bidder already has established control (much higher adjusted R-square).

We also tried to discriminate between the effects of the two bargaining variables, including and excluding, respectively, the effects of potential arbitrageurs, by separately analyze a subgroup of 28 takeovers where the bidder had a toehold of more than 50%. Among these observations, 10 had negative total takeover gain. Due to the limitation of few observations, we conducted a regression analysis including only ownership variables, since it is our main interest to see whether the effect is different with respect to the ownership structure of the target. As can be seen from Models 19 and 20, there seems to be a difference in the explanatory power of the bargaining parameter depending on whether the effect of potential arbitrageurs is included or not. Both variables have a significant coefficient of expected sign, but the variable including potential arbitrageurs seems to have a better explanatory power for takeovers with a high degree of bidder toehold.

The effect is expected since in the subgroup where the bidder had no prior control (bidders with small toeholds), there are often several large blockholders present, and therefore less action space for potential arbitrageurs. Accordingly, in this subgroup, the effect of potential arbitrageurs is of minor importance. However, when the bidder owns a large toehold, there is not often any large blockholder present, which opens up the window for potential arbitrageurs, and their effect in the bargaining game becomes much larger.

Table 4. Target ownership measures prior to the tender offer.
Ownership measures covers 94 cases of matched pairs in non-partial takeovers from 1980-1991. The data set is obtained from Aktiemarknadsbevakning (1980-1984) and from Sundqvist (1985-1991).

	γ	γ'	γ	γ' e_b<50%	γ	γ' e_b>50%
Mean	0.83	0.82	0.81	0.84	0.92	0.75
Median	0.82	0.84	0.81	0.85	1.00	0.76
Minimum	0.53	0.56	0.53	0.67	0.56	0.56
Maximum	1.00	0.92	1.00	0.92	1.00	0.83
Standard deviation	0.14	0.07	0.13	0.05	0.14	0.07
Number of cases	94	94	66	66	28	28

γ = bargaining variable excluding arbitrageurs
γ' = bargaining variable including arbitrageurs

This is also obvious from Table 4, where we present the descriptive statistics for the bargaining variable. In the subgroup with a large bidder toehold, the effect of potential arbitrageurs is of significant importance. The mean of the bargaining variable including potential arbitrageurs is significantly different from the mean for the bargaining variable not including potential arbitrageurs.

In conclusion, the empirical analysis performed in the appendix provides further evidence that the share of the total takeover gain accruing to the target shareholders is a function of the distribution of target ownership. We have demonstrated that the variables gauging the ownership structure do influence the distribution of the gain, in particular when the total gain is positive. If the full takeover gain is negative, there seems to be size related variables that effect the distribution as well.

For our Swedish sample, the magnitude of the bidder's toehold has a significant negative effect on the targets gain, except for the subgroup when the bidder had no prior control, where the effect was insignificant. Moreover, we have shown that the size of the ownership of large shareholders as such does not effect the division of the gain, independently of how we measure their ownership (total or average holdings, or as a dummy when they are pivotal). Of particular interest with respect to the theory derived in this paper, we have also obtained empirical support for the significant effect of the bargaining parameters γ and γ'. The result is valid both when the bidder already has or has not prior control of the target, and irrespective if we consider potential arbitrageurs or not. However, when the bidder has a substantial equity stake in the target, the bargaining variable including the effect of potential arbitrageurs seems to possess a better explanatory power. Accordingly, two of the implications of our model are not rejected by the more extensive testing on Swedish data.

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Essay 3:

The Mandatory Bid Rule

An Analysis of British Self-Regulation and a Recent EC Proposal

by

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Abstract

A recent directive from the European Community (EC) Commission proposes a general enactment of the Mandatory Bid Rule within the Community. By requiring any bidder who is trying to acquire control to extend an offer for all shares of the target firm, the rule is, in effect, a prohibition of partial bids. Within a general version of the Grossman-Hart (1988) security-voting structure model where two competitors for control have private and security benefits, the paper analyzes how implementation of the MBR affects the post-takeover wealth of the target shareholders, who wins the takeover contest, and also evaluate its properties as a policy instrument. The pertinent contribution of the paper is the derivation of a general design principle, *The Relative Similarity of Willingness to Pay Rule*, which applies to all parameter configurations in the Grossman-Hart set-up and for a wider range of problems. In particular, it characterizes the precise and quite restrictive conditions when enactment of the principle is in the interest of the target shareholders. We also deal with the somewhat more general problem of selecting the optimal bidform, i.e. whether a potential bidder in a future takeover contest should be required to offer to purchase half, all or some *intermediate* fraction of the outstanding shares of the firm.

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1. Introduction

THE MANDATORY BID RULE (MBR) is founded on two basic principles. First, a shareholder should have the right to sell her shares if control of the company changes. This *Right to Sell Provision* implies an obligation of any bidder trying to acquire control to extend an offer for all shares of the corporation and not only for a controlling position. The implication of this principle is that an acquirer cannot establish such a position without making a non-partial bid.[1] Consequently, the principle is, in effect, a prohibition of partial bids, i.e., offers for a controlling stake but for less than 100% of the voting equity. Second, it requires the acquirer to extend the same bid price to all shareholders, irrespective if they own controlling positions or not. This *Equal Bid Provision*, de facto, amounts to a prohibition of price differentiated tender offers.

The MBR has not been thoroughly analyzed in the literature.[2] The general purpose of this paper is to remedy this shortcoming. The need for such an analysis is further emphasized by the rule's popularity among European regulators. For example, France, Italy and Norway have enacted the MBR, however, with somewhat different limits for operational control.[3] In its quest for creation of a "level playing-field" in European company law matters, the EC Commission proposes the adoption of the MBR as well as a set of rules governing disclosure of information within the EC in *The Amended Proposal for a Thirteenth Council Directive on Company Law, Concerning Takeover and Other General Bids* (1990).[4]

The inspiration behind and the archetype for this legislative activity is the extra-legal code in the UK known as *The City Code on Takeovers and Mergers*, the oldest and most flexible European regulatory framework for the MBR and supervised by a

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[1] Alternative labels for non-partial bids are *any or all bids* or an *unrestricted offers* and partial bids are sometimes referred to as *restricted offers*.

[2] The only published paper known to us that discusses the mandatory bid rule is Yarrow(1985). He uses the Grossman-Hart(1980) model as an organizing framework for his arguments in favor of the MBR. However, in contradistinction to our analysis, he only highlights the negative effects of partial bids but does not critically assess the problems or drawbacks with non-partial bids.

[3] Actual control is supposed to be achieved at around 30 to 40% of the voting equity, implying that an acquirer who obtains a position of at least this size must extend an offer to all shareholders at the same price at which he acquired it.

[4] In the US the Mandatory Bid Rule is still a source of substantial controversy. The second wave of takeover status include redemption rights that give all shareholders a redemption rights against any buyer of at least 30 percent of the firms stock. Only three states adopted the redemption rights provision. For instance, the Pennsylvania law require any person who acquires a 20 % or higher stake in a firm to notify all other shareholders of the acquisition. all other shareholders are then entitled to sell their shares to the buyer at a price at least as high as the highest price the buyer paid in the 90 days preceding and including the day the buyer become a 20% shareholder. Maine and Utah passed similar laws (Karpoff and Malatesta (1989)).

professional body known as *The Panel on Takeovers and Mergers*. With a few important exceptions, the EC Directive almost emulates the rules in The City Code.[5]

The general motivation behind the MBR is the need for protection of minority rights which might be compromised or violated in takeovers. According to Farrar et al (1991), the MBR in the City Code can be derived from the notion that "...it is felt to be wrong to compel shareholders to become minority shareholders in a company without giving them the option to sell their shares", and the view that "...shareholders, who are already minority shareholders under one controlling shareholder, should not be compelled to continue under a different controlling shareholder."

The quotations from Farrar's Company Law seem to suggest that the MBR represents a costless option of selling when control changes which is exercised only when it is favorable to do so. Giving all shareholders such an option, would intuitively seem like a fair and innocuous requirement aimed at the protection of minority interests. However, a decision to enact the MBR is a more multifaceted one. Although seemingly innocuous, by systematically changing the conditions for control contests, the MBR has profound effects on who is winning the contest and at what price. In fact, the rule has two fundamental dimensions: (i) an *allocative* and (ii) a *surplus extraction* dimension. The first one measures how the rule affects the outcome of a control contest in terms of the post-takeover value of the firm: Is a more or less efficient management the result? The second one determines the price the winner must pay and thereby it captures how much the target shareholders are able to extract from the winning party's surplus (profit) in a control contest. As we will show, neither partial nor non-partial bids are uniformly best in both of these respects. Hence, in general, there exists a genuine trade off between the two dimensions. For example, if partial bids are allowed, an acquirer who has private benefits of control may defeat a more efficient competitor by offering the tendering shareholders a price that is higher than the opponent's as well as higher than the post-takeover value of the firm. In this situation, the MBR form promotes surplus extraction by increased price competition between the opponents at the expense of allocative efficiency. In fact, the existence of a trade-off in the surplus extraction potential and the allocative role between bidforms suggests that enactment of the MBR is not a costless option.

The specific purpose of this paper is to delineate and analyze this trade-off. Along the way, we answer the following questions. Is the MBR really in the interest of the target shareholders? Does the MBR in general induce takeovers that develop a

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[5] For a presentation of The City Code, see Farrar, Furey & Hannigan (1991). One difference between *The City Code* and *The 13th EC Directive* is that the trigger limit for actual control is 30% of the equity in the former but at most one third in the latter. Another is that the British is extra-legal while the EC rules are supposed to be enacted by public law.

more efficient industrial structure in a dynamic perspective? Is the rule a good policy instrument?

The paper analyzes the MBR by studying its effects on the outcome of a takeover contest in a firm where no controlling position exists between two rival management teams.[6] To focus exclusively on the economic consequences of The Right To Sell Provision and isolate it from The Equal Bid Principle, which is predicated on the difference between small and large, controlling shareowners, we assume that the firm is atomistically owned. We conduct the analysis within a general version of the Grossman-Hart (1988) security-voting structure model where the two competitors for control both have significant security and private benefits.[7] Specifically, we characterize exactly how the MBR affects shareholder wealth, who wins the contest, and also evaluate its properties as a policy instrument.

The Grossman-Hart framework is, in our opinion, the most appropriate for analyzing the MBR. Besides being simple, transparent, and providing a takeover mechanism by the presence of private benefits, there exists a close analogy between the choice of security voting structure and the selection of bidform. This parallelism allows us to extend their results and make comparisons, and, thereby, generate a better understanding of the basic economic mechanisms at work in the two problems.

The paper makes two general contributions. The first one is the general and precise formal analysis of if and when enactment of the MBR is in the interest of the target shareholders. The analysis covers all possible combinations of private and security benefits between the two competitors for control. We demonstrate that it is only under quite restrictive assumptions that the shareholders actually gain from its implementation. One sufficient (global) condition for a non-negative effect on the shareholders' wealth is the special case with one-sided private benefits. This is analogous to the Grossman-Hart proposition that one share/one vote is the optimal security voting structure. In particular, both the non-partial bidform and the non-dual

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[6] In general, the MBR covers both the case (i) where no controlling position exists in the firm and (ii) where the takeover amounts to a transfer of such a position. This paper deals exclusively with the first situation; see Högfeldt(1993a) for a discussion of the second case.

[7] In the literature on takeovers, the present paper is most closely related to Zingales(1991) by the common usage of the Grossman-Hart(1988) framework. However, he analyzes a different problem-- the optimally retained ownership share in an IPO (Initial Public Offering)-- and uses a different takeover mechanism; bargaining instead of competition (auction); see Högfeldt(1993a) for a discussion of Zingales' work and relation to the analysis of the MBR. Moreover, the present analysis was initiated independently of Zingales'. More distant relatives are Israel(1991) and (1992) which determine optimal extraction in a takeover model with private benefits but for a firm that also issues debt.

voting structure assign the least weight to the private benefits and the most to the security benefits.[8]

In the general case with two-sided private benefits, the MBR is only aligned with the shareholders' interests over a comparatively small set of values in the parameter space that depends on the size of the discrepancy between private benefits; implementation of the rule does not generally benefit the target shareowners. Specifically, if the private benefits of the two contestants are of about equal size, its effect on the shareholders' wealth is uniformly non-positive. In fact, unless the difference in private benefits is large, the target shareowners encounter a loss, ceteris paribus, from implementation of MBR.

The second main contribution of the paper is methodological. We view the decision whether to allow or prohibit partial bids as a discrete design problem of selecting a package of security and private benefits that is optimal for target shareholders. In particular, it amounts to a selection of two sets of weights on the benefits: either equal (a proscription of partial bids) or differentiated, with a double weight on private benefits (allowing partial bids). We derive a very general design rule called *The Relative Similarity of Willingness to Pay Rule* that informs us precisely when a prohibition of partial bids is in the interest of the target shareholders, and when it is not.[9] The rule is the generalization of Grossman-Hart's analysis of the special case with one-sided private benefits to the realm of two-sided ones.

Our design rule is predicated on the general economic canon of competition. The simple but very suggestive intuition supporting this general design rule is that the shareholders gain most when the two competitors fight over packages of two rights or benefits for which their willingness to pay is relatively most similar. By making the competition as fierce as possible the target shareholders gain most. Specifically, if the formal requirement of the design rule is satisfied, the contestants' relative willingness to pay is most similar for security benefits, the non-partial bidform should be chosen since it makes the competition over security benefits as fierce as possible. If this criterion is violated, the MBR should not be adopted since partial bids benefit target shareholders more by making competition most intense over private benefits, i.e., partial bids are best aligned with the two contestants' relative similarity in willingness to pay.

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[8] As Grossman-Hart(1988) observed, there exists a close analogy between the choice of security voting structure and the choice of bidform. But they did not develop the logical affinity between the two problems in the direction of this paper.

[9] This is a generalization of Grossman-Hart's rule of similar willingness to pay. They invoke it only when discussing an example where the two contestants have significant private benefits of similar size, and where a security voting structure that completely unbundles the security and private benefits, the opposite extreme to the one share/one vote structure, can be optimal, see Grossman-Hart(1988) p 181. However, as we demonstrate in this paper, the rule applies more generally.

The Relative Similarity of Willingness to Pay Rule also pinpoints the Policymakers' Dilemma: no single and comprehensive rule like the MBR is the best choice for all corporations.[10] Consequently, the interests of the shareholders in a widely held company are better served if the legislators do not regulate the choice of bidform through the MBR but leave it as a discretionary choice to the equityowners in each corporation. Furthermore, when we broaden the policy analysis to a general discussion of The Thirteenth Council Directive, we argue that the legislative package is inconsistent since it does not contribute to the achievement of the explicit objectives of a more efficient industrial structure in Europe and the protection of the shareholders' interests. Accordingly, a serious debate whether general enactment of the Directive is really in the European interest is warranted.

The paper is organized as follows. Section two outlines the model and gives the necessary formalism. The third section conducts the analysis of the effects on firm value of bidforms in the special cases of (i) one-sided and (ii) identical private benefits as well as in (iii) the general configuration with significant and two-sided private benefits. Section 4 deals with the somewhat more general problem of selecting the optimal bidform, i.e. whether a potential bidder in a future takeover contest should be required to offer to purchase half, all or some intermediate fraction of the outstanding shares of the firm. The penultimate section discusses The Thirteenth Takeover Directive more generally as a policy proposal, and the paper concludes by a short summary.

2. The Model

CONSIDER THE FOLLOWING SCENARIO.[11] A firm is initially privately owned by a founder/entrepreneur. However, to capitalize his investment, the owner turns to the capital market for an Initial Public Offering (IPO) of equity. The entrepreneur designs the company's securities as well as the governance structure in such a way that the potential investors are prepared to pay as high a price as possible for the offered shares. In particular, the corporate charter, as part of the governance structure, may include a number of provisions that affect the investors' assessment of the firm's future value, e.g. specification of majority rules, selection of a dual or non-dual security voting structure etc. This paper focuses on the choice of bidform as the main decision variable of the entrepreneur.

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[10] For a general discussion of the policymaker's dilemma in corporate law, see Macey (1986).
[11] The general perspective is that of Jensen and Meckling (1976).

His objective is to maximize the expected (future) value of the corporation either by amending the corporate charter with a clause banning partial bids or by allowing this bidform, i.e. decide whether the MBR applies or not in future tender offers.[12] The founder writes the corporate charter anticipating that the company, subsequent to the IPO, will be widely held, i.e. an atomistic ownership structure evolves. The small shareholders are identical and rational. Furthermore, the voting structure is one share/one vote, and the corporation is expected to continue to be all equity financed. Due to the simple majority rule provision in the charter, an acquirer establishes control of the company by owning a position of at least fifty percent of the equity.

As in the Grossman-Hart (1988) model, competition in the market for corporate control is a basic element of our model.[13] The corporate charter is written apprehending a future control contest where a single outside rival (R) management team challenges the incumbent (I) team. In an auction procedure, the team with the highest willingness to pay establishes control of the atomistically owned firm. The security benefits-- the value, or net present value, of the firm's projects, that accrue to all of the firm's shareholders-- associated with the two teams are y^R and y^I, respectively. Furthermore, independently of their managerial skills (as measured by the security benefits) the contestants have some private benefit of control denoted by z^R and z^I. They are defined net of any costs of making a bid and measure psychic value generated by power over the firm or the value of network relationships associated with control.

The Control Contest

A successful bid for control satisfies three general conditions. (1) It is profitable for the contestant to go through with the offer. (2) The bid exceeds that of the counter-party. (3) The tender offer price at least equals the small shareholders reservation price. Combined, the first two conditions, regarding profitability and price matching, constitute a bidding subgame and represents the competitive mechanism in the model. The bidding subgame can be viewed as an English auction with two bidders. It is won

[12] In general, the probability of a takeover contest depends on the bidform. However, as a simplifying assumption, we postulate that identical and constant probabilities prevails for all bidforms. This implies that, in effect, our analysis, like Grossman-Hart's, has an *ex post* perspective. See Bergström, Högfeldt & Ravid(1993) for a general ex ante analysis of the Grossman-Hart(1988) model. An ex ante analysis of the MBR when controlled is transferred is presented in Högfeldt(1993a).

[13] We also assume that the capital markets are perfect; there are no problems of financing a tender offer of any size. In our commentary section we discuss the implications for the MBR when this assumption is violated.

by the party with the highest willingness to pay, and the winning auction price equals the loser's maximum willingness to pay.

Assume that a bidder (b) issues a tender offer for a fraction ϕ of the equity of the target firm where $\phi \in [0.5, 1]$. He expects to profit from a successful takeover attempt if $\phi \cdot (y^b - p^b) + z^b \geq 0$, where p^b is his offered price per 100 percent of the shares; $(y^b - p^b)$ measures the bidder's capital gain or loss; and z^b captures his private benefit of control. By solving for p^b in the zero-profit condition, we derive the bidder's maximum willingness to pay expressed per hundred percent: $y^b + z^b/\phi$. For example, if b issues a bid for 50% of the shares, his maximum willingness to pay is $y^b + 2 \cdot z^b$. Correspondingly, under a non-partial bid for all outstanding share, he is prepared to extend a bidprice of at most $y^b + 1 \cdot z^b$.

The bidding subgame is won by the party with the highest willingness to pay. In formal terms, the result can be stated as follows. Let B be an index for partial (P) and non-partial (N) tender offers for fifty and one hundred percent of the shares of the firm respectively. W(B) [L(B)] denotes the winner [loser] of a control contest. Specifically, $y^{W(P)} + 2 \cdot z^{W(P)} > y^{L(P)} + 2 \cdot z^{L(P)}$ if the partial bids are allowed, while $y^{W(N)} + z^{W(N)} > y^{L(N)} + z^{L(N)}$ under the non-partial bidform, and the winning auction price equals the loser's maximum willingness to pay, i.e., $y^{L(P)} + 2 \cdot z^{L(P)}$ in partial bids and $y^{L(N)} + z^{L(N)}$ in non-partial bids.

The Equilibrium Tender Offer Price p(B) for Partial (P) and Non-Partial (N) Bids.

Due to free riding option available to the target shareholders, the auction price may not be acceptable to them. A rational equityowner's best response to an offer is to accept if the bid price equals or surpasses his reservation price: the value of a share-- security benefit-- under the management team that is expected to win the bidding subgame.[14] This is the free rider mechanism of the model. We assume that a bidder who is indifferent between accepting and rejecting the offer accede to it.

Consequently, the tender offer price [p(B)], i.e. the price that satisfies the three necessary conditions for a successful bid for control, is the largest of the loser's maximum willingness to pay and the winner's security benefits. If the resulting tender offer price is determined by the former, the competitive mechanism is instrumental,

[14] If bids are unconditional, the shareholders' reservation price for a given bid will be the maximum of y^R and y^I if the rival extends the bid, and y^I if the incumbent makes it; see Grossman-Hart (1980). However, as it turns out, the distinction between conditional and unconditional bids is irrelevant for the outcome of the contest and the subsequent equilibrium price. Therefore, we only consider conditional bids in the sequel.

while if the shareholders reservation price decides the final price, the free rider mechanism generates the tender offer price. Hence, the tender offer price p(B) can be written as:

$$p(B) \equiv \max[y^{L(B)} + (1/\phi)\cdot z^{L(B)}, y^{W(B)}]$$

where ϕ is 1 if bids are non-partial (B=N), and ϕ equals 0.5 if bids are partial (B=P). This succinct result is very useful since it allows us to easily analyze the trade-off between the allocative and surplus extraction roles of the two bidforms, and how the choice of bidform affects the wealth of the shareholders for all parameter values.

The Shareholder Wealth Effect

Suppose a bidder issues a partial bid for 50% of the shares, and prorates if more shares are tendered. For any successful bid, this implies that an individual shareholder sells half of his original holding to the bidder and retains the other half. The post-takeover value of an equityowner's position is the sum of the equilibrium price he receives for the fifty percent of his holding that he sells, and the worth under the winning management of the fifty percent he is forced to retain. Since all shareholders act and are treated identically, the total post-takeover value of the corporation under partial bids is $V(P) \equiv \frac{1}{2}\cdot[p(P) + y^{W(P)}]$, where p(P) denotes the tender offer price of a successful partial bid, and $y^{W(P)}$ is the post-contest security benefits under the winner. If the MBR applies, the shareholder post-takeover wealth is simply $V(N) \equiv p(N)$, where p(N) denotes the equilibrium price of a successful non-partial bid.

To measure the difference in post-takeover equityowner value between the two bidforms, we define the *shareholder wealth effect* as $\Delta V \equiv V(N) - V(P) \equiv p(N) - \frac{1}{2}\cdot[p(P) + y^{W(P)}]$, i.e. the difference between the shareholder's total post-takeover value under non-partial and partial bids. Specifically, it captures the effect on shareholder wealth of a prohibition of partial bids. A positive wealth effect implies that the target shareholders would be better off if the MBR is enacted, and a negative wealth effect indicates a loss.

In order to highlight the trade-off implicit in the choice of bidform, we decompose the shareholder wealth effect into a *surplus extraction component*, Δs, and an *allocative component*, Δa , or, formally, $\Delta V = \Delta s + \Delta a$. The surplus extraction part captures how effective a bidform is in extracting the winning party's private benefits in a control contest, while the allocative component measures how different bidforms affect the outcome in terms of security benefits of a takeover contest, i.e., the extent to

which the bidform determines whether the control will rest in the hands of a more or less efficient management measured by the security benefits.

Let us first define the surplus extraction component. The winners actual profit (surplus) if partial bids apply equals $\pi(P) = ½\cdot[y^{W(P)} - p(P)] + z^{W(P)}$. His gain if the partial bidform is banned, and he has to extend a non-partial bid amounts to $\pi(N) = y^{W(N)} - p(N) + z^{W(N)}$. Due to free riding by target shareholders, the winner of the control contest must at least pay the free rider price $y^{W(B)}$. Hence, his maximum profit equals the size of his private benefits, $z^{W(B)}$. If the competitive mechanism is instrumental, the price is higher and he makes a capital loss financed by his private benefits. Consequently, the amount of the winner's surplus extracted by target shareholders is the difference between the maximum possible gain and the profit he actually makes. Hence, if partial bids are allowed the surplus extracted by the shareholders equals $s(P) = z^{W(P)} - \pi(P) = ½\cdot[p(P)-y^{W(P)}]$ while the surplus extracted under non-partial bids equals $s(N) = z^{W(N)} - \pi(N) = [p(N)-y^{W(N)}]$.

The difference between the surplus extraction under non partial and partial bids amounts to the surplus extraction component of the wealth effect of implementing the MBR, and equals $\Delta s \equiv s(N) - s(P) \equiv [p(N)-y^{W(N)}]-½\cdot[p(P)-y^{W(P)}]$. As will be demonstrated later, for a large region of parameter values, we find that the surplus extraction component is non-positive.[15] The intuition is that the bidder is always prepared to extend a higher price per 100 percent of the shares in a partial bid than in a non-partial bid, thereby reducing his surplus to the benefit of the shareholders in the target company.

The second part of the wealth effect of implementing the MBR is the allocative component. It captures the discrepancy between the security benefit that accrue to the target shareholders under non-partial bids and the security benefit under partial bids: $\Delta a \equiv y^{W(N)} - y^{W(P)}$. As will be demonstrated formally, the allocative component is always non-negative. The intuition is as follows. Compared to the bidder's maximum willingness to pay in non-partial bids, the partial bidform doubles the weight assigned to private benefits. This implies that a ban on partial bids makes it, ceteris paribus, more difficult for a bidder with higher private but lower security benefits than his opponent to win the takeover contest. Or stated somewhat differently, because the non-partial bid form assigns less weight to private benefits, a more efficient management team is never installed in a partial bid than in a corresponding non-partial bid. Consequently, $y^{W(N)} \geq y^{W(P)}$ and $\Delta a \geq 0$, i.e., the MBR promotes efficiency measured in terms of security benefits.

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[15] In fact, as we will develop further in the next section, the *surplus extraction component* is **positive** if and only if the less efficient (in terms of security benefits) management team wins irrespective if the MBR applies or not.

To sum up, the surplus extraction component together with the allocative component makes up the total shareholder wealth effect, $\Delta V = \Delta s + \Delta a$. The surplus extraction component is likely to be negative, i.e., gauging a loss in surplus extraction of a prohibition on partial bids (enacting the MBR), while the allocative component represents a counteracting gain in terms of security benefits. Depending on the parameter values, the balance between the surplus extraction and the allocative component may result in a positive or negative total shareholder wealth effect if the MBR is enacted, see Appendix A for two illustrative numerical examples. Accordingly, contrary to the explicit objective of protecting the shareholders' interests, the Thirteenth Directive of the EC Commission may in fact not generally benefit them since the MBR is not a free option. The purpose of the following analysis is to substantiate this claim by a general analysis of the trade-off between the surplus extraction and allocative component implicit in the enactment of the MBR for all parameter values.

3. Analysis

TO BETTER DISCERN the simple economic mechanism through which the choice of bidform affects shareholder wealth in the general configuration where both contestants have significant and non-identical private benefits, it is worthwhile first to study two simple special cases. In the first one, only one of the contestants has positive private benefits while in the second one, both have non-negligible and identical private benefits. In the former, the target shareholders never lose from an enactment of the MBR while they never gain in the latter case.

ONLY ONE CONTESTANT HAS POSITIVE PRIVATE BENEFITS

By studying the same special case as Grossman and Hart did, we both accent the logical affinity between our bidform choice problem and their security voting structure question, and generate a better understanding of the common economic mechanism that is operational in the two problems. They demonstrated that if only one contestant possesses private benefits when in control, the one share/one vote structure is optimal since it promotes allocative efficiency by making it more difficult for the relatively less efficient party to gain or remain in control.

Assume that the rival is the only contestant with positive private benefits.[16] A characteristic trait of this situation is that while the rival's willingness to pay is affected by the choice of bidform, the incumbent's is, irrespective of bidform, his security benefits. In particular, because of his private benefits, the rival may establish control of the corporation by an offer that generates less security benefits than the incumbent team. By assigning more weight to private benefits, this opportunity is most prevalent if bids are partial. How does implementation of the MBR affect the shareholders' wealth when only one contestant has private benefits?

In Figure 1, the shareholder wealth effect as well as its decomposition into the surplus extraction and allocative components are graphically presented as functions of the difference in security benefits (y^I - y^R) for any arbitrary positive value of z^R under the assumption that $z^I = 0$.[17] First of all, it illustrates that when only one of the contestants has positive private benefits, the MBR cannot have a negative impact on shareholders wealth ($\Delta V \geq 0$).

In the outer regions (I and IV), the wealth effect is zero ($\Delta V = 0$). The simple logic behind this is that one of the contestants is so superior in terms of security benefits that the winner of the control contest as well as the equilibrium bid price will be the same in both bidforms. When one contender generates sufficiently high security benefits, the bidform cannot affect the outcome of the control contest and the free-rider mechanism will always determine the bid price. Accordingly, both the allocative component and the surplus extraction component are zero ($\Delta a = \Delta s = 0$).

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[16] We assume that symmetric information applies, i.e., the outside rival only challenges the incumbent management if he is certain to win. The analysis does not depend on if it is the incumbent or the outside rival who is endowed with private benefits; the results are symmetrical but with a somewhat different economic interpretation. An alternative assumption might have been to postulate asymmetric information and that the two contestants are both outside rivals.

[17] Due to considerations of simplicity and transparency, we present all our basic results in this paper in graphical form. Our exposition explores the fact that the pivotal element in the Grossman-Hart framework determining the outcome in terms of tender offer price and winner of a control contest under different bidforms is the *relation* between the *difference in security benefits* and the *reversed discrepancy between private benefits*, e.g. (y^I-y^R) compared to (z^R-z^I) or $2\cdot(z^R$-$z^I)$. Depending on whether $z^R > z^I$ or $z^R < z^I$, two panels illustrate *all* possible parameter combinations by positioning (y^I-y^R) in relation to the private benefits and the reversed difference. In particular, the private benefits and the associated reversed discrepancies are located on the axis for (y^I-y^R), and, depending on which section or interval (y^I-y^R) is situated in, a set of inequalities are satisfied. In turn, the inequalities are instrumental in determining the winner of the control contest as well as the equilibrium price. The technique is illustrated as we go along

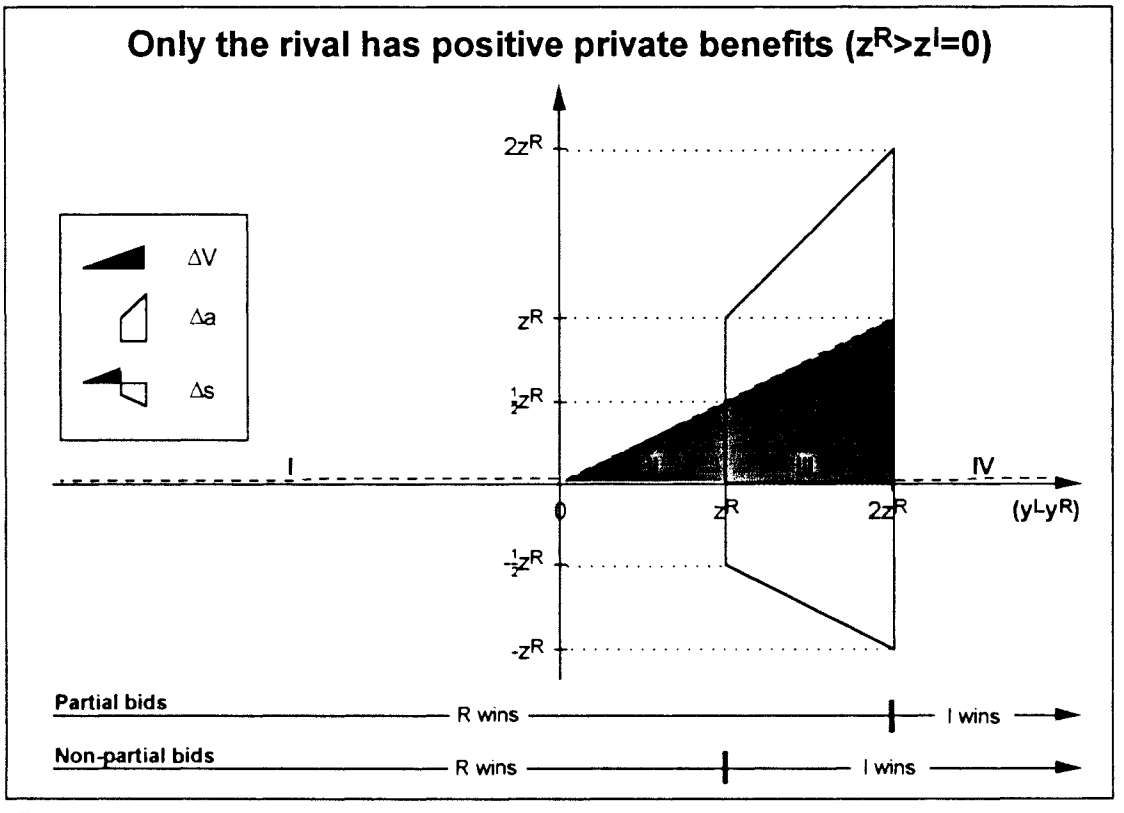

Figure 1: The figure shows the wealth effect, ΔV, as a function of the difference in security benefits (y^I-y^R), as well as its decomposition into the surplus extraction component, Δs, and the allocative component Δa. In region II, ΔV=Δs.

The more interesting part of the figure is the segment of positive wealth effects (regions II and III). First, consider region II. Here, the relative magnitude of the rival's private benefits is such that she will establish control under both bidforms and despite being less efficient in terms of security benefits. Consequently, the allocative component is zero ($\Delta a = 0$). However, the shareholders will be able to extract more of the winner's surplus if the MBR is implemented. This is so because the competitive price is not affected by the bid form since the incumbent's (the loser's) willingness to pay is completely given by her security benefits (by assumption, the incumbent has no private benefits). Hence, requiring non-partial bids means that a shareholder will be able to sell all her shares at a price equaling their status quo value. By contrast, allowing partial bids means that she could only sell half of her shares at the status quo price while having to retain the other half, which will be worth less under the rival's management. Extraction of the rival's surplus is therefore improved if the MBR is operational; the surplus extraction component of the wealth effect is $\Delta s = (y^I - y^R) - \frac{1}{2}(y^I - y^R) = \frac{1}{2}(y^I - y^R) > 0$.[18]

In interval III, the rival's private benefits are such that she will establish control if partial bids are allowed but not if non-partial bids are required; the implementation of

[18] $\Delta s \equiv s(N) - s(P) \equiv [p(N)-y^{W(N)}]-\frac{1}{2}\cdot[p(P)-y^{W(P)}]$, where in this case $p(N) = p(P) = y^I$.

the MBR causes a reversal of winners for this set of parameters in favor of the more efficient contestant. The allocative component is $\Delta a = y^I - y^R > 0$. However, this gain in allocative efficiency is counteracted by a loss in surplus extraction. This is intuitive since the less the winner's private benefits, the less her potential surplus (profit), and, hence, the lower potential surplus extraction by the shareholders. In this case, the zero private benefit incumbent wins a non-partial bid contest, and, consequently, there is no surplus to be extracted under this bidform. There exists surplus extraction potential only when the contestant with private benefits, the rival, wins. In this region, this will only happen if partial bids are allowed. Therefore, the surplus extraction component will be negative in region III: $\Delta s = -\frac{1}{2}(y^I - y^R) < 0$. Accordingly, we have a trade-off between the two components. However, in this case, the positive, allocative component more than offsets the negative, surplus extraction component resulting in a positive total wealth effect; $\Delta V = \Delta s + \Delta a = \frac{1}{2}(y^I - y^R) > 0$.

Summarizing the graphical analysis, we observe that when only one of the contestants has positive private benefits, the target shareholders never lose from an enactment of the MBR. The economic intuition behind this result is captured by a general design rule, derived in this paper, called *The Relative Similarity in Willingness To Pay Rule*. The two contestants compete over packages of rights where security and private benefits either have equal weights (non-partial bids) or a double relative weight on private benefits (partial bids). By assigning a lower relative weight on private benefits (higher relative weight on security benefits), the equityowners gain more under non-partial bids if the two competitors have security benefits that are relatively more similar than their private benefits, and through partial bids in the reverse case. Specifically, by making competition as fierce as possible over a package of rights for which their relative willingness to pay is most similar, the equityowners gain as much value as possible from the competition between the two contestants.

Since the incumbent enjoys no private benefits in our special case, the difference in willingness to pay over private benefits between the two contestants is as large as possible or $(z^R - 0)$. In particular, if the parameters satisfy the relation $0 < (y^I - y^R) < 2 \cdot (z^R - 0)$, the region with a positive shareholder wealth effect in Fig 1, the competitors have relatively more similarity of willingness to pay over security benefits, $(y^I - y^R)$, than over private benefits. Accordingly, the shareholders exploit this fact by only allowing non-partial bids, i.e., competition over a package of rights that put as high relative weight on security benefits as possible. In this case, prohibition of partial bids makes the competition between the two contestants as fierce as possible over security benefits, and the equityowners extract as much value as possible from the winner.

From the graphical analysis in Fig 1, we observe that sufficient conditions for a positive shareholder wealth effect are either a positive surplus extraction component

(region II) or a positive allocative effect (region III). In particular, the fact that a prohibition of partial bids promotes surplus extraction may at first seem counter-intuitive. But our design rule provides the basic economic intuition behind the result that the surplus extraction component, Δs, is positive in region II. Since the incumbent's maximum willingness to pay is totally captured by his security benefits, and the rival is less efficient than the incumbent, the shareholders extract as much as possible of the rival's (winner's) private benefits if the competition is most intensive over security benefits, i.e. only non-partial bids are allowed. In region III the more efficient incumbent management team remain in control when partial bids are banned. Consequently, the MBR generates a reversal of winner and accordingly $\Delta a > 0$. At the same time the surplus extraction component becomes negative; $\Delta s < 0$. This latter effect is due to the fact that it is only the winner in partial bids (the rival) that enjoys private benefits that can be extracted by target shareholders. The result that enactment of the MBR is beneficial for target shareholders in this region ($\Delta V > 0$), i.e., that the allocative effect dominates the surplus extraction effect, follows from the general design rule.

For the special case with one-sided private benefits, the logical affinity between Grossman-Hart's analysis with respect to security voting structure and the present discussion of the MBR is apparent. They distinguish between the allocative and surplus-extraction role of a security voting structure and show that one share/one vote is the optimal one since the allocative dimension is relatively more important when only one contestant enjoys private benefits when in control.[19] Despite different terminology, the operational economic mechanism in the two problems is the same. Specifically, in both design problems, the shareholders gain most by selecting a voting structure-- one share/one vote-- or bidform-- non-partial bids-- that distribute as little relative weight as possible to private benefits. In Grossman-Hart's terminology, one share/one vote minimize the surplus extraction role. Alternatively stated, the shareholders benefit from one share/one vote and non-partial bids, respectively, by letting the takeover contestants compete over packages of voting and security rights with equal weights (one), since this design makes competition most intense over security benefits. This in turn emanates from the fact that the competitors' relative similarity in willingness to pay is higher over security benefits than over private benefits in the special case with

[19] Grossman-Hart(1988) define the two dimensions: "Through this competition effect, the assignment of voting rights determines both whether control will rest in the hands of a high-private-benefit party or a high-security-benefit party and the value of the income claims under the controlling management. Together these effects represent what we call the of the assignment of claims. The assignment of voting rights also determines the price an acquirer must pay voteholders for the private benefits of control, which we call the" p 177. Please, observe that the present paper's definitions of the *surplus extraction* and the *allocative components* differ from Grossman-Hart's definitions of the *surplus-extraction role* and the *allocative role*

one-sided private benefits. Accordingly, the general design rule derived in this paper applies by analogy to the Grossman and Hart's problem as well.

Let us summarize the result of our analysis of the special case where only one of the contestants have significant private benefits somewhat more formally.

RESULT 1: *If only one of the contestants in a future control contest enjoys private benefits from control, enactment of the MBR generates a non-negative change in the shareholders' post-takeover wealth, and a positive change if and only if* $y^I - y^R$ *is on the interval*

$$0 < y^I - y^R < 2 \cdot z^R \text{ for } z^R > z^I = 0 \text{ or } 0 < y^R - y^I < 2 \cdot z^I \text{ for } z^I > z^R = 0.$$

Consequently, a ban on partial bids is in the shareowners' interest and may be amended to the corporate charter.

RESULT 2: *If only one of the contestants in a future control contest has positive private benefits, sufficient conditions for a positive shareholder wealth effect are either (i) the surplus extraction component,* Δs, *is positive or (ii) the allocative component,* Δa, *is positive. The first condition is satisfied if the less efficient (in terms of security benefits) contestant wins irrespective of bidform. The second one is fulfilled if enactment of the MBR generates a reversal of winners, i.e. different contestants win the non-partial and partial bid contest, respectively.*

RESULT 3: *If only one of the contestants in a future control contest enjoys private benefits of control, the MBR does not necessarily prevent a less efficient (in terms of security benefits) management team from establishing or maintaining control of the corporation (Region II in Fig 1 or Result 2 (i)).*

However, even though Grossman-Hart predicate their argument in favor of the one share/one vote security voting structure on the particular assumption that only one of the contestants enjoys private benefits of control, there exists no good economic a priori argument in support of this restrictive presupposition. In fact, it is just as reasonable to infer that private benefits are approximately of the same size regardless of who is in control. Let us explore how the MBR affects the post-takeover wealth of the shareholders in this special case.

THE INCUMBENT AND THE RIVAL HAVE NON-NEGLIGIBLE BUT IDENTICAL PRIVATE BENEFITS

Instead of assuming, as in the previous special case, that the difference in private benefits between the two challengers for control is as large as possible (z^R - 0), we make the converse supposition that the discrepancy is as small as possible. To pinpoint the contrasting conclusions in the two special cases, we suppose that the private benefits are of exactly the same magnitude or $z^I = z^R = z > 0$. This implies that competition between the two is not distorted by disparate private benefits; independently of bidform, the most efficient contestant always wins. Because the choice of bidform does not affect in whose hands the control will rest, the allocative component equals zero ($\Delta a = 0$). The shareholder wealth effect is therefore equivalent to the difference in surplus extraction capability between the two bidform; $\Delta V = \Delta s$.

Figure 2 illustrates the outcomes for all possible values of $y^I - y^R$, for any arbitrary value of the contestants' private benefits.[20] Due to the conspicuous symmetry of the case, we confine our analysis to the three regions in the positive segment of the horizontal axis. Since $y^I \geq y^R$, the incumbent wins in the entire segment. In region I ($y^I > y^R$ and $y^R + z > y^I$), the surplus extraction component as well as the entire wealth effect equals $\Delta s = \Delta V = - \frac{1}{2}\cdot(y^I - y^R)$, which is negative since by the definition of the region, $y^I > y^R$. Furthermore, in region II, ($y^I > y^R + z$. and $y^I < y^R + 2z$), the shareholder wealth effect is $\Delta V = \Delta s = \frac{1}{2}\cdot(y^I - y^R) - z$. By the definition of the interval we know that $y^R + 2\cdot z > y^I$ which implies a negative ΔV. Accordingly, also in this region are shareholders worse off if the MBR applies. In region III, the choice of bidform is irrelevant since the free rider option resolves the equilibrium price independently of bidform which implies that the surplus extraction effect is zero.

[20] In contradistinction to the previous case, we assume that the information about parameter values is asymmetrically distributed, i.e., the outside rival may challenge the incumbent team even if he eventually loses since he does not know beforehand how large the incumbents' private benefits are. We maintain this more realistic information presupposition for the rest of the paper.

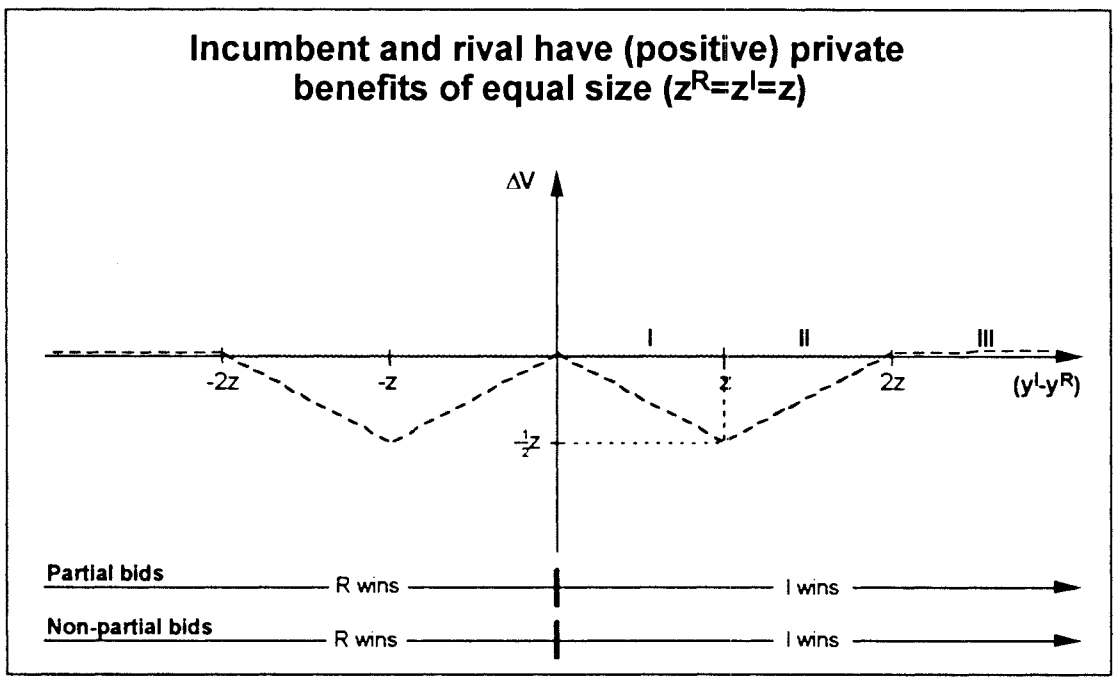

Figure 2: The figure shows the wealth effect, ΔV, as a function of the difference in security benefits (y^I-y^R). The shaded area represents *negative* wealth effects of a prohibition of partial bids and equals the surplus extraction component, Δs (since $\Delta a = 0$).

Why does enactment of the MBR cause a non-positive shareholder wealth effect for this special set of parameter values? A conjecture based on the fact that identical private benefits neutralize each other might have been that differences in security benefits become relatively more important, implying that non-partial bids by assigning relatively less weight to private benefits should be more favorable to the target shareholders than partial bids. But, as demonstrated, the opposite conclusion applies. The partial bidform, which distributes the highest possible relative weight to private benefits, is preferred by the shareowners since the competition between the two contestants is most fierce over such benefits where their willingness to pay is relatively most similar. Since private benefits are identical, it follows that partial bids extract more of the winner's surplus since this bidform makes the competition over private benefits more intense than non-partial ones. Accordingly, the result that implementation of the MBR is not in the shareholders' interest when private benefits are of identical size follows from an application of our general design rule: *The Relative Similarity of Willingness to Pay Rule*. Let us summarize the results of our analysis of this special case somewhat more formally.

RESULT 4: *If the two contestants in a future control contest have private benefits of identical size, the shareholder wealth effect (ΔV) of a prohibition of partial bids is non-positive; and negative if and only if $y^I - y^R$ is on the interval $-2 \cdot z < y^I - y^R < 2 \cdot z$;*

$y^I \neq y^R$. Furthermore, since the allocative component is zero, $\Delta a = 0$, the choice of bidform is exclusively a matter of surplus extraction: $\Delta V = \Delta s$.

RESULT 5: *Under the same conditions regarding private benefits as above, the target shareholders will never deliberately amend the corporate charter with the MBR; the best bidform from their perspective is the partial one. Moreover, the most efficient (in terms of security benefits) rival wins irrespective if partial bids are prohibited or not.*

Comparing the results of the two previous special cases, we infer that a sufficient condition for a non-negative shareholder wealth effect is one-sided private benefits while identical such benefits implies a non-positive influence on the post-takeover equity value of the target firm (Result 6). Accordingly, the size of the difference in private benefits is pivotal in determining if enactment of the MBR benefits the shareholders or not. In economic terms, the mechanism of competition explains this result. For the configuration in which only one contestant has significant private benefits, the non-partial bidform serves the interest of the shareholders best by making the competition most intense over security benefits. In the configuration where both have significant private benefits of equal size, the competitive pressure is most fierce over private benefits. Value-maximizing shareholders exploit this fact by allowing partial bids.

RESULT 6: *A sufficient (global) condition for a non-negative shareholder wealth effect of enactment of the MBR is one-sided private benefits while identical private benefits is sufficient (global) for a non-positive effect.*

For the two special cases above, to ask whether the shareholders should enact the MBR or not is tantamount to analyze if partial or non-partial bids utilize the competition over packages of security and private benefits between the two rivals most efficiently. In general, when analyzing the impact on the target shareholders' wealth of the MBR we, therefore, have to consider the trade-off between two counteracting economic forces or facets of competition at work in this model. It is worthwhile to keep this in mind when we turn to a less restrictive set of parameters.

THE GENERAL CONFIGURATION: BOTH CONTESTANTS HAVE SIGNIFICANT AND NON-IDENTICAL PRIVATE BENEFITS

If both contestants have sizable, positive, and non-identical private benefits, the effect on the target shareowners post-takeover wealth of enactment of the MBR can, depending on the parameter values, be either positive, negative or zero. To focus on the pertinent economic insights the detailed analysis of all subcases are relegated to Appendix B. We present the final result graphically in Figure 3 for all combinations of private and security benefits such that $2 \cdot z^I > z^R > z^I > 0$.[21] As before, we depict the shareholder wealth effect as a function of the difference in security benefits, $(y^I - y^R)$.

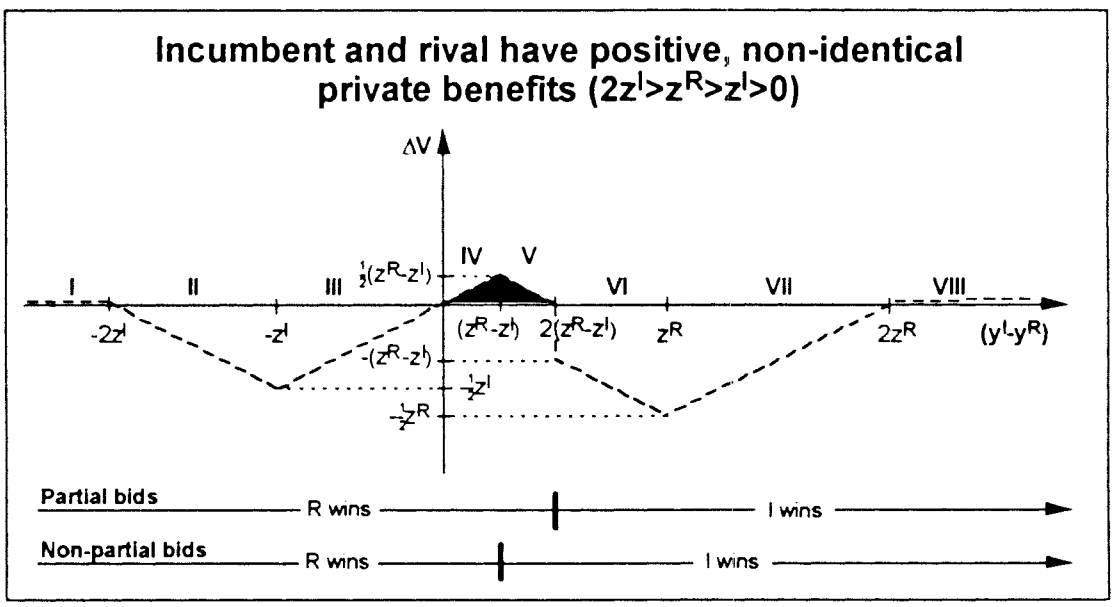

Figure 3: The figure shows the wealth effect, ΔV, as a function of difference in security benefits (y^I-y^R). The dark-shaded area represents *positive* wealth effects of a prohibition of partial bids, and the light-shaded areas represent *negative* wealth effects.

The most conspicuous characteristic is that the size of the positive effect of enactment of the MBR is relatively small compared to the negative effect, and that it is confined to a comparatively narrow interval of parameter values. In particular, unless the difference in private benefits, (z^R-z^I), is significant there is no positive shareholder wealth effect. In order to understand why, we discuss the regions with positive and negative effects successively, and in more intuitive economic terms.

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[21] When looking at the figure it is essential to remember that all distances regarding the private benefits are **proportional**, i.e. the figure presents the **exact relative sizes** of the negative and positive effects on shareholder wealth of implementation of the MBR for specific numbers on private benefits that satisfy the general inequalities stated above. In particular, it is easily verifiable that our two illustrative examples in Appendix A are located in regions V and VI respectively. Substitution of the parameter values in the definition of region V, $(z^R-z^I) < (y^I-y^R) < 2 \cdot (z^R-z^I)$, and VI, $2 \cdot (z^R-z^I) < (y^I-y^R) < z^R$, yields $100 < 150 < 200$ for example 1, and $200 < 300 < 400$ for example 2.

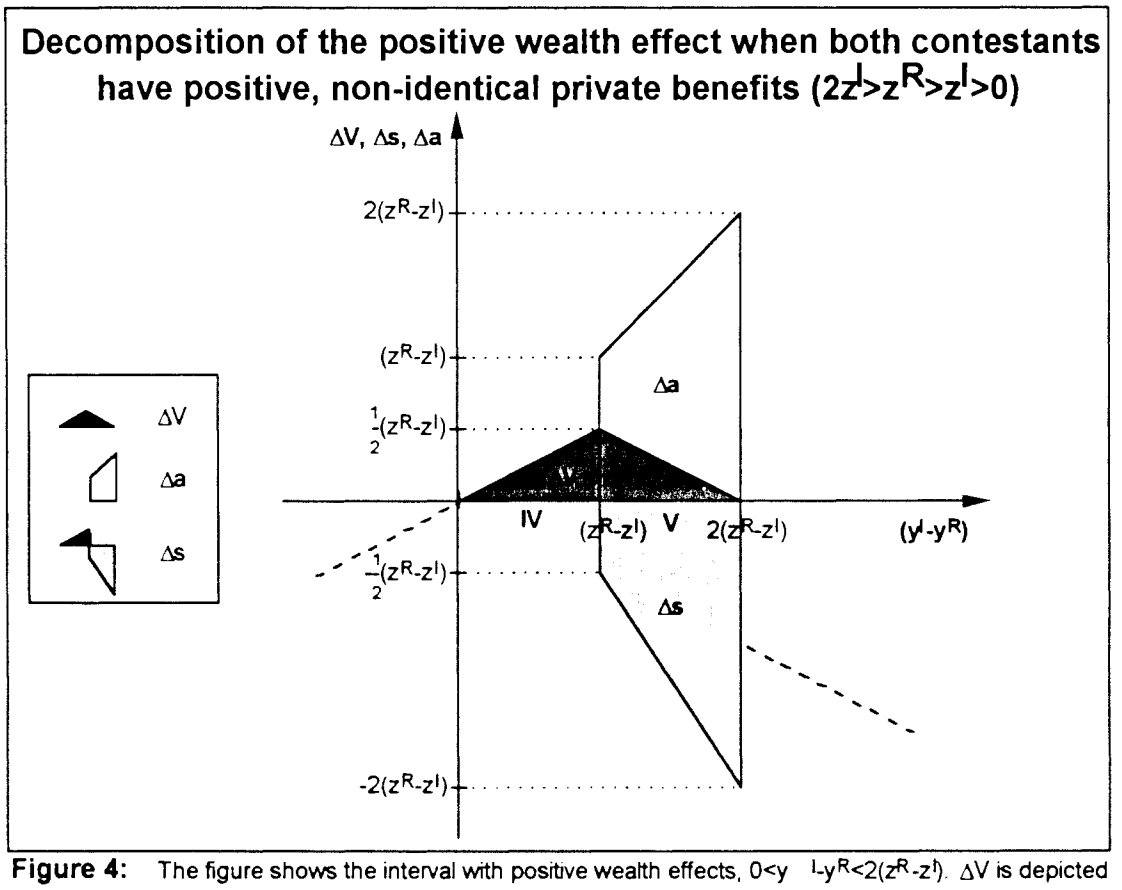

Figure 4: The figure shows the interval with positive wealth effects, $0<y^I-y^R<2(z^R-z^I)$. ΔV is depicted as a function of the difference in security benefits (y^I-y^R), as well as its decomposition into the surplus extraction component, Δs, and the allocative component Δa. In region IV, ΔV=Δs.

The positive shareholder wealth effect in regions IV and V is the generalization of Grossman-Hart's special case with one-sided private benefits to the two-sided realm. However, compared to our previous analysis of this particular case, we observe that the region where the MBR is beneficial becomes, ceteris paribus, smaller; it shrinks from the interval $(0, 2\cdot z^R)$ to the subinterval $(0, 2\cdot(z^R - z^I)$. In this sense, both the one share/one vote rule and the MBR becomes less attractive as encompassing policy proposals than might be inferred from the analysis of the special configuration with one-sided private benefits. As evident from the decomposition of the two regions with positive shareholder wealth effect in Figure 4, it is only in region V where the choice of bidform makes a difference in allocative terms, $\Delta a > 0$, and where the allocational gain from prohibiting partial bids outweighs the loss in surplus extraction: $\Delta a > |\Delta s|$. Expressed somewhat differently, there exists a trade-off between the two components of the shareholder wealth effect in this region, but facing the discrete choice whether to allow partial bids or not, the allocative component dominates over the surplus extraction component.

However, in region IV, the less efficient (in terms of security benefits) management team wins the takeover bidding contest irrespective of whether partial bids are allowed or not. Hence the adoption of the MBR does not prevent a less efficient management from seizing or retaining control. In particular, the shareholder wealth effect is positive and equals the surplus extraction component (the allocative one is zero), i.e. non-partial bids extract more of the winner's private benefits than partial ones. This may seem counter-intuitive using the general insight, stressed e.g. by Grossman-Hart(1988), that partial bids extract more of the bidder's private benefits than non-partial ones since they put a higher relative weight on private benefits. This is, however, not true if the winner of both bidding contests is the least efficient party. Then there exists an additional counteracting gain in surplus extraction potential since the winner has to pay at least the losing party's security benefits, the winner pays for the efficiency gap out of his private benefits. Since non-partial bids put relatively more weight on security benefits, this positive gain in surplus extraction is larger than for these bids than for partial ones. In fact, so large that this positive gain in surplus extraction capability surpasses the loss emanating from the loss caused by disallowing partial bids.[22] Accordingly, non-partial bids extract more of the winner's private benefits than partial bids when he wins either bidding contest but is less efficient.

Since this result is also valid for the special case with one-sided private benefits, it gives a different interpretation of the Grossman-Hart's analysis of the one share/one vote rule. Specifically, although the shareholder wealth effect in region IV, see Appendix B, is $\Delta V = \frac{1}{2}\cdot(y^I - y^R)$, and looks like an allocative effect (the difference in security benefits), it gauges the difference in surplus extraction potential between the two bidforms since the winner is the same for these configuration of parameter values. This implies, using their terminology, the allocative role is not uniformly dominant in one share/one vote (non-partial bids), and the surplus extraction role is not uniformly dominant in dual class shares (partial bids). Accordingly, even in the special case with one-sided private benefits, the trade off inherent in the choice of voting structure problem (whether to implement the MBR or not) can not simply be described in terms of the allocative and surplus extraction role.[23]

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[22] The shareholder wealth effect for region IV is $\Delta V = \Delta s = V(N) - V(P) = y^I + z^I - \frac{1}{2}\cdot(y^I + 2\cdot z^I - y^R) = \frac{1}{2}\cdot(y^I - y^R)$ which can be rewritten as $\frac{1}{2}\cdot[(y^I + z^I) - (y^I + 2\cdot z^I)] + \frac{1}{2}\cdot[(y^I + z^I) - y^R]$; see Appendix B. The first term gauges a loss in surplus extraction potential from a prohibition of partial bids while the second captures a gain since the rival is less efficient in terms of security benefit and the incumbent has positive private benefits. The latter terms dominates since the total shareholder wealth effect is positive for these parameter configurations.

[23] In region V, however, the Grossman-Hart charaterization is correct since the allocative role dominates the surplus extraction one. In particular, the surplus extraction component is $(\Delta s = (3/2)\cdot(y^I - y^R) + z^R - z^I)$ and the allocative one is $(\Delta a = y^I - y^R)$; $\Delta V \equiv \Delta s + \Delta a = \frac{1}{2}\cdot(y^I - y^R) + (z^R - z^I) > 0$.

The two regions of parameter values in Figure 3 that generate a negative shareholder wealth effect are characterized by the fact that (i) the same management team wins irrespective if partial bids are allowed or not, implying that $\Delta V = \Delta s$ since the allocative component is zero $\Delta a = 0$, and that (ii) the victorious team is also the most efficient one in terms of security benefits.[24] The latter condition implies that the winner does not have to use part of his private benefits to cover a gap in efficiency relative his opponent. Unlike the situation in region IV, non-partial bids do not extract enough private benefits from the winner to counteract the generic loss associated with a prohibition of partial bids. Consequently, the shareholders gain if they do not amend the corporate charter with the MBR.[25]

Further intuition behind the outcomes is provided by *The Relative Similarity of Willingness to Pay Rule*. For the decision whether to adopt the MBR or not, it constitutes, by analogy, the generalization of Grossman-Hart's specific analysis of the security voting structure problem to the more prevalent configuration with two-sided private benefits. In particular, the Rule is operationalized since it informs us precisely when a prohibition of partial bids (accept only one share/one vote structures) is in the actual interest of the target shareholders, and dually when it is not. The discrete choice problem whether to allow or ban partial bids is regarded as a question of designing a package of security and private benefits that extracts as much total value from the winner as possible. This amounts to a selection of weights- either equal or differential- on the private and security benefits. In particular, allowing partial bids means a double weight on private benefits, and non-partial bids amounts to equal weights on both types of benefits. Moreover, instead of using the specific concepts of surplus extraction and allocative components, the Rule is predicated on the much more fundamental economic concept of competition. Appendix C reports the formal derivation of the Rule.

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[24] A difference between the two areas with negative shareholder wealth effect is that in regions II and III the winner is superior both in terms of security and private benefits, while in regions VI and VII his only comparative advantage is in generation of security benefits. Using the notation of Aghion & Bolton(1992), the parameter configurations are comonotonic in the first situation but not comonotonic in the second.

[25] The particular shape of the negative wealth effect stems from the fact that in regions II and VII, only partial tender offer prices are set by competition while non-partial ones are determined by free riding. However, in regions III and VI competition settles the resulting prices under both bidforms, and this accounts for the fact that the shareholder wealth effect becomes less negative.

Proposition 1:

THE RELATIVE SIMILARITY OF WILLINGNESS TO PAY RULE

Assume that the selection of bidform is relevant, i.e. affects the shareowners' post-contest wealth.[26] *If the founder(regulator) of a corporation faces a choice between allowing(not enacting) or not allowing(enacting) partial bids (the MBR) in future control contests, and his objective is to maximize the shareholders' post-takeover wealth, the following decision rule is instrumental.*

Adopt The MBR if and only if

$$0 < (y^I - y^R) < 2 \cdot (z^R - z^I) \text{ or } 0 < (y^R - y^I) < 2 \cdot (z^I - z^R).$$

An alternative formulation of The Relative Similarity in Willingness to Pay Rule uses the terminology of allocative and surplus extraction components.

Proposition 1':

Adopt the Mandatory Bid Rule if either (i) the surplus extraction component (Δs) is positive or (ii) the allocative component (Δa) is positive.

The simple but very suggestive intuition supporting this general design rule is that the shareholders extract most value when the two competitors fight over packages of two rights or benefits for which their willingness to pay is relatively most similar, i.e. by making the competition as fierce as possible the target shareholders gain most. The inequalities formalize this intuition. (i) If the positive difference in security benefits between the two contestants, e.g. $(y^I - y^R)$, is smaller than twice the reversed positive discrepancy in private benefits, $2 \cdot (z^R - z^I)$, their willingness to pay is relatively more equal for security benefits than for private ones. If this applies, choose the non-partial bidform, i.e. amend the corporate charter with the MBR, since it assigns as low relative weight as possible to private benefits, and, ipso facto, as relatively high as feasible to security benefits. (ii) If the inequalities are violated the two parties have relative more similar willingness to pay for private benefits than for security benefits. The partial bidform should be selected in this situation because it consigns as much relative significance on private benefits as possible. Accordingly, the discrete choice of bidform problem is tantamount to design of a package with equal or different weights on security and private benefits that makes the competition between the two contestants as intensive as possible by exploiting their relative similarity in willingness to pay for the two rights or products.

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[26] This is the case if and only if the free rider mechanism does not determine the resulting tender offer price irrespective if partial bids are allowed or not.

The Relative Similarity in Willingness to Pay Rule provides the economic intuition behind the outcome reported for the general case with two-sided private benefits in Figure 3. Enactment of the MBR is in the target shareholders' interest if and only if their relative similarity in willingness to pay is greater for security benefits than for private benefits; if not, they never gain from such an act. Moreover, it is easily verifiable that it is valid also for the special case with one-sided private benefits. Our previous analysis of this case demonstrated that the effect of the MBR on shareholder wealth is positive for all parameters satisfying $0 < (y^I - y^R) < 2 \cdot z^R$. But this is precisely what our design rule states when private benefits are one-sided ($z^I = 0$). Moreover, it is immediate that the second special case with identical private benefits and non-positive shareholder wealth effects is consistent with the design principle. Accordingly, the outcomes in the two special cases are the result of the simple but general economic principle of competition.

Furthermore, we claim that The Relative Similarity in Willingness to Pay Rule also applies more generally to discrete design problems that utilize the competitive pressure within the Grossman-Hart modelling framework of security and private benefits. Appropriately modified, a corresponding (generic) rule is operational, for example, when to decide whether to select a one share/one vote security voting structure or a specific dual-class alternative as in the general version of Grossman-Hart's problem with two-sided private benefits or whether to retain all shares or go public with half of them as in Zingales (1991). Although the latter model uses a bargaining mechanism instead of an auction mechanism, the results are qualitatively very similar to the ones reported in this paper; see Högfeldt(1993a) for analytical details. For example, if the discrete choice is between retaining all shares or only fifty percent, the Rule provides the correct answer: retain all shares if and only if the parameter restrictions above apply.[27] Accordingly, due to the economic canon of competition the basic mechanism at work in these disparate problems have a much more unified structure than is immediately apparent.

As a bridge to the discussion of the MBR proposal in The 13th Takeover Directive of the EC, we partially summarize the general policy implications of the formal analysis in this section.

RESULT 7: *If both the rival and the incumbent have significant private benefits, we can always find parameter values for the two contestants' security and private benefits such that the effect of a prohibition of partial bids on shareholder wealth is negative. Specifically, the impact on the post-takeover wealth of the target*

[27] This assumes implicitly that the two parties have equal bargaining strength. Furthermore, adjustment also occurs because Zingales assumes full information.

shareowners is non-positive if the two contestants are expected to have private benefits of equal size. Accordingly, enactment of the MBR is not generally in the interest of the target shareholders.

RESULT 8: *The Right To Sell Provision eliminates the forced loss on the sale of retained shares if and only if it has a positive effect on the target shareholders post-takeover wealth. Hence, as a motive behind the Provision, elimination of this loss is not general enough.*

4. The optimal bidform

THE AIM OF THE PREVIOUS sections was to study the wealth effects of imposing a specific regulatory device, the Mandatory Bid Rule. As a consequence of this objective, the selection of bidform problem was analyzed as a binary choice between two polarities -- the prohibition of partial bids versus imposing no restrictions on the use of partial bids. However, in principle, there is no reason why the choice of bidform should be confined to a discrete choice between two extremes. It may be the case that the optimal fraction that a potential bidder should be required to offer to purchase is neither 100%, nor the threshold for gaining control (here assumed to be 50%, as defined by the simple majority rule operational in most corporations), but rather something in-between. Formally, this more general maximization problem can be stated as follows.

$$\underset{\phi\in[1/2,\,1]}{\text{Max}}\ V(\phi;\, y^I, y^R, z^I, z^R) = \phi\cdot p(\phi) + (1-\phi)\cdot y^W = \phi\cdot(p(\phi) - y^W) + y^W$$

$$\text{where } p(\phi) = \text{Max}\,[y^L + z^L/\phi,\ y^W],\ \text{and}$$

$$\{W, L\in\{I, R\},\ W\neq L \mid y^W + z^W/\phi > y^L + z^L/\phi;\ \phi\in[½, 1];\}$$

The post-takeover value of the firm (V) is a weighted average of the equilibrium tender offer price for a unit of the sold shares (p) and the value of a unit of the retained shares under the winner's management (y^W), where the weights are given by the sold fraction, ϕ, and the retained fraction, $(1-\phi)$. The maximization problem seems complicated by the fact that the choice of an optimal ϕ simultaneously determines the price ($p = y^W$ or $p = y^L + z^L/\phi$), and the identity of the winner (W) and the loser (L). Fortunately, for most configurations of parameters y^R, y^I, z^R and z^I, the identity of the winner in the control contest is independent of ϕ, in which case W and L can be

regarded as given. Specifically, the identity of the winner in the control contest will be dependent on ϕ if and only if $\frac{1}{2} < \left(z^I - z^R\right)/\left(y^R - y^I\right) < 1$.[28]

Similarly, given W and L, there will exist combinations of y^W, y^L and z^L for which the price mechanism is also independent ϕ. In particular, if the winner generates sufficiently large security benefits, the free rider mechanism is instrumental regardless of ϕ, implying that the shareholder wealth is simply y^W, rendering the choice of ϕ irrelevant to shareholder wealth. Specifically, this will be the case when $y^W > y^L + 2z^L$.

For all other configurations of y^W, y^L and z^L, the *competitive mechanism* will provide the *relevant price function* in the shareholders' maximization problem. Hence, if the combinations of parameter values are such that W and L are given, and the free-rider mechanism does not automatically determine the bid price, the shareholders' maximization problem is simplified to one where $p(\phi) = y^L + z^L/\phi$ or

$$\max_{\phi \in [1/2,\, 1]} V(\phi; y^W, y^L, z^L) = \phi\cdot(p(\phi) - y^W) + y^W = \phi\cdot(y^L - y^W) + z^L + y^W.$$

The term $\phi\cdot(p(\phi) - y^W) = \phi\cdot(y^L - y^W) + z^L$ represents the shareholders' surplus extraction, $s(\phi)$, and y^W is the allocative component of the shareholders' wealth.[29] It is clear that the shareholders' wealth is maximized by maximizing their surplus extraction. If the winner is superior in terms security benefits ($y^W > y^L$), the shareholders' surplus extraction (or conversely, the winner's capital loss) is maximized if ϕ is set as low as possible ($\phi = \frac{1}{2}$). Conversely, if the winner is inferior ($y^W < y^L$), it is optimal to set ϕ as high as possible ($\phi = 1$). Hence, when W and L are given, the maximization problem is solely a matter of extracting as much surplus as possible from the winner.

However, when the winner can be affected by the choice of ϕ (for parameter values such that $\frac{1}{2} < \left(z^I - z^R\right)/\left(y^R - y^I\right) \equiv \left(z^R - z^I\right)/\left(y^I - y^R\right) < 1$) the maximization problem involves an allocative dimension. In this case, it is easily inferred that the

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[28] The choice of ϕ is pivotal in determining the outcome of the control contest if for some value ϕ°, constrained to the interval [½, 1], the two contestants' willingness to pay can be mimicked to be exactly identical. That is, if $\exists\ \phi^\circ \in [\frac{1}{2}, 1]$ such that $y^I + z^I/\phi^\circ = y^R + z^R/\phi^\circ$. By solving for ϕ° in the equation, an equivalent statement is that there is a ϕ° such that $\frac{1}{2} < \phi^\circ = (z^I - z^R)/(y^R - y^I) < 1$.

[29] The winner's profit from a successful bid is $\pi(\phi) = \phi(y^W - p) + z^W$, where $\phi(y^W - p)$ represents the winner's capital loss (financed by his private benefits, z^W) from a successful bid. Because $p \geq y^W$, the winner's maximum profit (surplus) is z^W. As before, the shareholders' surplus extraction is the difference between the maximum possible surplus and the winner's actual gain. We define the shareholders' surplus extraction as $s(\phi) = z^W - \pi(\phi) = -\phi(y^W - p)$, i.e., the shareholders' corresponding gain from the winner's capital loss. It follows that maximization of the surplus extraction is equivalent to maximizing the absolute value of the winner's capital loss. When the competitive price mechanism is instrumental, it follows that the winner's potential profit is $\pi(\phi) = \phi(y^W - y^L) - z^L + z^W$, and, consequently, the shareholders' surplus extraction becomes $s(\phi) = \phi(y^L - y^W) + z^L$.

specific choice is between a high security benefit/low private benefit party and a high private benefit/low security benefit party.[30] The outcome of the control contest is flipped over in favor of the high security benefit/low private benefit party by setting ϕ above the pivotal point, $\phi^O = (z^R - z^I)/(y^I - y^R) < \phi \leq 1$, because an increase in ϕ reduces the weight on private benefits in the willingness to pay, making security benefits relatively more important (See the analysis in Section 3). Conversely, the low security benefit/high private benefit party is chosen by setting ϕ below the pivotal point: $½ \leq \phi < (z^R - z^I)/(y^I - y^R) = \phi^O$.

From the analysis of the case where the identity of the winner does not depend on the choice of ϕ, we know that shareholder wealth is maximized by setting ϕ as low as possible if the winner is superior in terms of security benefits and as high as possible if the opposite is true. This means that if we do choose the high security benefit party, it is optimal to set ϕ above the pivotal point but as close to it as possible, because this will maximize the extraction of the winner's surplus. That is, set $\phi = (z^R - z^I)/(y^I - y^R) + \varepsilon$, where ε is some small positive number. Conversely, if we choose the low security benefit party, it is optimal to set ϕ slightly below the pivotal point; $\phi = (z^R - z^I)/(y^I - y^R) - \varepsilon$ (interpreting ε as the same number in both cases). Hence, irrespective of which team we choose, an "intermediate" bid form will be optimal ($½ < \phi < 1$).

If the choice of bidform also influences who wins the takeover contest, we have a trade-off between the allocative advantage from choosing the high security benefit party and the corresponding advantage in surplus extraction from choosing the high private benefit party. However, the allocative gain from choosing the high security benefit party exceeds the gain in surplus extraction from choosing the high benefit party. In fact, any ϕ that implements the more efficient team is preferable to the best possible ϕ that implements the low security benefit party. In this sense, requiring non-partial bids ($\phi = 1$) is a reasonable approximation of the optimal solution, $\phi = (z^R - z^I)/(y^I - y^R) + \varepsilon$, because it ensures that the most efficient management team wins.

Why is the allocational gain most important for this set of parameter values? From the upper inequality in the definition of the interval where the choice of bidform is pivotal, we deduce, using the fact that the signs of the terms in the ratio must be the same, two inequalities: either $(y^I - y^R) > (z^R - z^I) > 0$ or $(y^R - y^I) > (z^I - z^R) > 0$. In the

[30] The ratio between $z^R - z^I$ and $y^I - y^R$ is confined to a positive segment. This implies that $z^I - z^R$ and $y^R - y^I$ must be of the same sign: either $z^R > z^I$ *and* $y^R < y^I$, or $z^R < z^I$ *and* $y^R > y^I$.

first case, the incumbent is the more efficient management, and the inequalities can be rewritten as $(y^I + z^I) > (y^R + z^R)$; the reverse ranking occurs in the second case. Since the sum of a contestant's security benefits and private benefits is the maximum value the target shareholders can obtain from the bidding contest, and this is possible by a suitable choice of bidform (ϕ) in this region of parameter values, it follows immediately that the best choice of bidform is the one that (i) guarantees that the most efficient party wins, and, at the same time, (ii) extracts as much surplus as possible from him. Since a selection of a ϕ just above the threshold level (ϕ^O) warrants that the most efficient team gets control, and, ipso facto, extracting as much value as possible from the winner, it is the best choice.

Proposition 2 formally summarizes this reasoning.

Proposition 2:

Suppose the two contestants have positive private benefits.

(a) If $\frac{z^R - z^I}{y^I - y^R} \notin (0, \frac{1}{2})$, *i.e., the identity of the winner/loser of the control contest is independent of* ϕ *(W and L are given), then*

(i) the choice of ϕ *is irrelevant to shareholder wealth if and only if* $y^W > y^L + 2z^L$ *(i.e., if and only if the free rider mechanism determines the bid price regardless of* ϕ*),*

(ii) the optimal choice of $\phi = \frac{1}{2}$ *if and only if* $y^L < y^W < y^L + 2z^L$
(it is optimal to allow partial bids without restrictions if and only if the free rider mechanism does not automatically determine the bid price and the winner is superior in terms of security benefits),

(iii) the optimal choice of $\phi = 1$ *if and only if* $y^W < y^L < y^L + 2z^L$
(it is optimal to allow only non-partial bids if and only if the free rider mechanism does not automatically determine the bid price and the winner is inferior in terms of security benefits).

(b) If $\frac{z^R - z^I}{y^I - y^R} \in (0, \frac{1}{2})$, *i.e., the choice of* ϕ *is pivotal in determining the winner/loser (W and L) of the control contest, any* ϕ *that installs the party with the highest security*

benefits is better than one that installs a less efficient party. Specifically, it is optimal to set ϕ higher than the pivotal point $\frac{z^R - z^I}{y^I - y^R}$ *but as close to it as possible.*

These general results can be translated in terms of our graphical example with double-sided non-identical private benefits. Consider Figure 5, where it is assumed that $2z^I > z^R > z^I > 0$. The only interval of $(y^I - y^R)$ where the winner/loser of the control contest are not exogenously given by the parameter values, is region V.

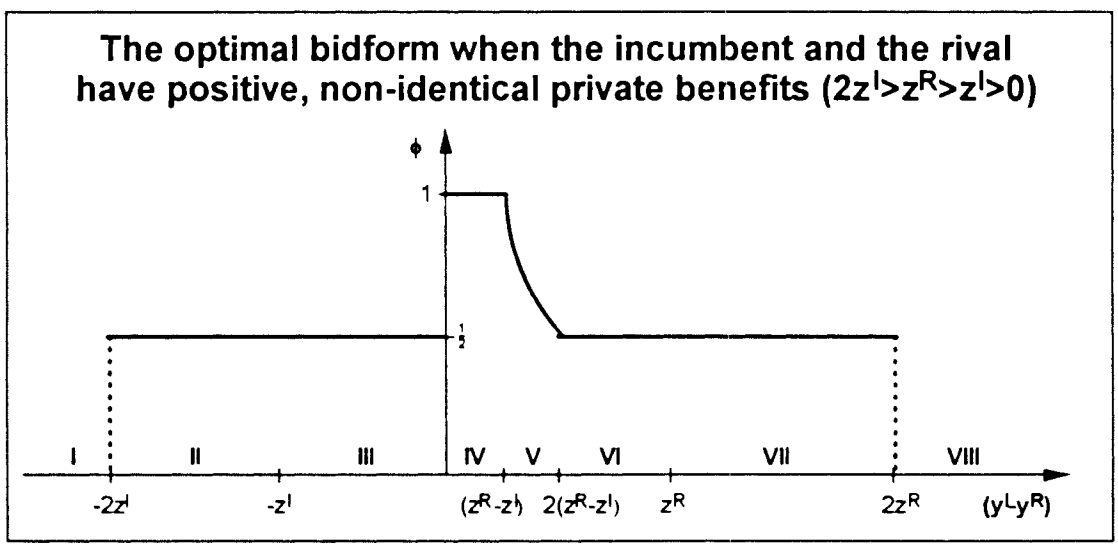

Figure 5: $0.5 \leq \phi \leq 1$ is a measure of bidform. $\phi=1$ is a non-partial bid for all shares; $\phi=0.5$ denotes a partial bid for half of the equity; and values in between are partial bids for a percentage between 50% and 100% of the outstanding shares. $1/\phi$ is the weight on private benefits in the bidform. In the two other regions (I and VIII), the choice of bidform is irrelevant.

Specifically, in region I and VIII, we have that $y^W > y^L + 2z^L$, implying that the choice of ϕ is irrelevant to shareholder wealth. It is clear that this is the case because the winner in both of these regions is so superior that the free rider mechanism will determine the bid price regardless of ϕ.

In regions II, III, VI and VIII, we have that $y^L < y^W < y^L + 2z^L$, or equivalently, the free rider mechanism does not automatically determine the bid price and the winner is superior in terms of security benefits. Most surplus is extracted through the competitive mechanism by setting ϕ as low as possible ($\phi = ½$).

In region IV, $y^W < y^L$, which implies that the competitive mechanism determines the bid price regardless of ϕ and that the winner is inferior in terms of security benefits. The most surplus is extracted by setting ϕ as high as possible ($\phi = 1$).

In region V, there exists a choice of winner. The most surplus is extracted by choosing ϕ so that the contestants' willingness to pay are as similar as possible, but still

allows the control contest to flip over in favor of the allocatively most superior party. This is achieved by setting ϕ just slightly above the pivotal point $(z^R - z^I)/(y^I - y^R)$ which lies strictly between ½ and 1 in this region, explaining the convex shape of the curve.

The most conspicuous feature of the optimal solution is its similarity to the discrete choice solution. The two extreme bidforms-- partial bids for no more than the control threshold and non-partial bids for all outstanding shares-- dominate for a large set of parameters, while intermediate bid forms are optimal only for a comparatively small subset of parameter values. In addition, any value of ϕ above the optimal curve in region V will be preferable to any value below it. In this sense, the discrete choice problem can serve as a reasonable approximation of the more general problem. Notably it is in the shareholders' interest to promote efficiency when they have choice. This would suggest that any general policy directive or law forcing them to do so is uncalled for. Accordingly, the basic economic intuition that non-partial bids are optimal when the contestants have relatively more similar willingness to pay over security benefits, and that partial bids are optimal when this applies to private benefits, epitomize the pertinent economic content of Proposition 2.

The general analysis is easily adapted to the two special cases with one-sided private benefits and with two-sided identical private benefits. As was evident from the discrete analysis, when two contestants have identical and positive private benefits, the winner of the control contest is, independently of ϕ, the most efficient one in terms of security benefits. Imposing these restrictions on the results of Proposition 2 by letting $z^I = z^R = z$, we get the following corollary.

Corollary 1:

If the two contestants have identical private benefits, $z > 0$, then

(i) the choice of ϕ is irrelevant to shareholder wealth if and only if $y^W > y^L + 2z$, and

(ii) the optimal choice of $\phi = ½$ otherwise.

The intuition behind these results should be clear from the previous analysis. An implication of Corollary 1 is of course that imposing no restrictions on the use of partial bids is the globally best decision rule if $z^I = z^R = z$.

When private benefits are strictly one-sided, we cannot improve shareholder wealth by deviating from the non-partial bid form, despite the fact that the outcome of the control contest can be affected by the choice of ϕ for some configurations of parameter values. Specifically, we get the following formal results.

Corollary 2:

Suppose private benefits are strictly one-sided. Let b denote the contestant with positive private benefits and let b' denote the bidder with zero private benefits; b, b' ∈ {I, R}, b≠b'.

(i) The choice of ϕ is irrelevant to shareholder wealth if and only if $y^{b'} > y^b + 2 \cdot z^b$ or $y^{b'} < y^b$. (Or equivalently, the choice of bid form is irrelevant if and only if the free-rider mechanism determines the bid price regardless of ϕ)

(ii) The optimal choice of $\phi = 1$ if and only if $y^b < y^{b'} < y^b + z^b$.

(Or equivalently, non-partial bids are optimal if and only if a less efficient party wins regardless of ϕ)

(iii) If $y^b + z^b < y^{b'} < y^b + 2 \cdot z^b$, i.e., the choice of ϕ is pivotal in determining the winner/loser of the control contest, then the optimal bid form is any ϕ such that

$$\frac{z^b}{y^{b'} - y^b} < \phi \leq 1.$$

The results (i) and (ii) of Corollary 2 should be intuitive in light of the previous analysis. However, result (iii) will need some additional explaining. In accordance with the analysis of the double-sided non-identical private benefits, the outcome of the control contest can be affected by the choice of ϕ if and only if $\frac{1}{2} < z^b/(y^{b'} - y^b) < 1$, where the specific choice is between a high security benefit party with no private benefits and a low security benefit party with significant private benefits. By the same arguments as in the general case, it is optimal to choose the high security benefit party as the winner. The high security benefit party is implemented by setting ϕ higher than the pivotal point $z^b/(y^{b'} - y^b)$. But because the high security benefit party does not have any private benefits, this point is also pivotal for the price mechanism. In particular, by setting $\phi > z^b/(y^{b'} - y^b)$, also means that the free rider mechanism immediately becomes instrumental: $p = y^{b'} > y^b + z^b/\phi$. This implies that the shareholders will receive the same ex post wealth for any ϕ implementing the high security benefit party; $V = y^{b'}$. This result clearly differs from the general case where the choice of the high security benefit party does not imply that the free rider mechanism becomes instrumental. Instead, the shareholders can improve the competition between the two contestants and increase surplus extraction by setting ϕ just slightly above the pivotal point. The general implication of Corollary 2 is that, given that private benefits are strictly one-sided, the globally best decision rule is to set $\phi = 1$.

Conjecturing what the optimal feasible bidform might be if the shareholders are forced to select only one value of ϕ that is valid for all parameter values, i.e. eliminate

the possibility of contingent choices implicit in the previous results, the last two results are a suitable starting point. If both of these special parameter cases occur with zero or very low probability, it is evident that the best feasible ϕ is an intermediary value where the specifics of the probability distributions of the parameters determine the exact value. However, in the present case with atomistic ownership structure, one might argue that it is not unrealistic to assume that ϕ lies somewhere between 0.5 and 0.75. In particular, since the founder of the firm has relinquished all control, both future contestants are outsiders. Hence, it is not unreasonable to conjecture that they would enjoy private benefits of control of roughly the same size, which implies a selection of a ϕ closer to 0.5. Moreover, as was evident from Figure 4, the positive gain from implementation of the MBR was confined to a relatively narrow interval of parameter values depending on the difference between private benefits, and it seemed small in comparison to the losses by disallowing partial bids. Jointly, these arguments supports the conjecture that the best single selection of ϕ is closer to 0.5 than 1.

A rigorous argument must, however, also incorporate the fact that a more efficient extraction of the winners surplus if a takeover contest actually occurs, makes it less profitable for potential contestants to go through with such an endeavor, implying that it becomes less likely. Accordingly, when facing the full ex ante decision of selecting the optimal bidform, the shareholders also have to consider the trade-off between a higher takeover premium if a bidding contest actually occurs and the lower probability of it happening, see Högfeldt(1993a) for such an ex ante analysis of the MBR when control is eiher transferred or established. However, we leave the full ex ante analysis out of this paper and conclude by a discussion of the policy implications of the 13th Directive using our previous results.

5. Discussion

WHAT IMPLICATIONS FROM the previous formal analysis are valid when we view The Mandatory Bid Rule from the policy perspective of The Thirteenth Takeover Council Directive of the EC Commission? The overall aims of the EC proposal are twofold: (i) to create more effective corporate structures in Europe, and (ii) to protect the interests of the small shareowners. The potential conflict between these two allocational and distributive objectives are brought forward by our analysis. For example, while enactment of the MBR sometimes promotes efficiency in terms of higher security benefits, it is generally not in the interest of the target shareholders since their post-takeover wealth may, ceteris paribus, be higher without a ban on partial bids. In particular, if the private benefits of the rivals for control are assumed to be roughly of

equal size, it becomes very likely that enactment of the MBR does not benefit the target shareholders.

Our analysis of the MBR also illustrates the Policymaker's Dilemma: no single and comprehensive rule like the MBR is the best choice for all corporations and all potential takeover situations. Consequently, the interests of shareholders in a widely held company is better served if the legislators do not regulate the choice of bidform through the MBR but leave it as a discretionary choice to the equityowners in each corporation. In its quest for unifying rules, the EC Commission seems to have ignored this inherent dilemma of regulation.

The previous analysis presupposed perfect capital markets. In imperfect markets, the MBR may substantially increase the acquiring costs for a potential bidder by de facto raising the control limit to 100%, and thereby causing fewer takeover attempts. In particular, the increased cost in the form of higher interest expense and greater exposure to risk can make it unprofitable for a bidder who has already identified improvements in efficiency to acquire control, replace the management and change the production plan. A MBR can also prevent someone from acquiring a substantial position in order to learn more about the company and its development potential before going all the way and acquiring control. Furthermore, the MBR affects the incentives for anyone outside the companies existing circle of owners from incurring costs for identifying suitable takeover candidates since the cost of a control acquisition increases.

The value of a controlling block can also be large when two companies make investments directly linked to a joint project. If the control limit is raised, and thereby the cost of control, there is a greater risk that the two companies will not invest enough in relation-specific capital and that potential joint profits will be reduced, see Grossman-Hart (1986). On the whole, the enactment of a MBR may result in fewer productivity raising acquisitions. It is no coincidence that several US corporate managements have proposed that the MBR should be introduced into their articles of incorporation. The principle serves as a defence against hostile takeovers, it checks rather than stimulates acquisitions.[31] Accordingly, these more practical arguments supports the already critical stance against the MBR that was the result of the theoretical analysis. Specifically, a general enactment of it within the EC may generate fewer efficiency raising takeovers and it is also not generally in the best interest of the shareholders, i.e. such a measure is likely to be inconsistent with the two explicit objectives of The Thirteenth Council Directive.

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[31] The second wave of takeover status in US include redemption rights that give shareholders cash redemption right against any buyer of at least 30 percent of the firms stock. Only three states adopted the redemption rights provision, see Karpoff-Malatesta(1989).

With respect to another cornerstone of the Directive, the Equal Bid Principle (EBP), much the same conclusion applies. In a formal analysis, we have shown that it tends towards a direction opposite to the declared goal of stimulating acquisitions and transformation of corporate structures in Europe, see Högfeldt (1993b). By requiring the acquirer to extend the same tender offer price to all shareowners, the effects of EBP is to reduce a potential bidders advantage and to raise the price offered to the small shareholders. However, by the same token the incentive for the acquiring firm to make a bid is weakened. If this effect is strong enough, which is not unlikely, the target shareholders as a group may very well become less wealthy ex ante as a result of implementation of the ETP. Thus, not only does the ETP impede on the allocative goal of supporting the transformation of the European industrial structure but the shareholders may ultimately lose.

Besides the two general principles of Equal and Mandatory bid, the EC Commission's Takeover Directive contains a set of rules governing disclosure of substantial acquisition of shares and detailed prospectus requirement together with a minimum acceptance period. The underlying idea of these disclosure obligations is that the bidder can unduly utilize his information advantage. The information requirements are intended to create a safeguard for target shareholders.

Our view is that also these rules concerning equal access to information, make it less profitable to identify takeover candidates and look for improvements in efficiency. Economic analysis, see e.g. Shleifer-Vishny (1986), indicates that the incentives to accumulate shares before the bid is made are large, since a major part of the acquirer's profit consists of the capital gain on the position before the bid. The bidder would prefer to buy anonymously since he would then make a greater capital gain. The rules governing disclosure of substantial share acquisitions make it more costly to accumulate shares before the bid. Acquisitions of corporate control therefore becomes less profitable and the incentives to seek improvements in efficiency declines, which afflict the shareholders in the prospective target company.

The same type of reasoning also holds for the requirement of an obligation to provide a detailed prospectus and a period of acceptance. These requirements not only give the target company's shareholders information and time to arrive at a decision in respect to the offer, but also provide potential competing bidders free information and time to examine the target company. This impairs the private economic value of the information, and ,thereby, the incentives to produce it. Stringent information requirement can therefore imply that fewer players in the market will search for inefficiently run companies, seek more efficient production plans or identify synergy gains.

Empirical analysis of US data show that bid premiums rose and bidder returns declined significantly after similar rules (William's Act 1968) were introduced in US, see e.g. Bradley, Desai and Kim (1988). Competition for the target company quite simply pushed up the premium. The proponents of the rules were not slow to pointing out that the rules benefited the target company's shareholders. However, if the bidders profit decreases, his incentives to identify target companies is lessened. This is a disadvantage for the small shareholders since the likelihood of a bid, and thereby a bid premium is reduced.

Our overall conclusion of this policy discussion of the Thirteenth Council Directive of the EC Commission is that implementation of the MBR as well as the set of rules governing equal access to information impede a continuous change of the European industrial structure. Thus, the Takeover Directive is contrary to the declared purpose of transforming the corporate structures in Europe. Furthermore, the effects of the measures may also the diametrically opposed to the explicit goal of protecting the interest of the shareholders, especially the small ones. Accordingly, the objectives and the measures to achieve them are not properly aligned; as a policy package the Directive is inconsistent. This illustrates the old truth that reforms having the virtue of being motivated by good and well-meaning intentions are not seldom the worst enemy of what is actually the best solution.

6. Conclusions

THIS PAPER HAS MADE two major contributions. First, the formal analysis of if and when a general enactment of the Mandatory Bid Rule in Europe is really in the interest of the shareholders, remedies a gap in the theoretical literature on takeover regulation. By clearly demonstrating that it is only under quite restrictive presuppositions that the target shareowners actually gain ex post from implementation of the rule, it exposes the unclear and insufficient motivation behind the rule. In particular, it is not a free option which needs no serious motivation from the regulators. Second, the theoretical contribution of the paper is the generalization of the Grossman-Hart analysis to the prevalent situation with two-sided private benefits. The Relative Similarity of Willingness to Pay Rule gives the precise but intuitively simple answer to when enactment of the MBR is really in the interest of the shareholders. The basic insight is perhaps that the design of packages of rights or benefits does not differ qualitatively from the standard blueprint of economic analysis: in order to extract as much as possible from two competitors, select the solution that utilizes the competitive pressure as efficiently as possible.

APPENDIX A

Two Illustrative Examples

IN ORDER TO GENERATE a better understanding of how the implementation of the MBR affects the shareholder's wealth, we consider two examples that illustrate the total wealth effect as well as its decomposition into the surplus extraction and the allocative component.

Example 1

Assume we observe the following configuration of benefits in a future takeover situation.

	RIVAL (R)	INCUMBENT (I)
SECURITY BENEFITS (y)	1 000	1 150
PRIVATE BENEFITS (z)	400	300

The characteristic feature of the example is that the incumbent is a better management team than the rival one but enjoys less private benefits if in control.

Partial Bids

If partial bids apply the rival gets control (W(P) = R) because his maximum willingness to pay, $y^R + 2 \cdot z^R = 1\ 800$ exceeds the incumbents of $y^I + 2 \cdot z^I = 1750$. Hence, if partial bids are allowed, the outside rival wins despite being a less efficient manager in terms of security benefits than the incumbent team. This occurs because he has relatively higher private benefits than the residing team and since partial bids assign the weight two on such benefits in a control contest. The actual tender offer price he extends is the lowest possible one that matches the incumbents maximum assessment of control., i.e. p(P) = 1750. All shareholders tender at this price since it surpasses the value of a retained share under the new management which equals the rival's security benefit or 1 000. The Rival pockets a takeover gain of $\pi(P) = \frac{1}{2}\,[y^{W(P)} - p(P)] + z^{W(p)} = 25$ while the target shareholders extract $s(P) = \frac{1}{2} \cdot [p(P) - y^{W(P)}] = 375$ out of his maximum profit of $z^R = 400$. The total value of the company equals $V(P) \equiv \frac{1}{2} \cdot [p(P) + y^{W(P)}] = 1\ 375$.

Non-Partial Bid

If the partial bidform is banned, the incumbent defeats the rival because his willingness to pay ($y^I + z^I > y^R + z^R = 1\ 450$) now surpasses the rival's; $y^R + z^R = 1400$. Hence, compared to the partial bidform, there is a reversal of winner (W(N) = I). Consequently, the tender offer price equals p(N) = 1 400, and all shareowners tender their claims since the price exceeds its value of 1 150 under the continued management of the incumbent team. Accordingly, the value of the firm is V(N) = p(N) = 1 400

while the surplus extracted by the target shareholders equals $s(N) = (p(N) - y^{W(N)}) = 250$.

The Wealth Effect of MBR

Comparing the post-takeover shareowner wealth of the two bidforms, we infer that implementation of MBR has a positive total wealth effect of $\Delta V \equiv V(N) - V(P) \equiv p(N) - ½\cdot[p(P) + y^{W(P)}] = 1400 - 1375 = 25$. However if we decompose the wealth effect into the two components we observe changes of opposite signs. The surplus extraction component is negative; we find that more of the winner's private benefits are extracted by partial than non-partial bids; $\Delta s = [p(N)-y^{W(N)}]-½\cdot[p(P)-y^{W(P)}] = 250 - 375 = -125$. However, the ranking between the two bidforms with respect to allocative efficiency is reversed; $\Delta a = y^{W(N)} - y^{W(P)} = 1150 - 1000 = 150$. A ban on partial bids promotes efficiency in the sense that it stops a management team that generates less security benefits than the incumbent one from winning. In this particular example, the enactment of the MBR is in the interest of the target shareholders. However, a bold inference from this example might be that, in general, the MBR is a free option since it benefits the shareholders and also promotes efficiency. But as the next example shows, this is an erroneous conjecture.

Example 2

Let us slightly change the previous matrix of benefits by increasing the incumbent teams management skills but still letting the rival enjoy more private benefits if in control.

	RIVAL (R)	INCUMBENT (I)
SECURITY BENEFITS (y)	1 000	1 300
PRIVATE BENEFITS (z)	400	300

The distinctive feature of this example is that the incumbent remains in control under both bidforms ($y^I + z^I > y^R + z^R$ and $y^I + 2z^I > y^R + 2z^R$). Since $W(P) = W(N) = I$, the shareholder wealth effect does not depend on the allocational difference between the two bidforms.

Partial Bids

If bids are partial, the team already in power extends a winning offer of $p(P) = 1\ 800$, which is the losing rival's maximum assessment of control: $y^R + 2z^R$. The surplus extracted by the target shareholders equals $\Delta s = ½\cdot(p(P) - y^{W(P)}) = 250$ and the value of the firm amounts to $V(P) = ½\cdot 1\ 800 + ½\cdot 1\ 300 = 1\ 550$.

Non - Partial Bids

If bids are non-partial, the incumbent's victorious tender offer price is only $p(N) = 1\ 400$ which is the rival's maximum willingness to pay. Accordingly, the surplus extracted under the non-partial bidform is $s(N) = (p(N) - y^{W(N)}) = 100$. The value of the shares in this bidform is, of course, $p(N) = V(N) = 1\ 400$.

The Wealth Effect of MBR

In contradistinction to the previous example, the wealth of the shareholders is negatively affected by enactment of the MBR; they encounter a loss of $\Delta V \equiv V(N) - V(P) = 1400 - 1550 = -150$. Since the winner is the same under both bidforms the allocative component $\Delta a = 0$. The negative wealth effect is exclusively a reflection of the fact that partial bids extract more of the winner's private benefits than non-partial bids. Stated somewhat differently, the loss in shareholder wealth is entirely caused by the lower surplus extraction by non-partial bids under this configuration of parameter values.

The two examples demonstrate that, depending on the parameter values, the MBR may either have a positive or a negative effect on the target shareholder's post-takeover wealth, i.e. the rule is not a free option. Accordingly, contrary to the explicit objective of protecting the shareholders' interests, The Thirteenth Directive of the EC may in fact not generally benefit them.

We also infer from the two examples that partial bids are relatively better at extracting the winner's private benefits while non-partial bids have a comparative advantage in promoting allocational efficiency. In the first example, enactment of the MBR had a positive effect on the target shareholder's wealth since non-partial bids prevented a less efficient team than the incumbent from acquiring control and the larger surplus extraction in partial bids was not enough to compensate for the difference in allocational efficiency (security benefits) between the two parties. The opposite conclusion is valid in the second example; there the surplus extraction effect dominated the allocative role of the MBR. Even though this reasoning provides a simple economic interpretation of the results in the specific examples, it does not, however, as will be shown, stand up as the generally applicable explanation. But there exists such a simple and common economic mechanism since the difference in surplus extraction capability and allocational efficiency between non-partial and partial bids varies in a systematic way as the parameter values of the benefits change.

The analysis in the main part of the paper substantiates this claim, generalizes it beyond the specific examples, and demonstrates how the choice of bidform systematically affects the shareholders post-takeover wealth for all combinations of parameter values.

APPENDIX B

The Shareholder Wealth Effect for All Parameter Values When Both Contestants Have Sizable, Positive and Non-Identical Private Benefits

USING FIGURE 3 and Table 1 the following analysis transpires. In the outer regions (I and VIII) the shareholder wealth effect is zero since one contestant (the rival in region I, and the incumbent in region VIII) is so superior in terms of creating security benefits that he would win the control contest under both bidforms even if he had no private benefits. Accordingly, the free rider mechanism settles the price at the winner's security benefits regardless of the bidform.

Turning to regions II and III, we observe that the shareholder wealth effect is negative. For these parameter values a relatively superior rival will win irrespective of the bidform. In order to win a partial bid control contest, the rival has to forfeit some of his private benefits since he is forced by competitive pressure from the incumbent to bid $y^I + 2 \cdot z^I$, which surpasses his own security benefits when in control. But if bids are non-partial, his security benefits are sizeable enough to guarantee that he wins regardless of his private benefits in region II, i.e. $y^R > y^I + z^I$ and the free rider mechanism determines the non-partial bid equilibrium price. However, in region III this advantage does not apply, and the competitive mechanism settles the equilibrium price at $y^I + z^I$. Hence, the shareholder wealth effect in region II is $\Delta V = V(N) - V(P) = y^R - \frac{1}{2} \cdot (y^I + 2 \cdot z^I + y^R) = \frac{1}{2} \cdot (y^R - y^I - 2 \cdot z^I)$ which is negative by assumption since $y^I + 2 \cdot z^I > y^R$. Correspondingly for region III, we obtain $\Delta V = V(N) - V(P) = y^I + z^I - \frac{1}{2} \cdot (y^I + 2 \cdot z^I + y^R) = \frac{1}{2} \cdot (y^I - y^R)$ which is also negative since $y^R > y^I$. Consequently, the shareholder wealth effect is negative in the two regions, and, as depicted in figure 3, it changes linearly when the security benefit difference $(y^I - y^R)$ goes from $-2 \cdot z^I$ to 0, and with a minimum at $(y^I - y^R) = - z^I$.

Continuing to region IV, it is easily verified that the equilibrium tender offer prices are the same as in region III, i.e. $p(N) = y^I + z^I$, $p(P) = y^I + 2 \cdot z^I$ and the security benefit of the winning outside rival in partial bids is y^R. This translates into the same shareholder wealth effect as in the preceding region or $\Delta V = V(N) - V(P) = y^I + z^I - \frac{1}{2} \cdot (y^I + 2 \cdot z^I + y^R) = \frac{1}{2} \cdot (y^I - y^R)$, but, in contradistinction to the outcome there, the effect is positive since $y^R < y^I$. In terms of the figure, the shareholder wealth effect increases linearly with the positive slope of a half from $-\frac{1}{2} \cdot z^I$ to $\frac{1}{2} \cdot (z^R - z^I) > 0$ as $(y^I - y^R)$, passes through regions III and IV.

In region V, the results of the partial bid game are qualitatively the same as in II, III and IV. The rival wins the bidding contest and the competitive mechanism sets the equilibrium price at $p(P) = y^I + 2 \cdot z^I$ which translates into a post-takeover value of the target equity of $V(P) = \frac{1}{2} \cdot (p(P) + y^{W(P)}) = \frac{1}{2} \cdot (y^I + 2 \cdot z^I + y^R)$. However, with respect to non-partial bids, the change is more dramatic. When $(y^I - y^R)$ surpasses $(z^R - z^I)$, the incumbent wins the bidding subgame, i.e. a prohibition of partial bids causes a reversal of winners for these parameter configurations. The non-partial bid equilibrium price is now determined by the maximum of the incumbent's security benefits, y^I, and the rival's maximum willingness to pay, $y^R + z^R$. Since $y^R + z^R > y^I$ in this region, competition settles the price at $p(N) = y^R + z^R$. Consequently, the shareholder wealth effect becomes $\Delta V \equiv V(N) - V(P) = (y^R + z^R) - \frac{1}{2} \cdot (y^I + 2 \cdot z^I + y^R) = -\frac{1}{2} \cdot (y^I - y^R) + (z^R - z^I)$

which is positive since by definition of the region $(y^I-y^R) < 2\cdot(z^R-z^I)$. Moreover, ΔV decreases linearly as (y^I-y^R) traverses the region; the slope of the line is - ½.

Turning to region VI, we observe that the incumbent wins the bidding contests under both bidforms. Since the rival's willingness to pay exceeds the incumbent's security benefits regardless of the bidform, the competitive mechanism determines the equilibrium tender offer price in both situations: $p(N) = y^R + z^R$ for non-partial bids and $p(P) = y^R + 2\cdot z^R$ for partial bids. The resulting shareholder wealth effect becomes $\Delta V \equiv V(N) - V(P) = y^R + z^R - ½\cdot(y^R + 2\cdot z^R + y^I) = ½\cdot(y^R-y^I)$ which is negative since $y^I > y^R$. Compared to the corresponding result in region V, we observe that ΔV shifts downward discretely at the point $(y^I-y^R) = 2\cdot(z^R-z^I)$ by $-(z^R-z^I)$ and then declines linearly as the difference in security benefits approaches z^R. The downward jump occurs because, in contradistinction to region V, the incumbent is victorious in the bidding contest under both bidforms, i.e. in the shareholder effect in region VI there is no component that reflects a gain in security benefits due to a ban on partial bids, which occurs in the previous region. Hence, the shareholder wealth effect only captures the loss in extraction potential of the winner's private benefits from enactment of The Right To Sell Provision.

Finally reaching region VII, the results are very similar to those of the previous region. The only difference being that the non-partial bid equilibrium price is determined by the free rider mechanism instead of competition since the incumbents security benefits surpasses the rival's maximum willingness to pay or $y^I > y^R + z^R$. Accordingly, we derive the shareholder wealth effect as negative and equal to $\Delta V \equiv V(N) - V(P) = y^I - ½\cdot(y^R + 2\cdot z^R + y^I) = ½\cdot(y^I - y^R - 2\cdot z^R)$ since $y^I < (y^R + 2\cdot z^R)$. In terms of the figure, ΔV increases linearly from $- ½\cdot z^R$ to zero as (y^I-y^R) traverses from z^R to $2\cdot z^R$. This concludes the detailed discussion of the effect on shareholder wealth of enactment of the MBR.

Region	I	II	III	IV	V	VI	VII	VIII
Defining inequalities	$y^R>y^I+2z^I$	$y^R>y^I+z^I$ $y^I+2z^I>y^R$ $z^R>z^I$	$y^R>y^I$ $y^I+z^I>y^R$ $z^R>z^I$	$y^I>y^R$ $y^R+z^R>y^I+z^I$ $z^R>z^I$	$y^I>y^R$ $y^I+z^I>y^R+z^R$ $y^R+2z^R>y^I+2z^I$	$y^R+z^R>y^I$ $y^I+z^I>y^R+z^R$ $y^I+2z^I>y^R+2z^R$	$y^I>y^R+z^R$ $y^R+2z^R>y^I$ $y^I+2z^I>y^R+2z^R$	$y^I>y^R+2z^R$
Partial Bids: winner	R	R	R	R	R	I	I	I
LMWP: $y^{L(P)}+2\cdot z^{L(P)}$	y^I+2z^I	y^I+2z^I	y^I+2z^I	y^I+2z^I	y^I+2z^I	y^R+2z^R	y^R+2z^R	y^R+2z^R
PTVW: $y^{W(P)}$	y^R	y^R	y^R	y^R	y^R	y^I	y^I	y^I
Tender offer price: $p(P) \equiv \max[y^{L(P)}+2\cdot z^{L(P)}, y^{W(P)}]$	y^R	y^I+2z^I	y^I+2z^I	y^I+2z^I	y^I+2z^I	y^R+2z^R	y^R+2z^R	y^I
Shareholder wealth: $V(P) \equiv ½\cdot[p(P) + y^{W(P)}]$	y^R	$½\cdot[y^I+2z^I+y^R]$	$½\cdot[y^I+2z^I+y^R]$	$½\cdot[y^I+2z^I+y^R]$	$½\cdot[y^I+2z^I+y^R]$	$½\cdot[y^I+2z^R+y^R]$	$½\cdot[y^I+2z^R+y^R]$	y^I
Non-Partial Bids: winner	R	R	R	R	I	I	I	I
LMWP: $y^{L(N)}+1\cdot z^{L(N)}$	y^I+z^I	y^I+z^I	y^I+z^I	y^I+z^I	y^R+z^R	y^R+z^R	y^R+z^R	y^R+z^R
PTVW: $y^{W(N)}$	y^R	y^R	y^R	y^R	y^I	y^I	y^I	y^I
Shareholder wealth = tender offer price: $V(N)=p(N)\equiv \max[y^{L(N)}+1z^{L(N)}, y^{W(N)}]$	y^R	y^R	y^I+z^I	y^I+z^I	y^R+z^R	y^R+z^R	y^I	y^I
Shareholder wealth effect $\Delta V \equiv V(N) - V(P)$	0	$½\cdot[y^R-(y^I+2z^I)]<0$	$½\cdot[y^I-y^R]<0$	$½\cdot[y^I-y^R]>0$	$-½\cdot[y^I-y^R]+(z^R-z^I)>0$	$-½\cdot[y^I-y^R]<0$	$½\cdot[y^I-y^R-2z^R]<0$	0
The Shareholder wealth effect decomposed as $\Delta V \equiv \Delta s + \Delta a$								
$\Delta s \equiv [p(N)-y^{W(N)}]-½\cdot[p(P)-y^{W(P)}]$.	0	$½\cdot[y^R-(y^I+2z^I)]<0$	$½\cdot[y^I-y^R]<0-$	$½\cdot[y^I-y^R]>0$	$-3/2(y^I-y^R)+(z^R-z^I)$	$-½\cdot[y^I-y^R]<0$	$½\cdot[y^I-y^R-2z^R]<0$	0
$\Delta a \equiv y^{W(N)}-y^{W(P)}$	0	0	0	0	$y^I-y^R>0$	0	0	

TABLE 1. The grid shows the equilibrium tender offer prices, and shareholder wealth effect as well as its separate parts for all possible parameter values when both contestants have significant private benefits; $2\cdot z^I > z^R > z^I > 0$. LMWP is the loser's maximum willingness to pay and PTVW stands for the post-takeover value under the winner. The defining inequalities are derived from the definition of each region or interval on the axis for (y^I-y^R).

APPENDIX C

Proofs of Propositions

Lemma 1:

$\Delta a > 0$ if and only if

$0 < (z^{L(N)} - z^{W(N)}) < (y^{W(N)} - y^{L(N)}) < 2\cdot(z^{L(N)} - z^{W(N)})$ *where* $L(N)=W(P)$,

i.e. if and only if there is a reversal of winners. In particular, the more efficient one (in terms of security benefits) wins the non-partial bidding contest while the less efficient one is victorious in the non-partial contest. In terms of the parameter values, an equivalent statement is that the allocative component is positive if and only if either

$0 < (z^I - z^R) < (y^R - y^I) < 2\cdot(z^I - z^R)$ *or* $0 < (z^R - z^I) < (y^I - y^R) < 2\cdot(z^R - z^I)$.

Proof:

From the definition of the allocative component, $\Delta a \equiv y^{W(N)} - y^{W(P)}$, we infer that it is non-zero if and only if there are different winners (a reversal of winners) in the partial and non-partial bidding contest: $W(N) \neq W(P)$ and $y^{W(N)} \neq y^{W(P)}$. From the definition of the control contest we have that a reversal of winner occur if and only if:

$$\text{(i) } y^{W(N)} + z^{W(N)} > y^{L(N)} + z^{L(N)}$$

$$\text{(ii) } y^{W(P)} + 2\cdot z^{W(P)} > y^{L(P)} + 2\cdot z^{L(P)}.$$

Combining these two inequalities and using the fact that a reversal implies that $L(N) = W(P)$ and $L(P) = W(N)$ we have that

$$\text{(iii) } z^{L(N)} - z^{W(N)} < y^{W(N)} - y^{L(N)} < 2\cdot(z^{L(N)} - z^{W(N)}).$$

The fact that $z^{L(N)} - z^{W(N)} < 2\cdot(z^{L(N)} - z^{W(N)})$ in (iii) implies that $z^{L(N)} - z^{W(N)} > 0$. Furthermore, since $y^{W(N)} - y^{L(N)} > z^{L(N)} - z^{W(N)}$, we must have that $y^{W(N)} - y^{L(N)} > 0$, where $y^{W(N)} - y^{L(N)} = y^{W(N)} - y^{W(P)} = \Delta a$. Hence, $z^{L(N)} - z^{W(N)} < y^{W(N)} - y^{L(N)}) < 2\cdot z^{L(N)} - z^{W(N)}$ is a necessary and sufficient condition for a positive allocative component. Using the indices I and R for the two contestants in inequality (i) and (ii) reproduces this result in terms of parameter values. **QED**

If the inequalities of Lemma 1 does not hold, the same contestant wins both the partial and non-partial bidding contests. Hence, the allocative component equals zero for all parameter combinations not belonging to the interval of Lemma 1 or stated more formally.

Corollary 3:

If Δa is not positive, it is zero.

Lemma 2:
$\Delta s > 0$ if and only if

$$0 < (y^{L(N)} - y^{W(N)}) < (z^{W(N)} - z^{L(N)}) \text{ where } W(N)=W(P).$$

Since $z^{W(N)} > z^{L(N)}$, the inequalities state that the same contestant wins both the non-partial and partial bidding contest, but the winner is less efficient (in terms of security benefit) than the loser ($y^{L(N)} > y^{W(N)}$), i.e. he wins because his private benefits are sufficiently larger than the opponents. In terms of the parameter values, an equivalent statement is that the surplus extraction component is positive if and only if either

$$0 < y^R - y^I < z^I - z^R \text{ or } 0 < y^I - y^R < z^R - z^I.$$

Proof:
(Necessity)
From the definition of the surplus extraction component, $\Delta s \equiv s(N) - s(P) \equiv [p(N) - y^{W(N)}] - \frac{1}{2}\cdot[p(P) - y^{W(P)}]$, we deduce that an equivalent statement of a positive Δs is

$$\text{(iv) } 2\cdot[p(N) - y^{W(N)}] > [p(P) - y^{W(P)}].$$

Since the price in a partial bid contest (p(P)) is equal to or surpasses the free rider value ($y^{W(P)}$), we infer immediately that the inequality can only be satisfied if $p(N) > y^{W(N)}$, i.e. if the competitive mechanism settles the tender offer price in the non-partial contest. Furthermore, we have two subcases: either (i) the same contestant wins both the non-partial and partial bidding contest or (ii) there is a reversal of winners.

(i) No reversal of winners:
From the definition of the tender offer price in the non-partial contest, $p(N) \equiv \max[y^{L(N)} + 1\cdot z^{L(N)}, y^{W(N)}]$, and using the fact that it is determined by the competitive mechanism, we deduce that $(y^{L(N)} + 1\cdot z^{L(N)}) > y^{W(N)}$. Furthermore, if the same contestant also wins the partial contest (no reversal), we conclude immediately from the previous inequality that the competitive mechanism also settles the tender offer price for partial bids. Since both p(N) and p(P) are determined by the competitive mechanism, and there is no reversal of winners (L(N) = L(P) and W(N) = W(P)), inequality (iv) can be rewritten as

$$2\cdot(y^{L(N)} + 1\cdot z^{L(N)} - y^{W(N)}) > (y^{L(N)} + 2\cdot z^{L(N)} - y^{W(N)}),$$

which simplifies to (v) $y^{L(N)} > y^{W(N)}$. This in turn implies that the less efficient (in terms of security benefits) contestant wins both the partial and non-partial contests, i.e. in terms of willingness to pay two conditions must be satisfied

$$\text{(vi) } (y^{W(N)} + z^{W(N)}) > (y^{L(N)} + z^{L(N)})$$
$$\text{(vii) } (y^{W(N)} + 2\cdot z^{W(N)}) > (y^{L(N)} + 2\cdot z^{L(N)}).$$

Jointly, inequalities (v), (vi) and (vii) imply

$$0 < (y^{L(N)} - y^{W(N)}) < (z^{W(N)} - z^{L(N)}) \text{ and}$$
$$0 < (y^{L(N)} - y^{W(N)}) < 2\cdot(z^{W(N)} - z^{L(N)}).$$

Since the interval in the first set of inequalities is a subset of the latter set, we have derived the conditions of the necessity part of the lemma for the case with no reversal of winners. Substitution of indexes R and I for the winners generate the reminder of the claim.

(ii) Reversal of winners:
Returning to inequality (iv) and using the fact that the competitive mechanism determines the non-partial bid price and that a reversal implies that (L(N) = W(P) and L(P) = W(N) we have

$$2\cdot(y^{L(N)} + 1\cdot z^{L(N)} - y^{W(N)}) > \mathrm{Max}(y^{W(N)} + 2\cdot z^{W(N)} - y^{L(N)}, 0)$$

implying that

$$2\cdot(y^{L(N)} + z^{L(N)} - y^{W(N)}) > (y^{W(N)} + 2\cdot z^{W(N)} - y^{L(N)}),$$

which simplifies to

$$\text{(viii)}\ (z^{L(N)} - z^{W(N)}) > (3/2)\cdot(y^{W(N)} - y^{L(N)}) > 0.$$ [1]

Since there is a reversal of winners, we know from Lemma 1 that $y^{W(N)} > y^{L(N)}$, i.e. the RHS difference in (viii) is positive.
However, from Lemma 1 we also know that in terms of the contestants willingness to pay, the following restrictions must be satisfied

$$\text{(ix)}\ (y^{W(N)} - y^{L(N)}) > (z^{L(N)} - z^{W(N)}) > 0,$$

which is inconsistent with condition (viii). Hence, $\Delta s > 0$ is inconsistent with a reversal. Consequently, the necessity part of the claim is demonstrated.

(Sufficiency)
From the inequalities $0 < (y^{L(N)} - y^{W(N)}) < (z^{W(N)} - z^{L(N)})$ where W(N)=W(P), we deduce that $y^{L(N)} > y^{W(N)}$; $z^{W(N)} > z^{L(N)}$; and $(y^{W(N)} + (z^{W(N)}) > (y^{L(N)} + z^{L(N)})$, i.e. the less efficient (in terms of security benefits) competitor wins even the non-partial bidding contest because of his relatively larger private benefits. However, since partial bids put a double weight on private benefits, he also wins the partial bid contest. Furthermore, since $y^{L(N)} > y^{W(N)}$ the competitive mechanism settles the tender offer price for both partial and non-partial bids. Using these facts, the surplus extraction component can after substitution be written as

$$[y^{L(N)} + z^{L(N)} - y^{W(N)}] - \tfrac{1}{2}\cdot[y^{L(N)} + 2\cdot z^{L(N)} - y^{W(N)}],$$

which equals $(1/2)\cdot(y^{L(N)} - y^{W(N)})$. But we know that $y^{L(N)}$ is larger than $y^{W(N)}$, implying that the surplus extraction component is positive. This concludes the sufficiency part of the statement, and thereby the proof of the full lemma. **QED**

Lemma 3:
Δs is zero if and only if $y^{W(N)} > y^{L(N)} + 2\cdot z^{L(N)}$ where W(N)=W(P),
i.e. the free rider mechanism determines the tender offer price for both the non-partial and the partial bidding contests.

Proof:
From the definition of the surplus extraction component we derive the condition for a zero Δs as $2\cdot[p(N) - y^{W(N)}] = [p(P) - y^{W(P)}]$. Using the definitions of p(N) and p(P), and successively eliminating the inconsistent cases, only one combination of parameter values remains: $p(N) = p(P) = y^{W(N)} = y^{W(P)}$, i.e. one contestant is so superior in terms of security benefits that the free rider mechanism determines the tender offer price for both the non-partial and partial contest. **QED**

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[1] If the competitive mechanism determines the tender offer price in the non-partial contest, the free rider mechanism can not at the same time settle the corresponding price for partial bids. In particular, since the latter requirement amounts to satisfaction of the inequality $y^{L(N)} > y^{W(N)}) + 2\cdot z^{W(N)}$, it implies that it is impossible for another contestant to win the non-partial contest, i.e. the stated conditions are inconsistent with the occurrence of reversal of winners. Accordingly, if the competitive mechanism determines the tender offer price for non-partial bids it also settles it for partial bids.

From Lemma 1, 2 and 3, and Corollary 3 we immediately infer the following conclusion.

Corollary 4: *(i) If $\Delta a > 0$ then $\Delta s < 0$, and (ii) if $\Delta s > 0$ then $\Delta a = 0$.*

We are now ready to state and prove the main result of the paper.

Proofs of Proposition 1 and 1′:

(i) Since $\Delta V \equiv \Delta a + \Delta s$, we infer from Corollary 4(ii) that the shareholder wealth effect is positive if and only if the surplus extraction component Δs is positive which occurs (Lemma 2) if and only if $0 < (y^{L(N)} - y^{W(N)}) < (z^{W(N)} - z^{L(N)})$ where W(N)=W(P).

(ii) From Lemma 1 we know that the allocative component, Δa, is positive if and only if there is a reversal of winners (W(N)=L(P) and L(N)=W(P)). Furthermore, from the proof of this lemma we also know that the competitive mechanism determines the tender offer price for both the non-partial and partial bidding contest. Using these facts and the definition of the shareholder wealth effect, $\Delta V \equiv \Delta a + \Delta s$, we obtain

$$\Delta V = [y^{W(N)} - y^{L(N)}] + [y^{L(N)} + z^{L(N)} - y^{W(N)}] - (1/2)\cdot[y^{W(N)} + 2\cdot z^{W(N)} - y^{L(N)}]$$

which reduces to $\Delta V = (1/2)\cdot[y^{W(N)} - y^{L(N)}] + [z^{L(N)} - z^{W(N)}]$. However, from the definition of the interval where Δa is positive, see Lemma 1, we immediately conclude that both bracketed expressions are positive. Accordingly, the shareholder wealth effect is positive since the positive allocative component is larger than the absolute value of the negative surplus extraction component: $\Delta a > |\Delta s|$.

In conclusion, the two non-intersecting intervals derived in Lemma 1 and 2, where the allocative and the surplus extraction component, respectively, are positive also determines when the shareholder wealth effect is positive. **QED**

Corollary 5:
$\Delta V \leq 0$ if and only if neither $\Delta a > 0$ nor $\Delta s > 0$.
Or expressed in terms of parameter values, the shareholder wealth effect is non-positive if and only if

$$y^R - y^I \notin (0,\ 2(z^I - z^R)) \text{ if } z^I > z^R \text{ or}$$
$$y^I - y^R \notin (0,\ 2(z^R - z^I)) \text{ if } z^R > z^I.$$

The proof is immediate from Proposition 1, and Lemma 1 and 3.

As is easily verified, Results 1-8 stated in the main text are special cases of the previous Propositions, Lemmas and Corollarys.

Proof of Proposition 2:
Immediate from the reasoning in the text.

Corollary 1 and 2 follow directly from Proposition 2.

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Essay 4:

An Ex Ante Analysis of the Mandatory Bid Rule

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Abstract

The *Mandatory Bid Rule* (MBR) requires that any shareholder who either (i) establishes new control of a firm or (ii) takes over control by transfer of an old block position **also** extends an offer for the remaining shares at a fair price. For these two situations, the paper analyzes the effect of implementation of a Mandatory Bid Rule on the value of the firm. Implicit in the decision to enact the MBR is a trade-off between a lower frequency of takeovers but a higher premium if a takeover attempt actually succeeds. For the ownership structure where a minority owner establishes new control, we demonstrate the general result that the negative probability effect dominates the positive premium effect, i.e. the value of the firm *always* decreases if a MBR is implemented. For the situation where control is transferred, we characterize the balance of the two counter-acting effects in general, and derive the bidform that generates the highest ex ante value of the firm. In particular, if the incumbent owner enjoys larger private benefits of control than the potential raider, we show that it is likely that enactment of the MBR lowers the value of the firm. Moreover, we demonstrate how the shareholders ex post would extract as much value as possible from the new shareholder in control of the firm if they could act with full contingency. We also perform a comparative analysis of this ex post extraction mechanism with two others studied by Zingales (1991) and Bergström, Högfeldt and Molin (1993).

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1. Introduction

THE REGULATION OF TAKEOVERS has been a hotly debated legal issue in recent years. At the center of controversy is the extra legal code for regulation of takeovers in the UK known as *The City Code on Takeovers and Mergers*. Established in 1959, it is founded on the two basic principles of *Equal Treatment* and *Right to Sell*.[1] The first one requires that all shareholders of the same class in a target company must be treated similarly by a bidder, i.e. no price differentiation between large and small shareowners of the same class is permitted. The second principle governing the City Code provides the equityowners with the right to sell their shares if either a shareholder acquires control where no single party had control before or if control of the company changes hands.[2]

The Right to Sell Principle is implemented by two provisions. First, partial bids, i.e., bids for a controlling position but for less than 100 percent of the outstanding shares, are strongly discouraged, and cannot be made without the consent of the Panel which administers the Code. Second, the code obligates a bidder who has acquired a controlling position to extend an offer for the remaining shares of the firm. This implies that a shareholder cannot acquire a controlling stake without making an *any or all offer*. Specifically, once a shareowner reaches the control threshold, it becomes *mandatory* for him to make a general bid for all the remaining shares of any class in which he holds shares. The purpose of the present paper is to analyze this **Mandatory Bid Rule** (MBR).

Why does the Code discourage partial bids and require mandatory bids? The general, commonsensical motivation is that it is regarded as wrong or unfair to compel shareholders to become minority equityowners of a company without giving them the option to sell their shares. Nor should shareholders who are already minority equityowners under one controlling shareholder be forced to continue under a different controlling shareowner, as would be the case if a controlling block of shares were sold, without giving them the opportunity to sell their equity. The pivotal argument behind the Right to Sell Provision is to protect the minority shareholders against the risk that a control change violates minority rights and constitutes unfair treatment. Specifically, if new control is established, the minority owners may encounter a loss since their shares may be worth less under the new majority than before. Moreover, if a controlling block is transferred, a raider may take out

[1] The City Code is dealt with in detail in Farrar, Furey and Hannigan (1991).
[2] Control is regarded as established under the City Code by holding 30 percent or more of the voting shares in a company.

the "widows and orphans" cheaply and pay a premium for control only to the pivotal blockholder.[3]

While originally developed within the British institutional legal framework, The City Code on Takeovers has recently become of a concern of The European Community (EC). In January 1989, the EC Commission adopted a proposal for a Thirteenth Directive on Takeovers and Other General Bids, later known as *The Amended Proposal for a Thirteenth Council Directive on Company Law, Concerning Takeover and other General Bids* (1990). This proposal is strongly influenced by the City Code. One of the main features of the draft proposal, which is supposed to be enacted throughout Europe, is the *Mandatory Bid Rule*: an acquirer who crosses an ownership threshold of at most one third (33 1/3%) must make a mandatory offer for all the remaining voting shares and convertible securities of a firm at a price which equals the highest price he paid when establishing his position within a defined period of time.[4, 5]

The MBR is still a source of substantial controversy in the US, where the SEC's Advisory Committee on Tender Offers considered, but declined to recommend adoption of the British rule. The second wave of takeover legislation include provisions that give all shareholders redemption rights against any buyer of at least 30 percent of the firms stock. But only three states adopted the redemption rights provision.[6]

Despite much attention in the public debate, the City Code, in general, and the Mandatory Bid Rule, in particular, has, with the exception of Yarrow (1985), not been subject to economic analysis. The particular purpose of this paper is to rectify this shortcoming by analyzing the effects on the value of the firm of implementation of the MBR.

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[3] However, the equal treatment principle can not be a rational for the mandatory bid rule when a new control position is established, i.e., when there is no large pivotal shareholder who can be treated better than the "orphans and widows". If partial bids are allowed, equal treatment is ascertained by requiring that the shares are pro rated, i.e., if the partial bid is oversubscribed, each tendering shareholder will have the same fraction of his shares rejected.

[4] The obligation only applies to publicly listed companies. In particular, it does not apply to bids for small and medium-sized enterprises which are not listed. Other features of the draft are rules relating to the timetable for offers, the content of offers and defence documents, the prohibition of certain types of defences and the independent supervision of the takeover process.

[5] Some European countries have already enacted the MBR. E.g., France enacted a rule in 1973 that effectively converts a successful private tender offer involving a controlling block of shares into a public tender offer for 100 % of the targets shares. During a fifteen days period following the block trade, the buyer must be prepared to accept all additional shares tendered to him at the block trade price; see Eckbo and Langohr (1989).

[6] For instance, the Pennsylvania law require any person who acquires a 20 % or higher stake in a firm to notify all other shareholders of the acquisition. All other shareholders are then entitled to sell their shares to the buyer at a price at least as high as the highest price the buyer paid in the 90 days preceding and including the day the buyer become a 20% shareholder. Maine and Utah passed similar laws; see Karpoff and Malatesta (1989).

Specifically, we contribute to the understanding of the rule by studying its effects under two different, concentrated ownership structures. The first one postulates that there already exists a control position that might be transferred to a new owner, while the second assumes that a large minority owner may establish control of a firm where no shareholder has previous control. In particular, we analyze the question whether equityowners who are already minority shareholders under one controlling shareowner should be compelled to continue under a different controlling block without having the right to sell at the price paid for the controlling block of shares, and whether the legislation should effectively prevent anyone from establishing a new control position unless he tenders for the entire company.

The *general perspective* of the paper is *ex ante*. We study if it is in the interest or not of the entrepreneur/founder of a firm to amend the corporate charter with a Mandatory Bid Rule (MBR) which applies in the future when control of the firm either changes or is established. In particular, his objective is to maximize the expected (future) value of the corporation since he plans to capitalize on his investment by an Initial Public Offering. While the general problem is ex ante, the specific analysis of the problem in this paper will be either ex post or ex ante. The pivotal difference being that we in the *ex post analysis* ignore how changes in expected profits of a takeover attempt, due to adoption of the MBR, will affect the behavior of a potential bidder, and, thereby, the frequency of takeovers, the expected bid premium of the target shareholders, and the value of the target firm, while such effects are the focus of the *ex ante analysis*. The two approaches are complementary, and the paper makes four general contributions.

First, we analyze the *ex post effect* on the value of the outstanding shares of the target firm if a Mandatory Bid Rule is amended to the corporate charter and control is transferred by a bargaining mechanism. In particular, we derive the optimal (contingent) bidform and delineate the effect on the ex post value of the firm of adoption of the rule. For a comparatively large set of parameter values, it is in the interest of the target shareholders to mandate the equityowner who takes over control to extend an any or all offer. However, the encountered loss of value for the target shareholders may also be substantial. Specifically, this may happen if the incumbent's private benefits of enjoyment of control are larger than the rival's who wants a transfer of control.

The second contribution is primarily methodological. Viewing *bargaining* as a mechanism to extract surplus value from the new owner in control, we perform a *comparative analysis* with another extraction device, an *auction* procedure, which is also covered by the MBR. In particular, the auction mechanism is used in an atomistically owned firm when two parties with no toehold compete to establish control of the firm; see Bergström, Högfeldt and Molin (1993). The common, critical element of the two

mechanisms is that it is impossible to unbundle claims that accrues to all shareholders, *security benefits*, and private control rights that the party in control enjoys, *private benefits*. While the auction mechanism operates by designing a package of security and private benefits such that the two contestant's relative willingness to pay for the *same package of rights* are as similar as possible, the *bargaining mechanism* implicitly extracts as much surplus as possible from the new shareholder in control by making the two parties relative willingness to pay as similar as feasible over *two distinct packages of security and private benefits that are as different as possible*. In this sense, the two types of surplus extraction mechanisms which both may be operational under a general adoption of a Mandatory Bid Rule are as opposed as possible; this captures the pertinent difference in terms of economic logic between them.

Third, we perform a (full) *ex ante analysis* of the decision whether to amend a MBR or not to the corporate charter when control is transferred to a new shareholder. We show that there exists a trade-off between the (non-negative) expected value of a larger share of the takeover gain if the rule is adopted, and the (non-positive) expected loss due to fewer takeovers. The latter effect stems from the fact that the expected profit from a takeover attempt is lower if the bidder is mandated to extend an any or all offer. We demonstrate that it is possible to derive general ex ante results but without specific assumptions about the probability distribution of the takeover frequency we cannot unequivocally predict the effect on the value of the firm of adoption of the MBR. However, for a uniform distribution it is shown that enactment of the rule will lower the value of the firm if the incumbent's private benefits are not less than those of the party who wants a transfer of control.

The last contribution is the *ex ante analysis* of how adoption of the MBR affects the value of the firm when a large minority shareholder is the potential bidder who establishes control of the firm. We demonstrate that such a rule would seriously deter takeovers and unequivocally lower the value of the firm for **any** well-behaved probability distribution about future takeovers. The implicit trade-off is between a lower frequency of takeovers and a higher premium if an attempt to establish control is actually made. Since the negative probability effect always dominates the positive premium effect, the consequence ex ante is a lower value of the firm, i.e. the founder of firm will not deliberately amend it to the corporate charter.

Even though the economic literature on the Mandatory Bid Rule is quite limited, the present paper is part of a larger, general literature that analyzes how provisions in the corporate charter affects the frequency of takeovers and thereby the value of outstanding

shares.[7] Grossman and Hart (1980) focus on the question of optimal dilution rights. They show that it may be in the interest of shareholders to write a corporate charter that explicitly permits the raider to exploit the minority shareholders if he succeeds with the bid. The idea is that such dilution will make a takeover bid more profitable by encouraging raiders to invest in identifying firms with managerial misconduct, and thereby indirectly providing management with incentives to maximize firm value. Grossman and Hart (1988) and Harris and Raviv (1988) view the security voting structure in the charter as a mechanism for shifting control to a superior rival team, if such a team exists. They provide sufficient conditions for a one share/one vote security structure to result in the selection of efficient management. Moreover, since the MBR makes it more difficult for an outside raider to establish control, the present paper is also indirectly associated with the increasing use of defensive mechanisms in the form of anti-takeover amendments to the firm's corporate charter, popularly called shark repellents, which been the concern of much empirical analysis.

At a more general level, an important theoretical literature in finance has also studied the interaction between the outcome of takeover contests and the capital structure and/or ownership structure of the firm. Shleifer and Vishny (1986) find that as the holdings of a large minority shareholder increases, takeovers become more likely and the market value of the firm increases. However, the bid premium is actually lower because when the large shareholder owns more, he is willing to take over even if he only brings about a smaller improvement. There are also a few contributions that generate a relationship between the fraction of equity owned by a firms management, the probability of takeovers, and the price effects of takeovers (Stulz (1986)). Israel (1991) focuses on capital structure in a more traditional sense. He finds that the optimal debt level balances a decrease in the probability of a takeover against a higher share of the synergy for the targets shareholders. Zingales (1991) elaborates the idea (for an all equity firm) that going public with a fraction of the company may enhance the value of the remaining part, making the initial entrepreneur better off since it constitutes a credible strategy. The intuition is that the retained shares makes the entrepreneur more powerful in any subsequent bargaining with potential buyers. Israel (1992) extends this idea and includes debt raising as an additional strategic variable. Debt raising and the entrepreneurial decision to retain a stake in the company are decision variables neglected in Grossman and Hart (1988), where the expectation is that the (all equity) firm will be widely held and that the incumbent management can not be relied upon to oversee future changes in control.

[7] Specifically, the MBR may either be enacted by law or amended to the corporate charter.

The paper is organized as follows. The next section presents the basic modelling framework. Part 3 and 4 of the paper analyzes the effect on the value of the firm ex post and ex ante, respectively, of enactment of the MBR when control is transferred from one shareholder to another one. Section 5 performs an ex ante analysis of the situation when a large minority owner establishes control by acquiring more shares. The penultimate part of the paper makes a comparative analysis of two extraction mechanisms-- auction and bargaining-- which relate to ownership structures encompassed by the Mandatory Bid Rule. A concluding section summarizes the paper. If formal proofs are not presented in the text, they are relegated to the Appendix.

2. The Basic Framework

CONSIDER THE FOLLOWING STYLIZED SCENARIO á la Jensen and Meckling (1976). Initially, a firm is privately owned by a founder/entrepreneur. However, to capitalize on his investment, he turns to the capital market for an Initial Public Offering (IPO) of equity. The entrepreneur designs the company's securities as well as the governance structure in such a way that the potential investors are prepared to pay as high price as possible for the offered shares. In particular, the corporate charter, as part of the governance structure, may include a number of provisions that affect the investor's assessment of the firm's future value, e.g. specification of majority rules, selection of dual or non-dual security voting structure etc.

This paper is primarily concerned with the MBR as the main decision parameter of the entrepreneur. His objective is to maximize the expected (future) value of the corporation either by amending the corporate charter with a clause telling whether the Mandatory Bid Rule (MBR) applies or not in the future when control of the firm either changes or is established. Throughout the analysis we will assume that the voting structure is one share/one vote, and that the corporation is all equity financed. Due to the simple majority rule provision, control of the firm is established by owning a position of at least fifty percent of the equity. The founder writes the corporate charter rationally anticipating that the future ownership structure of the firm, subsequent to the IPO, will not be widely held, i.e. a concentrated ownership structure develops. We postulate two such structures in this paper.

In the first one, a single shareholder, the incumbent, already owns a controlling position of at least fifty percent of the outstanding shares. The remaining equityowners are assumed to be identical, small and to behave parametrically. In the future, an outside party, the rival, with no toehold in the firm may approach the incumbent and negotiate a transfer of

the control block. In particular, the takeover mechanism is a bargaining procedure that splits the takeover gain between the two parties who act strategically; no change of control occurs unless it is profitable for both the incumbent and the rival. Using both *ex ante* as well as *ex post analysis*, we study whether or not it is in the interest of the founder of the firm, who wants to maximize the value of the shares, to impose the restriction that the rival must also extend the same offer to all equityowners of the firm.

In the second one, we assume that no single shareholder has control, but a large minority owner wants to establish control; all other shares are owned by small equityholders. In the future, he may establish control by extending a partial offer; if successful, his total ownership will constitute a control block. The specific takeover mechanism used is the value appreciation on his large toehold in the target firm. Focusing on an ex ante approach, and using the framework of Shleifer-Vishny (1986), we study the effects on the value of the firm of implementation the MBR.

Remembering that the economic analysis of takeovers under the two ownership structures are different, let us start by a more penetrating formal study of the effect on the value of the firm ex post (Section 3) and ex ante (Section 4) of adoption of the MBR when control is transferred by a bargaining procedure between the incumbent and the rival.

3. An Ex Post Analysis of the MBR: Transfer of Control Via Bargaining.

Assume that an all equity firm is controlled by an owner called the incumbent (I) who owns a portion $e_I>1/2$ of the outstanding single class shares. The commonly known characteristics of the incumbent are his security benefits (y^I)-- the net present value of the firm's projects that accrues to all shareholders of the firm-- and his private benefits (z^I) which gauges his own enjoyment of control like the psychic value generated by power or the value of network relationships. The corresponding data of the outside rival is not known ex ante. We conjecture that his security and private benefits are independent stochastic variables $\tilde{y}$ and $\tilde{z}$ with distribution functions F(y) and G(z), respectively. The arrival of a potential outside acquirer is tantamount to realizations of drawings from these two distributions, denoted by y^R and z^R, respectively, and assumed to be common knowledge. For reasons of transparency, we assume that he has no toehold in the target firm. If the rival's valuation of the control position surpasses the incumbent's, he may negotiate a transfer of the block at a price of p* (per hundred percent) if the Mandatory Bid Rule is not amended to the corporate

charter and p** if it is. In particular, we postulate that the outcome of the bargaining procedure satisfies the conditions for the Nash solution concept.

THE MBR DOES NOT APPLY

If the bidder is not mandated to extend an offer for all shares of the firm, the price of the transfer of control p* is negotiated exclusively between him and the incumbent control owner. The incumbent's net profit is the capital gain on his position minus the loss of his private benefits of control or formally $S_I(p^*; e_I, y^I, z^I) = e_I \cdot (p^* - y^I) - z^I$. Correspondingly, the rival's gain is the net profit on the control block plus his private benefits or $S_R(p^*; y^I, y^R, e_I, z^R) = e_I \cdot (y^R - p^*) + z^R$. Accordingly, the size of the bargaining pie is $S(y^I, y^R, z^I, z^R, e_I) = S_I + S_R = e_I \cdot (y^R - y^I) + (z^R - z^I)$. Application of the Nash solution concept yields the bargaining price

$$p^*(y^I, y^R, z^I, z^R, e_I) = y^I + \frac{1}{2} \cdot (y^R - y^I) + \frac{(z^R + z^I)}{2 \cdot e_I}.$$

A necessary condition for this outcome to be realized is that the net profit of the two negotiating parties ($S_I \geq 0$ and $S_R \geq 0$) are positive or formally that

$$y^R + \frac{z^R}{e_I} \geq y^I + \frac{z^I}{e_I}.$$

Consequently, the rival approaches the incumbent only if his total valuation per 100% of the control block exceeds the incumbent's. In particular, the profit criterion amounts to a relative valuation of packages of two rights with different weights: assignment of the weight one on security benefits and a higher one $(1/e_I)$ on private benefits. Comparing the bargaining price agreed upon between the two negotiating parties (p*) with the post-takeover value of a share owned by a small shareholder (y^R), it is easily demonstrated that the latter value is never less than the bargaining price ($p^* \geq y^R$) if the security benefits of the rival are sufficiently large or

$$y^R \geq y^I + \frac{1}{e_I} \cdot (z^I + z^R),$$

i.e. when the security benefits generated by the rival is larger than the incumbent's maximum valuation plus his own valuation of his private benefits. This implies that the fringe of small stockholders obtains a larger takeover premium than the controlling blockholder, i.e. in this sense it is better to be a small owner who passively free ride than being pivotal and exercising the strategic option to bargain with the rival. This result will be valuable in the sequel. Formally, the results of this section are summarized as follows.

Lemma 1:

If the Mandatory Bid Rule is not implemented, an outside bidder takes over the control of the firm by transfer of the incumbent's control block at price p if*

$$\frac{1}{e_I}\cdot(z^I - z^R) \le y^R - y^I.$$

Specifically, if $y^R - y^I \le \frac{1}{e_I}\cdot(z^I + z^R)$, *the post-takeover value of the fringe of small shareholders is lower than the bargaining price,* $p^* \ge y^R$, *while the converse,* $p^* < y^R$, *is true if* $\frac{1}{e_I}\cdot(z^I + z^R) < y^R - y^I$.

One immediate implication of the result is that if the incumbent's private benefits are not less than the bidder's ($z^I \ge z^R$), the synergy is positive and the transition of control does not lower the value of the shares of the fringe. However, they may not obtain as high a capital gain as the incumbent.

THE MBR IS AMENDED TO THE CORPORATE CHARTER

If the MBR applies, the outside rival, who acquires the incumbent shareholder's block position, must at the same time extend an *any or all offer* for the remaining shares of the firm at a price that is not lower than the one he paid for the control block. Since he cannot price discriminate between the control owner and the fringe, we impose both the Equal Treatment and Right to Sell provisions on the bargaining procedure. Let p^{**} denote the resulting Nash bargaining price that incorporates the fact that the bidder must extend an offer at the same price to all shareholders. Let $\alpha - e_I$ be the fraction of the shares tendered by the small shareholders, and p be the reservation price of the fringe. If this reservation price exceeds the price the individual, small shareholder is offered, he will not tender his shares. However, if the price offered is larger than his reservation price, he will tender all his shares. Since all shareholders are identical, this implies that α is either equal to 1 or e_I.

Analogously with the previous situation, the incumbent's profit is $S_I(p^{**}; e_I, y^I, z^I) = e_I\cdot(p^{**} - y^I) - z^I$ while the rival's is $S_R(p^{**}; p, \alpha, y^I, y^R, e_I, z^R) = e_I\cdot(y^R - p^{**}) + (\alpha - e_I)\cdot(y^R - p) + z^R$ where the expression, $(\alpha - e_I)\cdot(y^R - p)$, measures the net gain on the equity tendered by the fringe. Consequently, the size of the bargaining pie is

$$S(p; \alpha, y^I, y^R, e_I, z^R, z^I) = S_I + S_R = e_I\cdot(y^R - y^I) + (\alpha - e_I)\cdot(y^R - p) + (z^R - z^I).$$

Imposing the Equal Treatment Provision that p = p^{**}, the Nash bargaining price solution becomes $p^{**}(\alpha; y^I, y^R, e_I, z^R, z^I) = y^I + \frac{\alpha}{(\alpha + e_I)}\cdot(y^R - y^I) + \frac{1}{(\alpha + e_I)}\cdot(z^R + z^I)$

where $\alpha \in [e_I, 1]$. Note that the coefficient in front of the synergy gain, $(y^R - y^I)$, is increasing in α, while the corresponding one for the sum of private benefits, $(z^R + z^I)$, is decreasing in α. Furthermore, like in the bargaining price solution when the MBR does not apply, private benefits are assigned a higher weight than the synergy gain. This implies that the Nash bargaining solution of the present problem is, implicitly, relatively better at extracting the bidder's private benefits than his security benefits.

The outside rival only bargains with the incumbent if his profit is positive ($S_R \geq 0$) which yields the necessary bargaining condition

$$y^R + \frac{z^R}{\alpha} \geq y^I + \frac{z^I}{e_I}$$

i.e. the rival's total valuation per 100% using the weight $1/\alpha$ instead of the previous weight of $1/e_I$, exceeds the incumbent's maximum valuation, which is the same as in the case without implementation of the MBR. Since α equals or surpasses e_I, this is a more stringent requirement than in the previous case where the rival negotiated with the incumbent exclusively about the transfer of the control position. Accordingly, fewer takeover attempts will, ceteris paribus, occur if the MBR applies. However, the parametric condition for the post-takeover value of the shares owned by the fringe of small shareholders to be no less than the bargaining price p^{**} is the same as previously ($y^R \geq p^{**}$) or

$$y^R \geq y^I + \frac{1}{e_I} \cdot (z^I + z^R).$$

Hence, if this occurs, the fringe of small equityowners will not tender their shares but benefit from free riding. We may summarize the results of this section by the following statement.

Lemma 2:

*If the **Mandatory Bid Rule** is **amended** to the **corporate charter**, an outside bidder takes over the control of the firm by extending the following **equilibrium any or all tender offers**:*

(a) $p^{**}(\alpha)_{|\alpha=1}$ *if* $\frac{1}{e_I} \cdot z^I - z^R \leq y^R - y^I \leq \frac{1}{e_I} \cdot (z^I + z^R)$: ***all** shareholders tender.*[8]

(b) $p^{**}(\alpha)_{|\alpha=e_I}$ *if* $\frac{1}{e_I} \cdot (z^I + z^R) < y^R - y^I$: ***only** the pivotal blockholder tenders while the fringe of small equityowners retains their shares and free rides:* $p^{**}(\alpha)_{|\alpha=e_I} < y^R$.

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[8] If $\frac{1}{e_I} \cdot z^I - z^R \leq y^R - y^I \leq \frac{1}{e_I} \cdot (z^I + z^R)$ then $p^{**}(\alpha)_{|\alpha=1} < p^*$, i.e. the bargaining price with the MBR is lower than the corresponding price without its implementation.

Since it is easily verifiable that $p^{**}(\alpha)_{|\alpha=e_I} = p^*$ when $\frac{1}{e_I}\cdot(z^I+z^R) < y^R - y^I$, the value of the equity of the firm after a successful takeover attempt is the same with or without amendment of the MBR to the corporate charter. This in turn implies that when we compare the value of the firm with and without implementation of the MBR, we only have to consider the synergy gains in the interval $\frac{1}{e_I}\cdot z^I - z^R \le y^R - y^I \le \frac{1}{e_I}\cdot(z^I+z^R)$.

We will soon explore this insight further, but to provide a better understanding of how a mandatory bid rule affects the value of the firm, we analyze how the optimal bidform or majority rule might be chosen ex post. Furthermore, in order to simplify the analysis we assume *from now on* that the incumbent owns half of the share; $e_I = 1/2$.

The Optimal Contingent Bidform

In this model, the specific objective of the founder is to select a single bidform $\alpha^* \in [0.5, 1]$ that maximizes the total value of the firm *ex ante*. However, in order to understand the problem better, a first step is to solve the corresponding problem *ex post*, i.e. given that he knows the actual characteristics of the two bargaining parties, and, in particular, ignoring the effects on a potential rival's incentives, what would the best *contingent* bidform have been? Expressed somewhat differently, given as much *ex post* action space as theoretical feasible, he would try to extract as much as possible of the bidder's surplus by appropriately selecting a rule requiring the bidder to extend an offer for at least a fraction α of the outstanding shares, or, formally, obtain the highest possible post-takeover value of the firm

$$\max_{\alpha\in[0.5,\,1]} V(\alpha; p^{**}(\alpha), y^R) = \alpha\cdot p^{**}(\alpha) + (1-\alpha)\cdot y^R.$$

Accordingly, if a successful takeover attempt occurs, determination of the best bidform problem is equivalent to find the optimal linear combination of two mechanisms or ways to extract the surplus from the rival: bargaining and free riding. Implicitly, we have assumed that the Equal Treatment Provision applies since the bargaining price functional $p^{**}(\alpha)$ is used.

If $(y^R - y^I) > 2\cdot(z^I + z^R)$ we know from Lemma 2 that the free riding value y^R exceeds the bargaining price p^{**}. Consequently, it is optimal to assign as low value as possible to α, i.e. set it equal to 1/2. Expressed somewhat differently, the best solution is to rely as much as possible on the free rider mechanism.

Turning to the case where all small shareholders tender if offered the price $p^{**}(\alpha)$, i.e., in the region $(y^R - y^I) < 2\cdot(z^I + z^R)$, we find that is convenient to reformulate the problem. After substitution for $p^{**}(\alpha)$ and setting $e_I = 1/2$, we obtain

$$\max_{\alpha\in[0.5,1]} V(\alpha; y^I, y^R, z^I, z^R) = y^R + \frac{\alpha}{(\alpha+1/2)}\cdot\left[(z^R+z^I) - \frac{(y^R-y^I)}{2}\right].$$

The problem has a simple structure with two basic cases: when the choice of $\alpha\in[0.5, 1]$ (i) does not affect the transfer of control and (ii) when it does. In order for the rival to appear, the synergy gain must surpass a certain threshold: $y^R - y^I \geq \frac{z^I}{e_I} - \frac{z^R}{\alpha}$. This condition is most stringent when evaluated at $e_I = 0.5$ and $\alpha = 1$: $(y^R - y^I) \geq 2\cdot z^I - z^R$. This implies that if we observe a larger synergy gain than $2\cdot z^I - z^R$, a successful transfer of ownership is guaranteed for any choice of $\alpha\in[0.5, 1]$, i.e. case (i) above occurs. Furthermore, it is immediate upon inspection that the square bracketed expression is positive if $(y^R - y^I) \leq 2\cdot(z^I + z^R)$, i.e. the double sum of the private benefits is larger than the synergy gain. Since the coefficient in front of the square bracket, $\alpha/(\alpha+1/2)$, is increasing in α, it is optimal to set α=1 for this interval of synergy gain, i.e. it is optimal to enact the MBR where the same bargaining price is extended to all shareholders. This implies that only the bargaining mechanism is used for extraction of the bidder's surplus.

Turning to the second case where the choice of α also affects if control will be transferred or not, we use the profit condition when it is as less stringent as possible to determine when it applies, i.e. when α=1/2 or $(y^R - y^I) \geq 2\cdot(z^I - z^R)$. Accordingly, if $2\cdot(z^I - z^R) \leq (y^R - y^I) \leq 2\cdot z^I - z^R$ there exists an $\alpha^{**}\in[0.5, 1]$ such that $y^R + \frac{z^R}{\alpha^{**}} = y^I + \frac{z^I}{e_I}$; the maximum valuations of the control block of the incumbent and the rival are identical. Solving for α^{**} yields $\alpha^{**} = \frac{z^R}{2\cdot z^I - (y^R - y^I)}$ when $e_I = 1/2$. Selection of a slightly larger value on α^{**} guarantees that the incumbent remains in control, while a lower one ascertains transfer of control and extraction of almost all of the new owners surplus. Notice that the expression for α^{**} is an increasing and convex function of the synergy gain $(y^R - y^I)$. Moreover, since the square bracketed term is positive, the optimization problem is tantamount to select as large α^*-value as possible that simultaneously generates a change of control, i.e. chose an α^* slightly below α^{**}. Since $p^{**}(\alpha^*)$ surpasses the free rider value, see Lemma 2, all small shareholders tender if such a price is extended to them. This reasoning is summarized in the following statement and illustrated in Figure 1.

Proposition 1:

The ex post (contingent) value of the firm is maximized by the following contingency rule for selection of bidform or majority rule (α^*).

(i) Set $\alpha^* = \alpha^{**} - \varepsilon$ *where* $\varepsilon > 0$ *and* $\alpha^{**} = z^R/(2 \cdot z^I - (y^R - y^I))$ *if*

$2 \cdot (z^I - z^R) \leq (y^R - y^I) < 2 \cdot z^I - z^R$;

(ii) $\alpha^* = 1$ *if* $2 \cdot z^I - z^R \leq (y^R - y^I) < 2 \cdot (z^I + z^R)$; *and*

(iii) $\alpha^* = 1/2$ *if* $(y^R - y^I) \geq 2 \cdot (z^I + z^R)$ *or if* $(y^R - y^I) < 2 \cdot (z^I - z^R)$.[9]

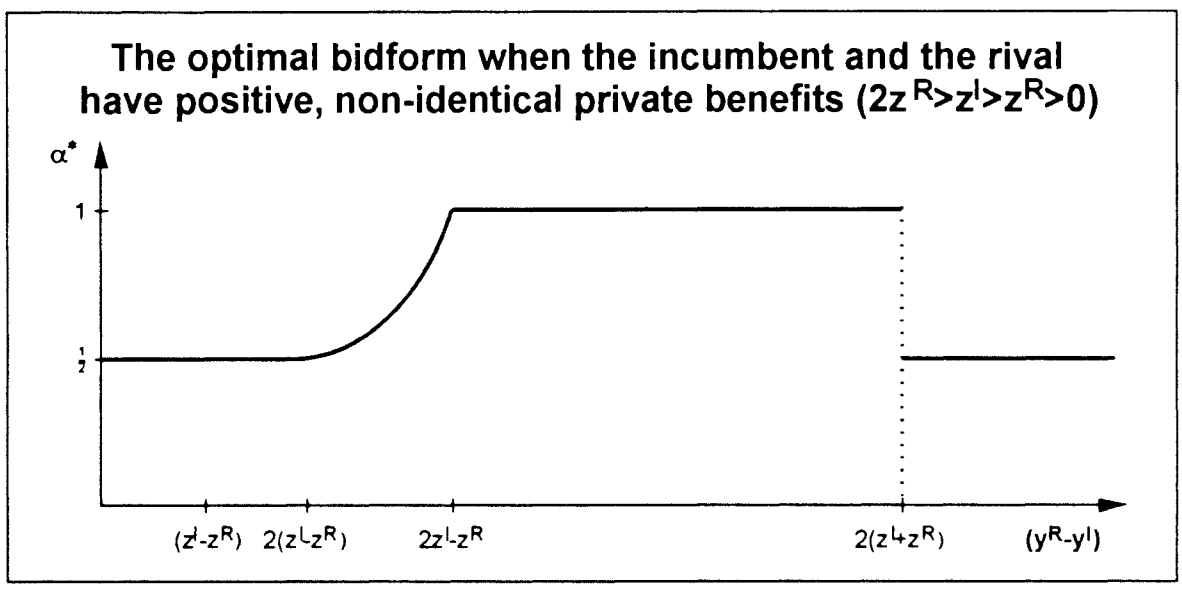

Figure 1: The figure shows the optimal bidform ex post ($\alpha^* \in [\frac{1}{2}, 1]$) as a function of the difference in security benefits (y^R-y^I) between the rival (R) and the incumbent (I).

The economic intuition behind the result is comparatively simple. Since the Nash bargaining price functional assigns relatively more weight on private than on security benefits, the founder maximizes the value of the firm by using this surplus extraction mechanism as much as possible when the private benefits of the two parties is relatively large compared to the synergy gain. This is operationalized as an interval restriction: $2 \cdot (z^I - z^R) \leq (y^R - y^I) \leq 2 \cdot (z^I + z^R)$. If this is the case, their *relative willingness to pay* is *most similar* over packages of rights that includes both security *and* private benefits. In particular, by setting α as high as feasible but still guaranteeing a transfer of control, the founder makes the profit condition of the rival most stringent, i.e. extracts as much as possible of his private benefits since he must use some of his private value of control to pay for the transfer of control if the interval restriction above applies. Accordingly, the

[9] If $(y^R - y^I) < 2 \cdot (z^I - z^R)$, there will be no transfer of control since it is not profitable for the rival for any value of α above one half. Hence, the choice of α is indeterminate, but for convenience we set it equal to one half.

bargaining mechanism is most efficiently used as a surplus extraction device if the weight of the private benefits of the rival is as small as possible while the incumbents private benefits are assigned the highest feasible weight of two, i.e. by making the *discrepancy* between the two weights as large as possible.

However, if the synergy gain is larger, the free rider mechanism generates more value since it exclusively extracts security benefits. Thus, use it as much as possible by setting α^* equal to 1/2 if $(y^R - y^I) > 2 \cdot (z^I + z^R)$. Consequently, the founder extracts most value from the new shareholder in control by exploring the comparative advantages of the two mechanisms. In particular, by using the bargaining mechanism as much as possible if the private benefits of the two negotiating parties is relatively larger than the discrepancy in security benefits, and, conversely, by utilizing the free rider one if the synergy gain is comparatively larger. As a particular implication, we observe that requiring the bidder to extend an offer for all shares of the firm, i.e. adopt the MBR, is only optimal when the synergy gain belongs to the interval $\left[2 \cdot z^I - z^R,\ 2 \cdot (z^I + z^R)\right]$.

However, while the analysis of the optimal bidform generates valuable insights about the surplus extraction potential, it was predicated on the assumption of full contingency. But how will the ex post value of the firm, ceteris paribus, be affected if the founder/writer of corporate charter faces the more restrictive *binary choice* whether to adopt the MBR or not?

A General Ex Post Analysis of the MBR

By calculating the difference of the value of the equity with and without the MBR, we delineate the consequences of the implementation of the rule. Formally, the change in firm value is defined as $\Delta F = F^{**} - F^*$ where F^{**} is the value when MBR applies and F^* when it does not. From Lemma 1 and 2, we know that if the synergy gain is located in the interval $\left[2 \cdot (z^I - z^R),\ 2 \cdot z^I - z^R\right)$, adoption of the MBR eliminates takeovers. However if the synergy gain is larger, and belongs to the interval $\left[2 \cdot z^I - z^R,\ 2 \cdot (z^I + z^R)\right]$, successful takeovers will occur both with and without implementation of the rule. Moreover, if the synergy gain is even larger, $y^R - y^I > 2 \cdot (z^I + z^R)$, the value of the firm will be same irrespectively if the rule applies or not. Accordingly, we only have to compare the values under the two regimes for two intervals.

If $2 \cdot (z^I - z^R) \leq (y^R - y^I) < 2 \cdot z^I - z^R$, the value of the equity of the firm under MBR is $F^{**} = y^I$ since the incumbent remains in control, while the pivotal block position is transferred to the rival if partial bids for the 50% are allowed. Then the value of the firm

value equals $F^* = (1/2)\cdot p^*(e_I)_{|e_I=1/2} + (1/2)\cdot y^R = \frac{3}{4}\cdot y^R + \frac{1}{4}\cdot y^I + \frac{z^I + z^R}{2}$. Hence, substitution and simplification yields

$$\Delta F^A(y^I, y^R, z^I, z^R) = F^{**}(y^I) - F^*(y^I, y^R, z^I, z^R) = -\frac{1}{4}\cdot\left[3\cdot(y^R - y^I) + 2\cdot(z^I + z^R)\right]$$

$$\text{when } y^1 = y^I + 2\cdot(z^I - z^R) \le y^R < y^I + 2\cdot z^I - z^R = y^2$$

Correspondingly, if $2\cdot z^I - z^R \le (y^R - y^I) \le 2\cdot(z^I + z^R)$, we infer from Lemma 2 that the value of the firm equity is $F^{**} = p^{**}(\alpha)_{|\alpha=1} = y^I + \frac{2}{3}\cdot\left[(y^R - y^I) + (z^I + z^R)\right]$ if the MBR applies while it is identical to the previous expression for F^* if it is not enacted. Accordingly, the difference in firm value becomes

$$\Delta F^B(y^I, y^R, z^I, z^R) = F^{**}(y^I, y^R, z^I, z^R) - F^*(y^I, y^R, z^I, z^R) = -\frac{1}{12}\cdot\left[(y^R - y^I) - 2\cdot(z^R + z^I)\right]$$

$$\text{when } y^2 = y^I + 2\cdot z^I - z^R \le y^R \le y^I + 2\cdot z^I + 2\cdot z^R = y^3.$$

The change in the value of the firm due to implementation of the MBR, ΔF, is illustrated in Figure 2 when the incumbent has larger private benefits than the rival ($z^I > z^R$), and in Figure 3 when the opposite ranking occurs ($z^R > z^I$).

The most conspicuous observation is the relatively large size of the loss due to adoption of the MBR compared to the small gain; the figure is drawn with exact proportions.[10] From an efficiency point of view, the serious drawback of the MBR is the loss of synergy gains. The positive effect on firm value from implementation of the MBR is small both because the pivotal blockholder obtains a lower price than if he negotiated without the restriction that the same price will be extended to all other shareholders, and since the value of free riding without the MBR is relatively large. Specifically, as the synergy gain comes closer to $2\cdot(z^I + z^R)$, the bargaining prices approaches the free rider value. Moreover, the specific motivation behind enactment of the MBR that the fringe of small equityowners may otherwise lose is not valid for these parameter specifications since the synergy gain is positive. However, they do not enjoy as high capital gain as the pivotal stockholder.

For the special parameter configuration of identical private benefits we notice that the regions of loss and gain are moved left-wards towards zero, i.e. losses happen for small synergy gains between 0 and z^I, while gains occurs until $4\cdot z^I$. If the rival has no private benefits, it is easily inferred that there will be no effect of adoption of the MBR. This occurs because the rule amounts to a different weight on private benefits of the rival, which is evident from his profit condition. In particular, transition of power only happens if the

[10] In fact, the area of the (lower) triangle of the loss part is identical to the whole area of the gain or $(3/8)\cdot(z^R)^2$.

rival's security benefit surpasses the incumbents valuation of his 50% ownership share or $y^I + 2 \cdot z^I$.

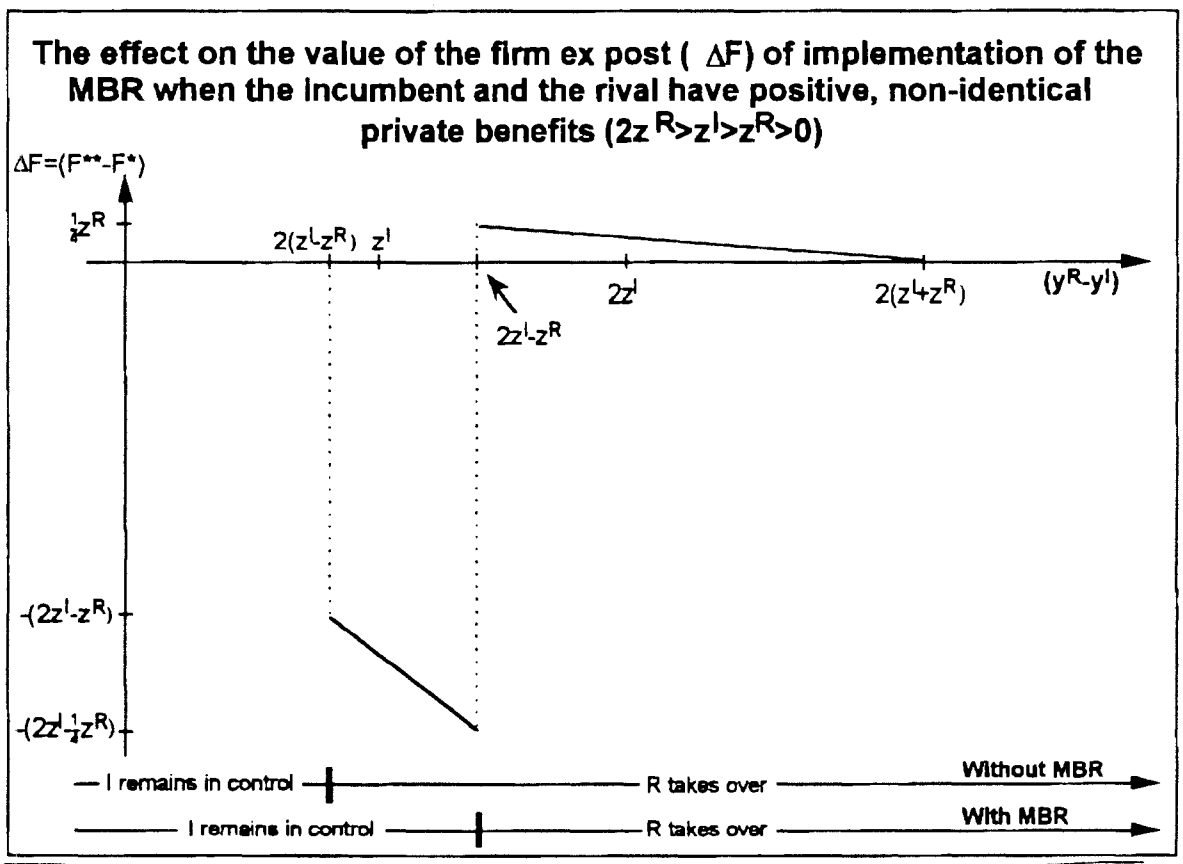

Figure 2: The figure illustrates the (ex post) effect on total firm value (ΔF) of implementation of the MBR as a function of the difference in security benefits (y^R-y^I). $\Delta F = F^{**} - F^{*}$ where F^{**} is the firm value when MBR applies and F^{*} when it does not. The specific assumption is that the incumbent controlling stockholder owns half of the equity (e_I=0.5).

As in the previous configuration of parameters, we infer from Fig 3 below that implementation of the MBR makes takeovers more difficult. However, if the rival enjoys more private benefits than the incumbent, adoption of the MBR may eliminate synergy losses. Hence, losses that accrues to the equity values of the fringe if the bidder does not have to extend an offer for the remaining shares may be annihilated by the MBR. Moreover, as expected, the size of the loss is lower if the rival has larger private benefits than the incumbent. In fact, if his private benefits are very much larger, $z^R > 2 \cdot z^I$, the MBR results in a gain since takeover attempts that lowers the security benefits substantially are annihilated. This occurs because the weight and thereby the value of private benefits becomes lower if

the MBR is adopted. In particular, this arises if only the rival has private benefits of control but the incumbent none.

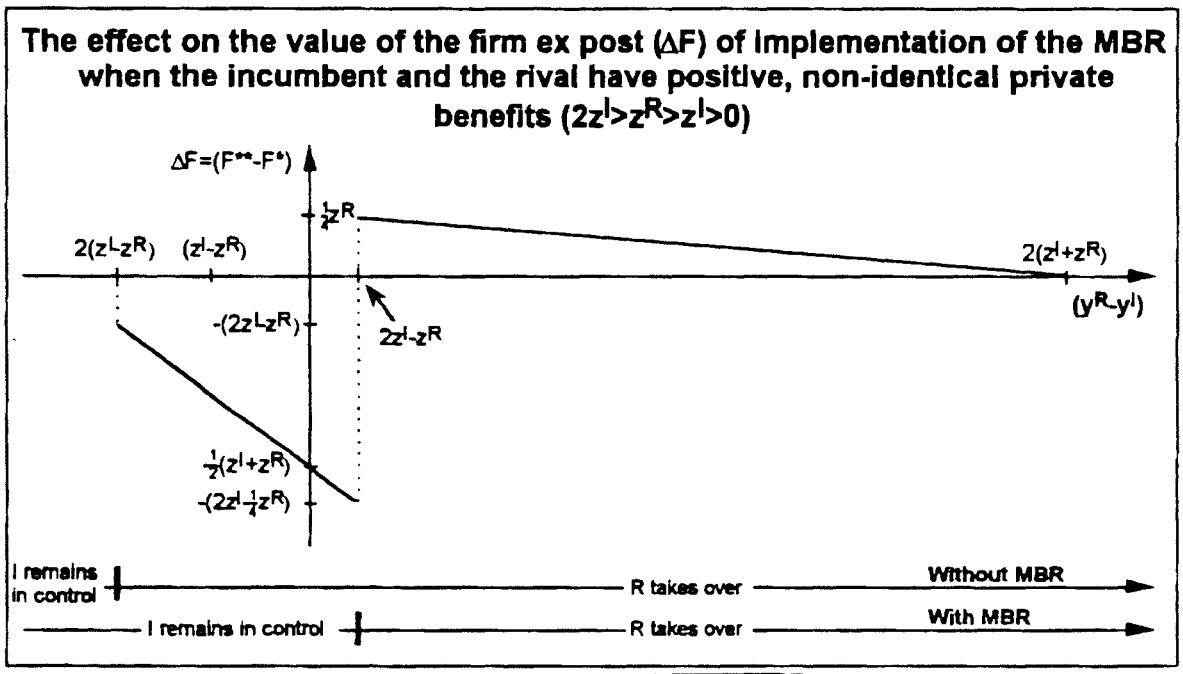

Figure 3: The figure illustrates the (ex post) effect on total firm value (ΔF) of implementation of the MBR as a function of the difference in security benefits (y^R-y^I). $\Delta F=F^{**}-F^{*}$ where F^{**} is the firm value when MBR applies and F^{*} when it does not. The specific assumption is that the incumbent controlling stockholder owns half of the equity (e_I=0.5).

From a policy perspective, the contribution of the analysis of the effects on the firm value of enactment of the MBR is that it captures the loss (ex post) which is not observable in potential takeover situations, and therefore neglected in the public debate. The case in favor of the rule is most strong if the rival has substantially greater private benefits than the incumbent shareholder in control, but it is not clear-cut; losses in the value of the firm ex post can still occur. If the incumbent enjoys greater private benefits it becomes more difficult to argue that adoption of the MBR is in the shareholders interest. In particular, if the two parties have such benefits of about the same size, perhaps the most realistic assumption about private benefits, implementation of the rule may generate substantial losses in firm value ex post.

While the ex post analysis is interesting by itself since it provides insights about the MBR, the appropriate legislative view ought to be the same as the founder's of the firm, i.e. an **ex ante perspective**. How does it affect the occurrence of future takeovers, and the efficiency of the firms? Is adoption of the MBR in the best interest of the shareholders of the

firm? In particular, How are the incentives of a potential rival affected by the rule, and thereby the value of the firm?

4. An Ex Ante Analysis of the MBR; Transfer of Control Via Bargaining.

THE SPECIFIC PURPOSE of the *ex ante analysis* is to determine how the value of the firm is affected by implementation of a bidform rule requiring a new shareholder, who takes over control from the incumbent, to also extend an offer for a share (α - 1/2) where $\alpha \in (1/2,\ 1]$ of the equity owned by the fringe of small equityowners. We demonstrate that the decision whether to adopt such a stricter bidform requirement or not has an inherent trade-off between a lower probability of a takeover attempt, but, when it actually happens, a higher premium as well as an extra distributive effect, a larger share of the gain, accrues to the firm's shareholders. In particular, the expected loss due to fewer takeovers is also increasing as α grows. The distributive effect on the gain side makes the ex ante analysis more complicated. To handle this problem and get a basic understanding of the inherent trade-offs we use the following specification. Assume that the rival's private benefits are given while his security benefit is a stochastic variable on R^+ with a well-behaved distribution function $F(y^R)$.[11] Using this simplification, we analyze the optimal bidform problem ex ante, and exemplify by postulating a uniform distribution. Moreover, we also derive, in this section, an operational criterion to inform us when adoption of the MBR lowers the value of the firm.

The Choice of Optimal Bidform Ex Ante

From the ex post analysis we know that it is sufficient to analyze the change of the value of the firm due to adoption of the MBR over two specific intervals for the synergy gain. We use this insight when studying the effect ex ante of a *more general bidform rule* requiring the outside bidder to extend an offer for at least a share $\alpha \in (1/2,\ 1]$ of the outstanding shares; in principle, there is no reason to limit the set of choices to the binary selection of either half or all of the shares. This is the *ex ante analogue* to the *contingent bidform*

[11] Postulating that his private benefits as well as his security benefits are stochastic variables would only complicate the analysis without generating any general insights. Since we know from the previous analysis that the relative size of the private benefits of the incumbent and the outside rival is pivotal for the effect on the value of the firm, we use it as well in the ex ante analysis but assume that both are exogenously given; see the example with uniform distribution.

analysis ex post in the previous section. Moreover, a general analysis will also better focus the implicit trade-offs of the optimal bidform problem.

The interval where a loss in the value of the firm ex post occurs now becomes

$$y^1 = y^I + 2\cdot(z^I - z^R) \le y^R \le y^I + 2\cdot z^I - \frac{z^R}{\alpha} = y^2(\alpha) \text{ where } \alpha \in (1/2,\ 1]$$

and the actual loss is

$$\Delta F^A(y^R) = F^{**}(y^R) - F^*(y^R) = -\frac{1}{4}\cdot\left[3\cdot(y^R - y^I) + 2\cdot(z^I + z^R)\right].$$

Since it is not profitable for the rival to takeover if the α rule is adopted, $F^{**}(y^R)$ equals y^I while the value ex post of the firm if it is sufficient to offer to buy half of the shares is

$$F^*(y^R) = (1/2)\cdot\ p^*(e_I)_{|e_I=1/2} + (1/2)\cdot y^R = \frac{3}{4}\cdot y^R + \frac{1}{4}\cdot y^I + \frac{z^I + z^R}{2}.$$

Correspondingly, the region where implementation of a stricter bidform rule generates a gain is $y^2(\alpha) = y^I + 2\cdot z^I - \frac{z^R}{\alpha} \le y^R \le y^I + 2\cdot z^I + 2\cdot z^R = y^3$. The ex post value of the firm is $F^{**}(y^R) = \alpha\cdot p^{**}(\alpha) + (1-\alpha)\cdot y^R$ if the corporate charter requires that the new shareholder in control also extends an offer for at least a share $\alpha \in (1/2,\ 1]$ of the equity and the Equal Treatment Principle applies. Since the expression for the value of the firm ex post if the 50% bidform rule applies is the same, we obtain after substitution and simplification

$$\Delta F^B(\alpha, y^R) = F^{**}(y^R) - F^*(y^R) =$$

$$(\alpha - \frac{1}{2})\cdot y^I + (1 - \alpha - \frac{1}{2})\cdot y^R + \left[\frac{\alpha^2}{\alpha + \frac{1}{2}} - \frac{1}{4}\right]\cdot\left[y^R - y^I\right] + \left[\frac{\alpha}{\alpha + \frac{1}{2}} - \frac{1}{2}\right]\cdot\left[z^R + z^I\right]$$

The size of the ex post gain increases as the required minimum size of an offer, α, becomes larger since

$$\frac{\partial \Delta F^B(\alpha, y^R)}{\partial \alpha} = \frac{1}{4\cdot\left[\alpha + \frac{1}{2}\right]^2}\cdot\left[2\cdot(z^I + z^R) - (y^R - y^I)\right] \ge 0.$$

The effect ex ante on the value of the firm, i.e. the expected value change, if the corporate charter adopts a more restrictive bidform rule, $\alpha \in (1/2,\ 1]$, is gauged by

$$\Delta F^{EX}(\alpha, y^R) = \left[F(y^2(\alpha)) - F(y^1)\right]\cdot E\left[\Delta F^A(y^R) \middle| y^1 \le y^R \le y^2(\alpha)\right]$$
$$+\left[F(y^3) - F(y^2(\alpha))\right]\cdot E\left[\Delta F^B(\alpha, y^R) \middle| y^2(\alpha) \le y^R \le y^3\right].$$

The expressions $\left[F(y^2(\alpha)) - F(y^1)\right]$ and $\left[F(y^3) - F(y^2(\alpha))\right]$, are the probabilities of a loss and gain, respectively, and the conditional expectation $E\left[\Delta F^A(y^R) \middle| y^1 \le y^R \le y^2(\alpha)\right]$ is the lost takeover premium due to the new rule, while $E\left[\Delta F^B(\alpha, y^R) \middle| y^2(\alpha) \le y^R \le y^3\right]$ is the corresponding conditional expected gain from its implementation. Accordingly, the first term

on the right hand side is the expected loss and the second one the expected gain from adoption of the stricter α rule. Thus, $\Delta F^{EX}(\alpha, y^R)$ is the overall ex ante impact on the value of the firm from acceptance of such a provision.

It is easily verified that while the expected loss grows as α increases, the expected gain is not necessarily monotonic in α; see proof of next proposition. The non-monotonicity stems from the fact that while the probability of a gain decreases as α becomes larger since $\frac{\partial F(y^2(\alpha))}{\partial y^2(\alpha)}\frac{\partial y^2(\alpha)}{\partial \alpha} > 0$ where $\frac{\partial y^2(\alpha)}{\partial \alpha} = \frac{z^R}{\alpha^2} > 0$, there is a counter-acting effect since the conditional expected gain becomes larger both because of a higher cut-off point from below, $\frac{\partial y^2(\alpha)}{\partial \alpha} > 0$, and because the actual gain is increasing in α; $\frac{\partial \Delta F^B(\alpha, y^R)}{\partial \alpha} \geq 0$. In turn, this latter effect occurs since a larger share of the takeover gain accrues to the target shareholders, in particular the fringe of small equityowners, as the bidform requirement becomes more restrictive.

If this distributive effect did not occur, it would be possible to demonstrate the general result that for all well-behaved probability distributions, adoption of a more demanding limit for control of the firm, unequivocally, lowers the value of the firm. Expressed dually, without specific assumptions about the distribution of the security benefit of the bidder we can't derive results with general validity. However, the following general proposition can be stated.

Proposition 2:

If the security benefits generated by a future rival (y^R) follows a distribution function $F(y^R)$ where $y^R \in [0, \infty)$, the choice of optimal bidform ex ante (α^*) is to

(i) set α^* equal to 1/2 if $\Delta F^{EX}(\alpha, y^R) < 0$, $\forall \alpha \in (0.5, 1]$;

(ii) if $\exists \alpha^* \in \left(\frac{1}{2}, 1\right)$ such that $\Delta F^{EX}(\alpha^*, y^R) > 0$ and

$$\int_{y^2(\alpha^*)}^{y^3} \frac{\partial \Delta F^B(\alpha^*, y^R)}{\partial \alpha} \cdot f(y^R) dy^R = \left[\Delta F^B(\alpha^*, y^2(\alpha^*)) - \Delta F^A(y^2(\alpha^*))\right] \cdot f(y^2(\alpha^*)) \cdot \frac{\partial y^2(\alpha^*)}{\partial \alpha}$$

then α^* is the best bidform;[12]

(iii) if neither (i) nor (ii) applies but $\Delta F^{EX}(\alpha^*, y^R)_{|\alpha^*=1} > 0$ and

$$\int_{y^2(1)}^{y^3} \frac{\partial \Delta F^B(1, y^R)}{\partial \alpha} \cdot f(y^R) dy^R \geq \left[\Delta F^B(1, y^2(1)) - \Delta F^A(y^2(1))\right] \cdot f(y^2(1)) \cdot \frac{\partial y^2(1)}{\partial \alpha}$$

adopt the Mandatory Bid Rule; set $\alpha^* = 1$.

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[12] The second order conditions are assumed to be satisfied, and non-uniquenss is no problem.

If there is no stricter bidform requirement $\alpha \in (0.5,1]$ generating a higher value of the firm, the best solution is to maintain the minimum limit for a transfer of control of half of the shares. However, it is optimal to mandate a new shareholder who wants to take over control of the firm to extend an offer for some intermediate amount between fifty and hundred percent of the shares if there exists an $\alpha^* \in (0.5,1)$ such that

$$\int_{y^2(\alpha^*)}^{y^3} \frac{\partial \Delta F^B(\alpha^*, y^R)}{\partial \alpha} \cdot f(y^R)dy^R = \left[\Delta F^B(\alpha^*, y^2(\alpha^*)) - \Delta F^A(y^2(\alpha^*))\right] \cdot f(y^2(\alpha^*)) \cdot \frac{\partial y^2(\alpha^*)}{\partial \alpha}$$

This expression is derived by setting the derivative of the ex ante change of the value of the firm, $\Delta F^{EX}(\alpha, y^R)$, with respect to α to zero and rearranging. Specifically, the left hand side gauges the expected non-negative marginal gain due to a marginally larger share of the takeover gain as α increases, whereas the right hand side captures the (non-negative) marginal loss because fewer takeover attempts will be made as the mandated size of the bid becomes marginally larger. The marginal loss has two parts. The first one

$$\left[\Delta F^B(\alpha^*, y^2(\alpha^*))\right] \cdot f(y^2(\alpha^*)) \cdot \frac{\partial y^2(\alpha^*)}{\partial \alpha} \geq 0$$

measures the marginal loss due to *foregone gains* while the second one

$$-\left[\Delta F^A(y^2(\alpha^*))\right] \cdot f(y^2(\alpha^*)) \cdot \frac{\partial y^2(\alpha^*)}{\partial \alpha} \geq 0$$

gauges the *marginal increase in loss* due to *annihilation of takeover attempts* generated at a slightly higher α value. Consequently, an interior optimum, $\alpha^* \in (0.5,1)$, exists if the marginal gain and the marginal costs of a change in α balance exactly.

Moreover, it is evident that if there was no marginal expected gain caused by a higher share of the takeover gain as α increases marginally, the effect of adoption of a stricter bidform requirement would always generate a loss in the value of the firm. In particular, it is only if this expected marginal distributive gain equals or surpasses the marginal expected loss caused by fewer takeover attempts also if α equals one, that it is optimal ex ante to implement the Mandatory Bid Rule. It is worth emphasizing that the marginal loss is as large as possible when α equals one. Moreover, the profit condition of the potential, new shareholder in control is as stringent as possible if the MBR applies.

We have captured the effect of adoption of a more restrictive rule on a potential bidder's incentives as a lower probability of takeovers. In particular, a maintained simplifying assumption in the ex ante analysis has been that the frequency of takeovers is *exogenously* given; a lower expected profit is, *ceteris paribus*, equivalent to a lower frequency. However, there may also exist an additional *endogenous* effect. For example, we have not analyzed how a lower expected profit of a takeover attempt due to a higher α will affect his *incentives for search* of improvements of how to run the target firm. If his marginal search

intensity is sensitive to marginal changes in expected profitability, it is likely that there will be an extra induced loss if a stricter bidform rule is adopted, i.e. it becomes even less likely that the founder of the firm will write a Mandatory Bid Rule into the corporate charter; see the analysis in section 5 for a discussion of this negative incentive effect.

The Choice of Optimal Bidform Ex Ante: The Case of A Uniform Distribution.

While the previous proposition is valid and informative as a general characterization of the problem of how to select the optimal bidform ex ante, and the intrinsic trade-offs in the decision, precise results requires specific assumptions about the distribution of the rival's synergy gain. In particular, by postulating a simple uniform distribution, the following result transpires.

Corollary 1:
If the security benefits generated by a future rival (y^R) follows a uniform distribution $f(y^R) = 1/c$ where $y^R \in [0,c]$ ($c \geq y^I + 2 \cdot z^I + 2 \cdot z^R = y^3$), the optimal bidform ($\alpha^*$) is to

(i) set $\alpha^* = 1/2$ if $z^R \leq \frac{4}{3} \cdot z^I$;

(ii) $\alpha^* = \dfrac{1}{\left[2 \cdot \frac{z^I}{z^R} + \frac{1}{2}\right]}$ if $\frac{4}{3} \cdot z^I < z^R < 4 \cdot z^I$ where $\alpha^* \in \left(\frac{1}{2}, 1\right)$; and

(iii) $\alpha^* = 1$ if $z^R \geq 4 \cdot z^I$.

We infer that if the private benefits of the rival are never larger than the incumbent's, it is optimal to allow partial bids for half of the equity of the firm. However, adoption of a MBR is only in the best interest of the founder of the target firm if the value of enjoyment of control for the rival is substantially larger than the incumbent's. Even if we have no firm a priori expectations either of the distribution functions of the synergy gain or of the size of the private benefits of the two parties, this result may give some feeling of how implementation of a MBR may affect the value of the firm. Specifically, if private benefits are of roughly the same size, perhaps the most realistic assumption, adoption of the rule can only benefit the target shareholders if substantially less than a proportional share of the probability mass over the two relevant intervals of the rival's synergy gain is located in the loss part. But if the distribution is about proportional, the rival's private benefits must be significantly larger than the incumbent's. This captures an intrinsic trade-off between the distribution of the probability mass and the relative sizes of the private benefits when facing the decision whether to adopt the MBR or not.

Operational Criterion when Adoption of the MBR Decreases the Value of the Firm

We may exemplify this reasoning by deriving a simple operational criterion when implementation of the MBR actually decreases the value of the firm for any general probability distribution $F(y^R)$ of the synergy gain. In particular, by evaluating $\Delta F^{EX}(\alpha, y^R)$ at α equal to one and require it to be negative, we establish the following result.

Corollary 2:

Adoption of the Mandatory Bid Rule decreases the value of the firm (ex ante) for any probability distribution $F(y^R)$ for the rival's security benefits if

$$\frac{\left[F(y^2)-F(y^1)\right]\cdot E\left[2\cdot(z^I+z^R)+3\cdot(y^R-y^I)\middle|y^1\le y^R\le y^2\right]}{\left[F(y^3)-F(y^2)\right]\cdot E\left[2\cdot(z^R+z^I)-(y^R-y^I)\middle|y^2\le y^R\le y^3\right]}>\frac{1}{3}$$

where $y^1=y^I+2\cdot(z^I-z^R)$, $y^2=y^I+2\cdot z^I-z^R$ and $y^3=y^I+2\cdot z^I+2\cdot z^R$.

If $z^I\ge z^R$, then the value of the firm decreases due to implementation of the MBR for ***any*** *probability distribution of the rival's synergy gain with a non-zero probability mass on the two intervals $y^1\le y^R\le y^2$ and $y^2\le y^R\le y^3$ if*

$$\frac{\left[F(y^2)-F(y^1)\right]}{\left[F(y^3)-F(y^2)\right]}>\frac{1}{4\cdot\left[2\cdot\frac{z^I}{z^R}-1\right]}.$$

The first part simply states that if the ratio of the expected loss to the expected gain from adoption of the MBR surpasses one third, the founder of the firm will not adopt it in the corporate charter. To understand the inequality, note that the length of the two intervals (y^2-y^1) and (y^3-y^2) are z^R and $3\cdot z^R$, respectively, or expressed proportionally as one third. For example, this implies that for a uniform (proportional) distribution the ratio of the probability mass on the two intervals, $\left[F(y^2)-F(y^1)\right]/\left[F(y^3)-F(y^2)\right]$, is 1/3. Accordingly, if the ratio of the expected loss to the expected gain is larger than proportional, adoption of the MBR amounts to a loss in the value of the firm.

Using the fact that if $z^I\ge z^R$, $E\left[2\cdot(z^I+z^R)+3\cdot(y^R-y^I)\middle|y^1\le y^R\le y^2\right]$ is positive, which is easily shown, we demonstrate in the Appendix that for any probability distribution of the rival's synergy gain with non-zero support in the two pertinent intervals, that even a non-proportional distribution of the probability mass may generate a loss in the ex ante value of the firm if the MBR is adopted. In particular, if $z^I=z^R$ then the criterion for a negative

effect on the firm value becomes $\frac{[F(y^2)-F(y^1)]}{[F(y^3)-F(y^2)]} > \frac{1}{4}$, i.e. even if less than a proportional share of the probability mass is located on the first interval, the ex ante effect of implementation of the MBR is negative. If $z^I > z^R$, the criterion becomes even less stringent; if $z^I = 2 \cdot z^R$ then the threshold level is 1/12.

Accordingly, we may summarize the ex ante analysis of adoption of the MBR when control is transferred via a bargaining mechanism, by stressing the common theme that there exists a basic trade-off between the distribution of the probability mass of the synergy gain of the rival and the relative size of the private benefits of the two parties. The two corollaries have generated some insights about this intrinsic trade-off in the decision whether to implement the MBR or not. However, whereas it was possible to derive very general ex ante result for this ownership structure, we could not pinpoint unequivocal results of the ex ante effect of enactment of the MBR for **all** well-behaved probability distributions, but we will now demonstrate that this is, in fact, possible for the configuration when a minority equityowner establishes control.

5. An Ex Ante Analysis of the MBR: A Minority Shareholder Establishes Control.[13]

INSTEAD OF ASSUMING that there already exists a control position that might be transferred to a new owner, we will in this section postulate that a large minority owner - a bidder with toehold - may establish control of a firm where no shareholder has previous control. In particular, we analyze whether the legislation should effectively prevent anyone from establishing a new control position unless he tenders for the entire company.

We assume that the charter specifies that the majority of the votes is enough to gain control. The corporate charter can either include a provision that entitles the shareholders to sell all their shares in case of a tender offer or it may not include such a provision. If partial bids are allowed, a bidder with toehold ($e_B > 0$) can offer to buy a fraction γ, less than 100 percent of the equity and will prorate equally if more than γ is tendered. If the bidder extends an offer to purchase a fraction γ such that $0.5 \leq \gamma + e_B < 1$ of the targets outstanding shares at a price p per 100% of the shares we call it a partial bid. If the corporate charter does not allow partial bids any bidder must make an offer for all of the shares at a particular price, an any or all bid. If the bidder extends an offer to purchase any or all of the outstanding shares,

[13] This section builds on Bergström and Peter Högfeldt (1992).

i.e., the fraction $\gamma + e_B = 1$, we assume that the target shareholder choose to tender all their shares as long as the offer price is no less than their reservation price. In the following it will be convenient to define $\alpha \equiv \gamma + e_B$, i.e., the fraction of equity held by the large shareholder after a successful takeover.

The Large Minority Shareholder

For a cost of c(S) for monitoring and research on the firm a bidder obtains a probability S of finding an improvement $Z \equiv y^B - y^I$ where y^B and y^I denotes the expected cash flow under the bidder and the incumbent management, respectively. This random variable has continuous cumulative probability function F(Z) defined on the interval $[Z_{min}, Z_{max}]$ where Z_{min} can be a negative number while Z_{max} is a positive one. The cost function is assumed to be strictly increasing, convex and continuously differentiable function such that $\lim_{S \to 0} \partial c(S)/\partial S = 0$ and $\lim_{S \to 1} \partial c(S)/\partial S = Z_{max}$. If the bid is successful the acquirer obtains a private benefits amounting to z.

Suppose he invests S and find out an improvement Z. He makes a tender offer if he can purchase $\alpha - e_B$ of the shares ($\alpha \geq 0.5$) at bid price p satisfying

$$\alpha \cdot y^B + z - (\alpha - e_B) \cdot p - e_B \cdot y^I - t \geq 0 \text{ or}$$

$$\alpha \cdot Z - (\alpha - e_B) \cdot (p - y^I) - (t - z) \geq 0$$

In this setting the bidder is able to profit from an acquisition by capital gains on either his own shares, from his private benefits z, or from the fact that p is smaller than the post takeover value of the company. He also pays a fixed transaction cost t for the tender offer. Any of these reasons gives him incentives to spend monitoring and takeover costs.

Tendering Shareholders

A target shareholder has information on t, F(Z), e_B and z. Hence, we have a situation where the small target shareholder knows less about the potential improvements. Tendering is the best strategy if and only if p exceeds his reservation price, the expected cash flow under the acquirer, $E(y^B)$. His forecast of y^B is based on his knowledge of the distribution of Z as well as of the rationality condition that the bidder only makes a bid if he can make a non-negative profit. This implies that he will tender if and only if

$$p \geq E\left[y^B \middle| y^B \geq \alpha^{-1} \cdot \{(\alpha - e_B) \cdot p + e_B \cdot y^I + t - z\}\right] \text{ or}$$

$$p - y^I \geq E\left[Z \middle| Z \geq (1-\alpha^{-1}\cdot e_B)\cdot(p-y^I)+\alpha^{-1}\cdot(t-z)\right]$$

If a target shareholder is indifferent between tendering and not tendering their shares she choose to tender.

Analysis

For any given offer price p, the larger is α, the larger is the target shareholders expectation of the post takeover improvements Z. Stated more formally we have:

Lemma 3:
$E\left[Z \middle| Z \geq (1-\alpha^{-1}\cdot e_B)\cdot(p-y^I)+\alpha^{-1}\cdot(t-z)\right]$ *is an increasing function of* α.

The interpretation of Lemma 3 is that the larger the fraction of equity the bidder must acquire, the harder it is to convince target shareholders that the value improvement, Z is small. Viewed another way, the bidder is convincing because as α increases, the premium over the status quo value has to be extended to more shares, thereby decreasing his profits for any given improvement Z. Therefore, in order for the bidder to make a profit at a higher value of α, and for a given p, Z needs to be larger.

Since the bidder wants to obtain $\alpha - e_B$ shares at minimum cost, he will bid the minimum price, $p^*(\alpha, e_B, z)$, satisfying the reservation price of the small shareholders. An immediate consequence of Lemma 3 is that the bid price is increasing in the fraction of equity the bidder must purchase;

Lemma 4:
$p^*(\alpha, e_B, z)$ *is increasing in* α.

Lemma 4 is intuitively clear because when α is large, it takes high-valued improvements to produce a profit. Accordingly, the target shareholders expectations of Z becomes larger, and, therefore, their reservation price increases.

We define Z^0 as the minimal improvement the bidder can accomplish above which a takeover becomes profitable. Then the combined effect of Lemma 3 and Lemma 4 gives us:

Lemma 5:
$Z^0(\alpha, e_B, z)$ *is increasing in* α.

Ceteris paribus, Z^0 is increasing in α (Lemma 3). Since $p^*(\alpha, e_B, z)$ is increasing in α (Lemma 4), the induced effect supports the primary effect of a higher α-value. Consequently, the total effect is positive. The implication of this result is that conditional on the bidder having drawn an improvement, the probability that the improvement is large enough to motivate a bid, $F[1 - Z^0(\alpha, e_B, z)]$, is decreasing in α.

Let us now consider the bidders optimal choice of monitoring and research intensity. Let $B(S, e_B, \alpha, z)$ be his expected benefit from research intensity S, i.e., $B(S, e_B, \alpha, z) = S(e_B, \alpha, z) \cdot E[\mathrm{Max}[\alpha \cdot Z - (\alpha - e_B) \cdot (p^*(e_B, \alpha, z) - y^I) - (t - z), 0]]$. The last factor denotes the expected benefits from investing in information about the target firm, conditional that the bidder finds an improvement. This conditional expected benefit is decreasing in α.

Lemma 6:
$E[Max[\alpha \cdot Z - (\alpha - e_B) \cdot (p^*(e_B, \alpha, z) - y^I) - (t - z), 0]] = E[Max[\alpha \cdot (Z - Z^0(e_B, \alpha, z), 0]]$ *is decreasing in* α.

For an improvement such that $Z \geq Z^0(e_B, \alpha, z)$, an acquisition is profitable. Since $Z^0(e_B, \alpha, z)$ is increasing in α, the expected benefit, conditional on the bidder having find an improvement, is a decreasing function of α. Hence, the higher α, the less willing is the bidder to pay for a higher probability of finding an improvement and as a consequence we have the following lemma:

Lemma 7:
The bidders optimal choice of research intensity - $S^*(e_B, \alpha, z)$ *- is decreasing in* α.

So far we have shown that $p^*(\alpha, e_B, z) - y^I$ and $Z^0(e_B, \alpha, z)$ increases in α and that $S^*(e_B, \alpha, z))$ decreases in α. The value of the firm is equal to the sum of the status quo value of the firm and the expected value of any future improvements accruing to tendering shareholders, i.e., the value of the firm can be expressed as

$$V(\alpha, e_B, z; y^I, t) = y^I + S^*(\alpha, e_B, z) \cdot [[1 - F(Z^0(\alpha, e_B, z))] \cdot E[Z | Z \geq Z^0(\alpha, e_B, z)]] \text{ or}$$

$$V(\alpha, e_B, z; y^I, t) = y^I + S^*(\alpha, e_B, z) \cdot \Pi(\alpha, e_B, z; y^I, t)$$

where $\Pi(\alpha, e_B, z; y^I, t)$ denotes the expected increase in the firms profit accruing to tendering shareholders, conditional on the bidder having drawn an improvement. This value decreases in α:

Lemma 8:

The expected increase in the firms profit accruing to tendering shareholders conditional on the bidder having drawn an improvement
$\Pi(\alpha, e_B, z; y^I, t) = \left[\left[1 - F(Z^0(\alpha, e_B, z))\right] \cdot E\left[Z \middle| Z \geq Z^0(\alpha, e_B, z)\right]\right]$ *is decreasing in* α.

Even though the expected improvement, conditional on a bid - $E\left[Z \middle| Z \geq Z^0(\alpha, e_B, z)\right]$- increases with a higher value of α, the total effect on the expected increase in firms profit, for a given research intensity, of an increase in α is non-positive since the decrease in the probability of a takeover, conditional on the bidder having drawn an improvement $\left[1 - F(Z^0(\alpha, e_B, z))\right]$ dominates over the positive premium effect. The intuition is that the expected value of the low-valued improvements that would have been made at a lower α is subtracted as α increases. Moreover, since $S^*(e_B, \alpha, z)$ is decreasing in α, the probability of a takeover becomes even smaller for high values of α. We summarize the consequences of the previous analysis in the following results.

Proposition 3:

Ceteris paribus, a rise in the fraction of equity the buyer must acquire α *generates an increase in the takeover premium* $p^*(\alpha, e_B, z) - y^I = E\left[Z \middle| Z \geq Z^0(\alpha, e_B, z)\right]$, *and a decrease in the probability of a takeover* $S^*(e_B, \alpha, z) \cdot \left[1 - F(Z^0(\alpha, e_B, z))\right]$. *Since the latter effect dominates the former, the market value of the firm decreases as* α *increases.*

Corollary 3:

Ceteris paribus, an amendment of a Mandatory Bid Rule to the corporate charter reduces the market value of the firm.

Since prohibition of partial bids is equivalent to an enforcement of a stricter control threshold, a higher α, the value of the firm decreases according to Proposition 4. Consequently, adoption of a Mandatory Bid Rule would seriously deter takeovers when a large minority shareholder wants to establish control by impeding even takeover attempts which are unrelated to the potential violation of minority rights; the conclusion applies whatever the motivation behind the activity is.

In particular, the implicit trade-off in the decision whether to adopt the rule or not is between a lower frequency of takeovers versus a higher tender offer price. However, we find that the negative probability effect, fewer expected takeovers, caused by implementation of a MBR dominates the positive premium effect; if a takeover attempt actually succeeds,

the premium above the prevailing stock price paid to tendering shareholders is higher. The latter effect is caused by the fact that when the bidder has to extend an any or all bid, the expected post takeover price is larger, and, therefore, the rationally inferred reservation price of the small shareholders becomes larger. Accordingly, enactment of the MBR, ceteris paribus, increases the takeover premium. However, despite this positive effect on the takeover premium, adoption of the MBR reduces the welfare of shareholders ex ante.

Comparing this ex ante effect of enactment of a Mandatory Bid Rule when the ownership structure of the target firm is dominated by a large minority shareholder with the corresponding one where one equityowner already has control, we observe that we are able to derive a general, negative effect on the value of the firm in the first case but not in the latter one. The pivotal difference being that besides the positive premium effect, a higher conditional expectation, we also demonstrated the existence of a larger share effect, a positive distributive effect, when α increases, in the situation when control changes hands. However, if this expected gain is small, we conclude that adoption of a MBR is likely to have a negative effect on the value of the firm for both ownership structures of the target firm.

A Numerical Example

Assume that private benefits as well as the cost of making a bid are negligible ($z = t = 0$), and that F(Z) is a uniform distribution defined on [0,1], i.e., $Z_{max} = 1$. The distribution assumption implies that $E\left[Z \middle| Z \geq Z^0\right] = \left[1 + Z^0\right]/2$, i.e. the expected improvement is the average of the maximum improvement $Z_{max} = 1$, and Z^0 is the smallest Z that allows a profitable takeover, i.e. Z^0 is the improvement that results in zero profit at the bid premium $p - y^I = \left[1 + Z^0\right]/2$. Inserting this expression into the zero profit condition - $\alpha \cdot Z^0 - (\alpha - e_B) \cdot (p - y^I) = 0$ - results in $Z^0 = (\alpha - e_B)/(\alpha + e_B)$. Accordingly, the small target shareholder infers that the bidder, given that he extends a bid, has found an improvement that amounts to at least $(\alpha - e_B)/(\alpha + e_B)$. Then the equilibrium bid premium becomes $p - y^I = \left[1 + Z^0\right]/2 = \alpha/(\alpha + e_B)$, which is his reservation premium.

Assume that the large shareholders stake in the company is $e_B = 0.25$. Then we find for $\alpha = 0.5$ and $\alpha = 1$, respectively, the following values of the cut-off point of improvements, Z^0 and the premium, $p - y^I$; see column 2 and 3 in the Table below. Conditional on the bidder having drawn an improvement, the probability that the improvement is large enough to motivate a bid, $1 - F(Z^0(e_B))$, decreases in α. But on the other hand, the premium is increasing in α. The combined effect, the expected increase in the

firm's profit, conditional on the bidder having drawn an improvement, $\left[1-F(Z^0(e_B))\right]\cdot E\left[Z|Z \geq Z^0(e_B)\right]$, is decreasing in α (column 4).

α	Z^0	$p-y^I$	$\left[(1-F(Z^0(e_B))\right]\cdot E\left[Z|Z \geq Z^0(e_B)\right]$
0.5	0.3333	0.6667	0.6667·0.6667 = 0.4445
1.0	0.6	0.8	0.4·0.8 = 0.32

While the smaller range of improvements acted on as α rises, leads to a higher takeover premium, the reduced probability of an improvement being implemented more than compensates for this. If a lower α-value is allowed, the target shareholders would receive a net gain since also low-value improvements would be implemented, i.e. they loose since the adoption of a more stringent threshold for control annihilates such gains.

6. A Comparative Analysis of Two Surplus Extraction Mechanisms: Auction and Bargaining

AS AN EXTENSION, we also provide a comparative analysis of two *surplus extraction mechanisms* encompassed by the Mandatory Bid Rule. As demonstrated by Bergström, Högfeldt and Molin (1993), an *auction mechanism* determines who the winner is as well as the resulting tender offer price, when two parties compete to establish control of an atomistically owned firm. Furthermore, as soon will be demonstrated, this surplus extraction mechanism is almost analogous to the one implicit in a very different problem, analyzed by Zingales (1991) and (1993): How to determine the *optimally retained ownership share* of a value maximizing founder of the firm? We analyze the economic difference between these two closely related extraction devices and the *bargaining mechanism* studied in this paper. Let us start with the founder's problem of how much to retain, assuming that bids are for all outstanding shares.

The Optimal Retained Ownership Share When MBR Applies

A maintained and simplifying assumption of most of the analysis so far has been that the pivotal blockholder owns half of the equity. However, if the MBR is implemented it also affects how large the optimal (retained) ownership of for example the founder or some other large future shareholder will be. In particular, how do we select the optimal size of a control block (e_I^*) such that the value of the firm is maximized when the MBR is amended to the corporate charter? In this section we assume that the MBR is adopted but that the Equal Treatment Provision does not apply, i.e. the bidder extends an offer for all outstanding shares but differentiate the prices between the incumbent blockholder and the fringe of small equityowners. He offers the agreed upon bargaining price to the pivotal owner and the free rider value to the fringe.

Under these specifications, the problem of selection of the optimal retained ownership share is formally

$$\max_{e_I \in [0,1]} V(e_I; p^*(e_I), y^R) = \begin{cases} \max_{e_I \in [0.5,1]} e_I \cdot p^*(e_I) + (1-e_I) \cdot y^R \text{ if } (z^I - z^R) \leq (y^R - y^I) \leq 2 \cdot (z^R + z^I) \\ y^R \text{ and } 0 < e_I < 0.5 \text{ if } (y^R - y^I) > 2 \cdot (z^R + z^I) \end{cases}$$

In particular, the choice of an optimal size of a block position is equivalent to the selection of the best linear combination of two price mechanisms: bargaining and free riding. In contradistinction to the previous optimization problem, the critical parameter, e_I, can attain values below one half, i.e. the blockholder may find it in his best interest to free ride and not accumulate a large enough share to block any takeover attempt and negotiate with the outside rival. From Lemma 1 we know that the free rider value exceeds the bargaining price for any size of a control position if $(y^R - y^I) > 2 \cdot (z^R + z^I)$. Thus, a choice of retained ownership share below 50% generates a value of y^R if the rival establishes control.

However, if the synergy gain is less than $2 \cdot (z^R + z^I)$ it is profitable to also use the bargaining mechanism as a surplus extraction mechanism. If the valuation of the firm under the control of the incumbent, $(y^I + z^I)$, surpasses the value if the rival establishes control, $(y^R + z^R)$, the incumbent will remain in power by retaining all shares, i.e. if $(y^R - y^I) < (z^I - z^R)$. Jointly, this implies that the bargaining mechanism is used and control transferred if $(z^I - z^R) \leq (y^R - y^I) \leq 2 \cdot (z^R + z^I)$. After substitution of the expression for $p^*(e_I)$ and simplification we obtain

$$\max_{e_I \in [0.5,1]} V(e_I; y^I, y^R, z^I, z^R) = \max_{e_I \in [0.5,1]} e_I \cdot p^*(e_I) + (1 - e_I) \cdot y^R = y^R + \frac{1}{2} \cdot \left[(z^R + z^I) - e_I \cdot (y^R - y^I) \right]$$
$$\text{if } (z^I - z^R) \leq (y^R - y^I) \leq 2 \cdot (z^R + z^I).$$

Let us first analyze the case when the incumbent has larger private benefits of control than the rival: $z^I > z^R$. As in the previous optimization problem, we have to consider two

situations: (i) if the choice does not affect the outcome of the takeover attempt, and (ii) when it does. From the profit condition $y^R - y^I \geq \frac{1}{e_I} \cdot \left[z^I - z^R\right] > 0$ we infer that it is most restrictive if $e_I = 1/2$. Accordingly, any choice of $e_I \in [1/2, 1]$ ascertains transfer of control if $0 < 2 \cdot (z^I - z^R) \leq (y^R - y^I) \leq 2 \cdot (z^R + z^I)$. But then it is immediate from inspection of the maximand that a choice of $e_I = 1/2$ generates the highest firm value.

Turning to the situation when the choice of e_I also affects if a transfer of control occurs or not, we infer from the profit condition of the rival that it is least tight if $e_I=1$ or $0 < (z^I - z^R) < (y^R - y^I)$ and most restrictive when $e_I = 1/2$. Hence, if the synergy gain satisfies $0 < (z^I - z^R) < (y^R - y^I) < 2 \cdot (z^I - z^R)$, the selection of retained ownership share is crucial when determining if the takeover attempt succeeds or not. In particular, this implies that there exists an ownership share $e_I^{**} \in [0.5, 1]$ such that the incumbent's and the rival's highest valuations of the firm are identical: $y^R + \frac{z^R}{e_I^{**}} = y^I + \frac{z^I}{e_I^{**}}$. Since $z^I > z^R$, this is only possible if the security benefits of the rival surpasses that of the incumbent: $y^R > y^I$. A choice of a slightly lower ownership share than e_I^{**} secures the maintained control of the incumbent, while selection of a higher one ascertains transfer of control. The latter choice is preferred since the value of the firm under the rival is higher than under the incumbent; $y^R + z^R > y^I + z^I$ (evaluate at $e_I=1$). Solving for e_I^{**} yields $e_I^{**} = \frac{(z^R - z^I)}{(y^I - y^R)}$ which is a decreasing and convex function of the synergy gain. Substitution of e_I^{**} into the maximand yields $V^* = y^R \cdot z^R$, i.e. the target shareholders extract all of the rival's security and private benefits.

Finally, analyzing the configuration when $z^R > z^I$ and using the fact that the incumbent only let go of control if $y^R + z^R > y^I + z^I$, we deduce that either $(z^I - z^R) \leq (y^R - y^I) \leq 0$ or $0 < (y^R - y^I) \leq 2 \cdot (z^R + z^I)$. From the maximand it is immediate that if $y^I > y^R$, the best choice is to set $e_I=1$. Furthermore, in the second case with positive synergy gain, optimal extraction happens if the founder retains half of the shares. These results are summarized in the following statement and illustrated in Figure 4 when $z^I > z^R$.[14]

[14] In the situation when $(y^R - y^I) < (z^I - z^R)$, we infer that the total valuation of the firm of the incumbent, $y^I + z^I$, surpasses that of the rival, $y^R + z^R$, and it is not profitable for the latter to take over control. Consequently, the founder can't extract any extra value in a future takeover; i.e. the firm's value is highest if it stays private: $e_I = 1$.

Proposition 4:[15]

If the MBR is adopted and differentiated tender offer prices are allowed, the ex post (contingent) value of the firm is maximized by the following contingency rule for selection of retained ownership (e_I^*).

(i) Set $e_I^* = 1$ *if* $(y^R - y^I) \leq max[(z^I - z^R), 0]$;

(ii) $e_I^* = e_I^{**} + \varepsilon$ *where* $\varepsilon > 0$ *and* $e_I^{**} = (z^R - z^I)/(y^I - y^R)$ *if*
$0 < (z^I - z^R) \leq (y^R - y^I) \leq 2 \cdot (z^I - z^R)$;

(iii) $e_I^* = 1/2$ *if* $max[2 \cdot (z^I - z^R), 0] \leq (y^R - y^I) \leq 2 \cdot (z^I + z^R)$; *and*

(iv) $0 < e_I^* < 1/2$ *if* $(y^R - y^I) > 2 \cdot (z^I + z^R)$.[16]

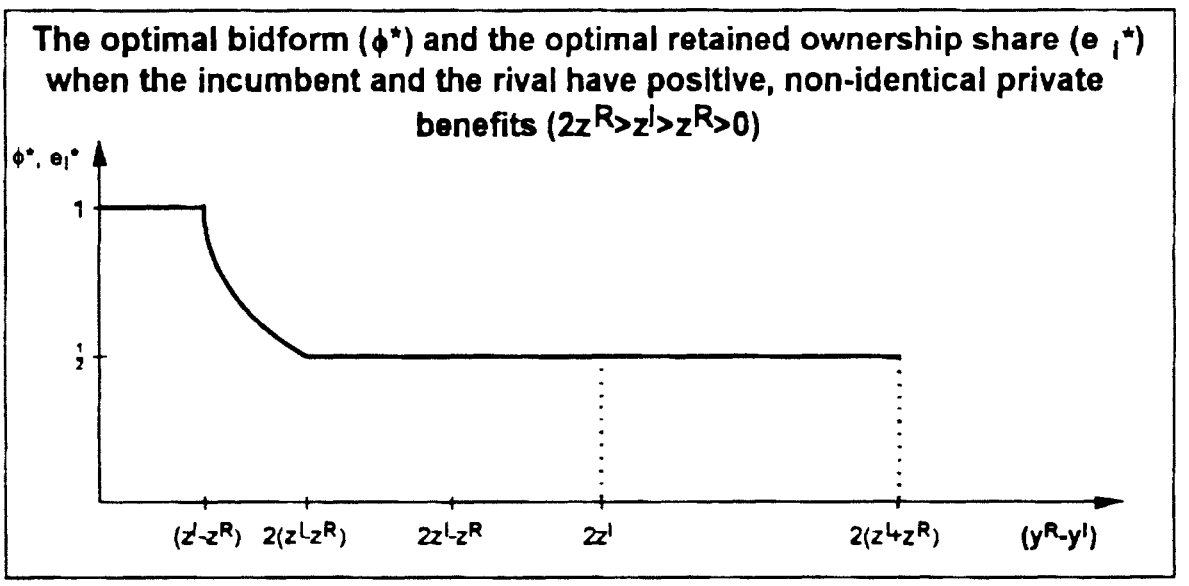

Figure 4: The optimal bidform ex post (ϕ^*) as a function of the difference in security benefits (y^R-y^I) when the two contestants fight to establish control in an atomistically held firm. To the right of $2z^I$, the choice of bidform is irrelevant. The figure also illustrates the optimally retained ownership share (e_I^*) when control is transferred through a bargaining procedure and the MBR applies. To the right of $2(z^I+z^R)$, the retained share is less than half of the equity.

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[15] Although differently stated, this proposition is analogous to Proposition 1 in Zingales (1993). However, we derive it differently and in a different economic context. Furthermore, we use it to demonstrate its affinity with the extraction mechanism derived under atomistic ownership structure in Bergström, Högfeldt and Molin (1993), and how different these two extraction mechanisms are from the one used when control is transferred via bargaining as in the present paper.

[16] If we also impose the Equal Treatment Provision on the bargaining price, the optimization problem becomes $\max_{e_I \in [0.5,1]} V = \max(p^{**}(e_I), y^R, y^I + z^I)$. It is possible to show that exactly the same solution applies as stated in the proposition but with the difference that the optimal e_I changes for the region the choice of retained ownership affects if a bargaining situation occurs or not. In particular, with equal treatment the crucial e_I^{*ETP} equals $z^I / [(y^R - y^I) + z^R]$. It can shown that $e_I^{*ETP} < e_I^{**} = (z^R - z^I)/(y^I - y^R)$.

What is the economic intuition behind the results? From our previous analysis we know that free riding is a more efficient extraction mechanism than bargaining if the synergy gain is larger than two times the sum of the two parties private benefits or $2\cdot(z^R + z^I) < (y^R - y^I)$. By not retaining a majority position the large blockholder abstains from bargaining with the rival and receives the best possible price: the free rider value.

However, if the synergy gain is less than $2\cdot(z^R + z^I)$, it is optimal to use the bargaining mechanism since it extracts more of the rival private benefits than free riding. Given that the bargaining mechanism is used and the MBR applies, a choice of optimal retained ownership share is equivalent to selection of a weight on the private benefits of the incumbent: $1/e_I^*$. In particular, by making the weight as large as possible, set $e_I^* = 1/2$, the profit condition of the rival becomes most stringent, i.e. his valuation of the firm, $y^R + z^R$, has to surpass the incumbent's valuation of $y^I + 2\cdot z^I$.[17] Since the rival must use some of his private benefits to pay the takeover premium, a retained ownership share of a half extracts as much of his private benefits as possible. This occurs if the synergy gain belongs to the interval $\left[2\cdot(z^I - z^R), 2\cdot(z^R + z^I)\right]$. Specifically, if the synergy gain is larger than $2\cdot z^I - z^R$ but smaller than $2\cdot(z^R + z^I)$, a joint choice of adoption of the MBR (α=1) and a retained ownership share of 50% of the equity is optimal, i.e. extracts as much value as possible from a new shareholder who takes over control.[18]

If the synergy gain surpasses $(z^I - z^R)$ but is smaller than $2\cdot(z^I - z^R)$, it is possible to extract all of the rival's surplus by setting $e_I^* = e_I^{**}$. Since the sum of synergy gain and private benefits under his leadership is larger than the incumbent's for this set of synergy gains, the founder extracts as much surplus as possible by retaining an ownership share slightly larger than e_I^{**}, which guarantees that the rival achieves control and the takeover premium is as close as possible to his maximum willingness to pay.

A GENERAL ANALYSIS AND COMPARISON OF TWO MECHANISMS

At a more general level, the implicit choice in selection of the optimally retained ownership share can be described as a design problem of how to model a package of two rights or benefits (security and private) that extracts as much as possible of the rival surplus. In

[17] This is also directly verifiable from the expression of the bargaining price functional under ETP, p**, since we observe that it is decreasing in e_I^*. Hence, the lowest possible pivotal ownership share of 1/2 generates the highest takeover premium under MBR.

[18] Either look at Figures 1 and 4 or use the price functional p**.

particular, if the weight on security benefits is normalized to one, private benefits are assigned the weight two if half of the firm's shares are retained, one if the firm stays or go private; and some weight between one and two if an intermediate share is retained. Accordingly, the basic problem is how to design a package of the two benefits such that the rival pays the highest possible premium for control. Specifically, by retaining half of the shares (if possible), the incumbent's willingness to pay for control in a bargaining mechanism is maximized. Since the rival's maximum willingness to pay for control must surpass the incumbent's, surplus extraction is optimized by such a choice of retained shares. Or expressed somewhat differently, by assigning as high weight as possible on private benefits in the package, the bargaining mechanism extracts as much of the rival's private benefits as possible.

The problem of how to select the optimally retained ownership share is, perhaps somewhat surprisingly, almost analogous of how to determine the optimal bidform (ϕ^*) if the ownership structure of the firm is atomistic and two management teams compete for control, see Proposition 2 in Bergström, Högfeldt and Molin (1993) which is illustrated in Figure 4. They analyze whether a party trying to acquire control should be required to extend a tender offer for 50% or for 100% as in the MBR or for some intermediate share of the outstanding equity. In particular, by requiring a potential bidder to extend an offer for a share ϕ^* of the equity, the two rival teams compete over a package of security and private benefits where the weight on the latter is $1/\phi^*$. Accordingly, by a suitable choice of bidform, the maximum willingness to pay for control of the two parties can be used by the incumbent shareholders in order to extract as much as possible of the winner's surplus. As evident from Figure 4, if the synergy gain is greater than $2\cdot(z^I - z^R)$ but smaller than $2\cdot z^I$ it is optimal to assign as large weight as possible on private benefits (2) by allowing bids for 50% of the shares. This choice makes the competition between the two rivals as fierce as possible over packages for which their similarity of willingness to pay is relatively most similar, i.e. over private benefits. This is equivalent to extract as much as possible of the winner's surplus since such a bidform makes him pay as high premium as possible for control.

Consequently, we conclude that even though the problem of selecting the optimally retained ownership share if the MBR applies and the question of how to choose the best bidform if the target firm is atomistically owned at first may look quite different, they are affine in terms of economic logic since optimal extraction of the surplus of the new shareholder in control is equivalent to a choice of a weight on private benefits that makes the bargaining parties or the two competitors willing to pay as much as possible for control. However, while these two extraction problems have an analogous structure, it is evident from comparison of Figure 1 and 4, that the problem of how to determine the optimal

bidform if the incumbent has control of the firm and a bargaining mechanism transfers control is quite different, almost diametrically opposed for some parameter configurations. Specifically, if the synergy gain is located in the interval $\left[2 \cdot z^I - z^R, 2 \cdot (z^I + z^R)\right]$, the optimal choice when control is transferred via a bargaining mechanism is to implement the MBR, but allow partial bids for 50% of the outstanding shares if two rival's compete for control in an atomistically owned firm and where an auction mechanism is used to settle who establishes control. Since the MBR covers both target firms with atomistic and concentrated ownership structures, its enactment can never be in the interest of the incumbent shareholders of all firms. This inconsistency in the MBR has not previously been observed in the literature.

If the size of private benefits is large relative to the synergy gain, we can make the following comparative statement of the different surplus extraction mechanisms which are operational either when two parties compete to establish control or bargain over transfer of control of the firm.[19] The difference between the two almost affine extraction mechanisms and the specific bargaining mechanism analyzed in this paper is that whereas the first set extracts most value by assigning the *highest feasible common value* on private benefits and thereby making the competitive pressure as fierce as possible, the latter extraction device is most efficient if the *discrepancy between the weights* on private benefits of the rival and the incumbent is *as large as possible* since the profit condition of the rival becomes most stringent. While the first two mechanisms operate by designing a package of security and private benefits such that the two contestant's relative willingness to pay for the *same package of rights* are as similar as possible, the *bargaining mechanism* implicitly extracts as much surplus as possible from the new shareholder in control by making the two parties relative willingness to pay as similar as feasible over *two distinct packages of security and private benefits that are as different as possible*. In this sense, the two types of surplus extraction mechanisms are as opposed as feasible; this captures the pertinent difference in terms of economic logic between them.

7. Conclusion

THE PERTINENT CONTRIBUTION OF THIS PAPER has been the *ex ante analysis* of how the amendment of a Mandatory Bid Rule to the corporate charter affects the value of the firm.

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[19] Assuming that $z^I > z^R$, this occurs for the auction mechanism if $2 \cdot (z^I - z^R) < (y^R - y^I) < 2 \cdot z^I$ or if $-2 \cdot z^R < (y^R - y^I) < 0$, and for the bargaining mechanism if $(y^R - y^I) < 2 \cdot (z^R + z^I)$.

The ex ante approach constitutes the relevant analytical perspective from an economic viewpoint. However, most of the legal literature as well as the motivation behind legislative initiatives are based on ex post arguments. Even if adoption of a Right To Sell Principle may be in the interest of the target shareholders from an ex post perspective, a conclusion with some formal support in the analysis of this paper, it is more questionable from an ex ante viewpoint. In particular, the founder of the firm where the expected future ownership structure will be dominated by a large minority shareholder, who may want to establish control of the firm, will never voluntarily write it into the corporate charter since it will definitely lower the value of the firm. Moreover, if the expected ownership structure instead involves a shareholder in control and where a transfer of the power over the company to a new party may occur, the ex ante effect of adoption of the MBR is not unequivocally negative. But if we also postulate that the incentives of the potential shareholder to take over control are sensitive to the negative effect on the expected profitability of a takeover attempt due the implementation of a MBR, it is likely that the overall effect ex ante also would be negative. Accordingly, the formal and informal arguments elaborated on in this paper seriously challenge the argument that such a rule is adopted because it is in the interest of the shareholders of the target firm. The Right To Sell Principle is not a free option.

Jointly, the present paper and the previous essay, Bergström, Högfeldt and Molin (1993), represents the most penetrating analysis of the Mandatory Bid Rule in the literature, covering two expected future ownership structures where control may be established (an atomistic structure and one with a large minority shareholder), and, finally, one where control is transferred via a bargaining mechanism.

APPENDIX
PROOFS OF RESULTS

Proof of Proposition 2.

(i) If there is no value of $\alpha \in (0.5, 1]$ which generates a positive ex ante change of the value of the firm, $\Delta F^{EX}(\alpha, y^R) < 0$, it is immediate that the best choice is to adopt the lowest possible limit for control: $\alpha^* = 1/2$.

(ii) Using the fact that

$$\left[F(y^2(\alpha)) - F(y^1)\right] \cdot E\left[\Delta F^A(y^R) \middle| y^1 \le y^R \le y^2(\alpha)\right] = \left[F(y^2(\alpha)) - F(y^1)\right] \cdot \int_{y^1}^{y^2(\alpha)} \frac{\Delta F^A(y^R)}{\left[F(y^2(\alpha)) - F(y^1)\right]} \cdot f(y^R) dy^R =$$

$\int_{y^1}^{y^2(\alpha)} \Delta F^A(y^R) \cdot f(y^R) dy^R$, and differentiation with respect to α yields

$$\frac{\partial \int_{y^1}^{y^2(\alpha)} \Delta F^A(y^R) \cdot f(y^R) dy^R}{\partial \alpha} = \Delta F^A(y^2(\alpha)) \cdot f(y^2(\alpha)) \cdot \frac{\partial y^2(\alpha)}{\partial \alpha}.$$

This expression gauges the marginal loss due to a marginal increase in the requirement for control, which is negative since $\Delta F^A(y^2(\alpha))$ is the loss evaluate at synergy gain $y^2(\alpha)$, and $\frac{\partial y^2(\alpha)}{\partial \alpha} = \frac{z^R}{\alpha^2} > 0$.

Since $\left[F(y^3) - F(y^2(\alpha))\right] \cdot E\left[\Delta F^B(\alpha, y^R) \middle| y^2(\alpha) \le y^R \le y^3\right] = \int_{y^2(\alpha)}^{y^3} \Delta F^B(y^R(\alpha)) \cdot f(y^R) dy^R$,

differentiation wrt α generates $\frac{\partial \int_{y^2(\alpha)}^{y^3} \Delta F^B(y^R(\alpha)) \cdot f(y^R) dy^R}{\partial \alpha} =$

$$-\Delta F^B(y^2(\alpha)) \cdot f(y^2(\alpha)) \cdot \frac{\partial y^2(\alpha)}{\partial \alpha} + \int_{y^2(\alpha)}^{y^3} \frac{\partial \Delta F^B(y^R(\alpha))}{\partial \alpha} \cdot f(y^R) dy^R.$$

The first term is negative since $\Delta F^B(y^2(\alpha))$ is positive and $\frac{\partial y^2(\alpha)}{\partial \alpha} = \frac{z^R}{\alpha^2} > 0$. It captures the marginal loss in takeover premium by a small increase in α. The second one is non-negative since $\frac{\partial \Delta F^B(\alpha, y^R)}{\partial \alpha} \ge 0$, and it gauges the expected gain due to a larger α. In particular, the target shareholders receive a larger share of the takeover gain if the control threshold increases.

Substitution of the above expressions into the derivative of the change in the ex ante value of the firm yields

$$\frac{\partial \Delta F^{EX}(\alpha, y^R)}{\partial \alpha} = \int_{y^2(\alpha)}^{y^3} \frac{\partial \Delta F^B(y^R(\alpha))}{\partial \alpha} \cdot f(y^R) dy^R -$$

$$\left[\Delta F^B(\alpha, y^2(\alpha)) - \Delta F^A(y^2(\alpha))\right] \cdot f(y^2(\alpha)) \cdot \frac{\partial y^2(\alpha)}{\partial \alpha}.$$

where the first term is the marginal gain and the sum of the remaining two is the marginal loss due to adoption of a marginally stricter requirement for control. Consequently, if there exists an $\alpha^* \in \left(\frac{1}{2}, 1\right)$ such that the marginal gain and the marginal loss are identical for this choice of control limit, and $\Delta F^{EX}(\alpha^*, y^R) > 0$, it constitutes the best possible selection.

(iii) Follows immediately from (i) and (ii). **QED**

Proof of Corollary 1.

The condition for an interior optimum, $\exists \alpha^* \in \left(\frac{1}{2}, 1\right)$ such that $\frac{\partial \Delta F^{EX}(\alpha^*, y^R)}{\partial \alpha} = 0$ or

$$\int_{y^2(\alpha^*)}^{y^3} \frac{\partial \Delta F^B(\alpha^*, y^R)}{\partial \alpha} \cdot f(y^R) dy^R = \left[\Delta F^B(\alpha^*, y^2(\alpha^*)) - \Delta F^A(y^2(\alpha^*))\right] \cdot f(y^2(\alpha^*)) \cdot \frac{\partial y^2(\alpha^*)}{\partial \alpha},$$

can after substitution and simplification be written as

$$\left[(y^I + 2 \cdot z^I + 2 \cdot z^R) - E\left[y^R \middle| y^2(\alpha^*) \le y^R \le y^3\right]\right] =$$

$$\left[\Delta F^B(y^2(\alpha^*)) - \Delta F^A(y^2(\alpha^*))\right] \cdot \left[\frac{f(y^2(\alpha^*))}{F(y^3) - F(y^2(\alpha^*))}\right] \cdot \left[\frac{4 \cdot (\alpha^* + \frac{1}{2})^2 \cdot z^R}{\alpha^{*2}}\right]$$

where $\left[\Delta F^B(y^2(\alpha^*)) - \Delta F^A(y^2(\alpha^*))\right] = 2 \cdot z^I + z^R \cdot (1 - \frac{1}{\alpha^*})$.

We apply this formula for an uniform distribution, and obtain the following results. $F(y^a) - F(y^b) = \frac{y^a - y^b}{c}$ and $\frac{f(y^2(\alpha))}{F(y^3) - F(y^2(\alpha))} = \frac{1}{\left[y^3 - y^2(\alpha)\right]}$ which equals $\frac{\alpha}{2z^R \cdot (\alpha + \frac{1}{2})}$ and $E\left[y^R \middle| y^2(\alpha) \le y^R \le y^3\right] = y^I + 2 \cdot z^I + z^R - \frac{z^R}{2 \cdot \alpha}$. Moreover, using the fact that $\Delta F^B(y^2(\alpha)) - \Delta F^A(y^2(\alpha)) = \left[2 \cdot z^I + z^R \cdot (1 - \frac{1}{\alpha})\right]$, yields after substitution into the optimum condition $\frac{1}{\alpha} \cdot \left[\alpha + \frac{1}{2}\right] \cdot z^R = \frac{2 \cdot (\alpha + \frac{1}{2})}{\alpha} \cdot \left[2 \cdot z^I + z^R \cdot (1 - \frac{1}{\alpha})\right]$. Simplification and direct analysis of the ratio $\alpha^* = 1 \Big/ \left[2 \cdot \frac{z^I}{z^R} + \frac{1}{2}\right]$ generates the result. **QED**

Proof of Corollary 2.

Substitution of $\Delta F^A(y^R) = F^{**}(y^R) - F^*(y^R) = -\frac{1}{4}\cdot\left[2\cdot(z^I + z^R) + 3\cdot(y^R - y^I)\right]$ and $\Delta F^B(1,y^R) = F^{**}(1,y^R) - F^*(y^R) = \frac{1}{12}\cdot\left[2\cdot(z^R + z^I) - (y^R - y^I)\right]$ into $\Delta F^{EX}(1,y^R) =$ $\left[F(y^2) - F(y^1)\right]\cdot E\left[\Delta F^A(y^R)\middle|y^1 \le y^R \le y^2\right] + \left[F(y^3) - F(y^2)\right]\cdot E\left[\Delta F^B(1,y^R)\middle|y^2 \le y^R \le y^3\right] < 0$ where $y^1 = y^I + 2\cdot(z^I - z^R), y^2 = y^I + 2\cdot z^I - z^R$ and $y^I + 2\cdot z^I + 2\cdot z^R = y^3$ yields after simplification the first part of the statement.

$E\left[2\cdot(z^I + z^R) + 3\cdot(y^R - y^I)\middle|y^1 \le y^R \le y^2\right]$ is positive if $E\left[y^R\middle|y^1 \le y^R \le y^2\right] > y^I$ which in turn is guaranteed if $z^I > z^R$. The worst distribution of a non-zero probability mass over the two relevant intervals occurs if it is concentrated at the point $y^R = y^I + 2\cdot(z^I - z^R) = y^1$ on the first interval, and at $y^R = y^I + 2\cdot z^I - z^R = y^2$ on the second one; see Figure 3. Then $E\left[2\cdot(z^I + z^R) + 3\cdot(y^R - y^I)\middle|y^1 = y^R\right] = 8\cdot z^I - 4\cdot z^R$ while we obtain $E\left[2\cdot(z^R + z^I) - (y^R - y^I)\middle|y^2 = y^R\right] = 3\cdot z^R$. Substitution and simplification yields the second inequality result if $z^I > z^R$. **QED**

Lemma 0.

$e_B\cdot(p - y^I) \ge t - z, \forall p \in \left[y^I, y^B\right]$

Proof:

From the definition of

$$p^*(\alpha, e_B, z) = \min\ p \text{ s.t. } (p - y^I) \ge \left[E\left[Z\middle|Z \ge (1 - \alpha^{-1}\cdot e_B)\cdot(p - y^I) + \alpha^{-1}\cdot(t - z)\right]\right]$$

follows that $(p - y^I) \ge (1 - \alpha^{-1}\cdot e_B)\cdot(p - y^I) + \alpha^{-1}\cdot(t - z)$. Simplification yields the result. **QED**.

Proof of Lemma 3:

From the definition of conditional expectation we get

$$E(Z\,|\,Z \ge K) = \int_K^{Z_{max}} \frac{Z\cdot f(Z)}{(1 - F(K))}dZ$$

Where $K \equiv (1 - e_B/\alpha)\cdot(p - y^I) + (t - z)/\alpha$. Apply Leibniz rule for differentiation of an integral and simplify

$$\partial E(Z|Z \ge K)\Big/\partial K = \frac{f(K)}{(1 - F(K))}\cdot\int_K^{Z_{max}} \frac{Z\cdot f(Z)}{(1 - F(K))}dZ - \frac{K\cdot f(K)}{(1 - F(K))} = \frac{f(K)}{(1 - F(K))}\cdot\left[E(Z|Z \ge K) - K\right] \ge 0$$

The derivative is non-negative since f(K)/(1-F(K)) > 0 and $E(Z|Z \geq K) \geq K$. Hence, $E(Z|Z \geq K)$ is an increasing function of K. Since $\partial K(\alpha, e_B, t, z, p, y^I)/\partial\alpha \equiv (e_B/\alpha^2)\cdot(p - y^I) + (t - z)/\alpha^2 \geq 0$, by Lemma 0, $e_B \cdot (p - y^I) \geq t - z, \forall p \in [y^I, y^B]$, the result of Lemma 3 follows. **QED**

Proof of Lemma 4:

From the definition of

$p^*(\alpha, e_B, z) = \min\ p \text{ s.t. } (p - y^I) \geq \left[E\left[Z|Z \geq (1 - \alpha^{-1}\cdot e_B)\cdot(p - y^I) + \alpha^{-1}\cdot(t - z)\right]\right]$ or

$\min\ p \text{ s.t. } (p - y^I) \geq \left[E\left[Z|Z \geq K(\alpha, e_B, t, z, p, y^I)\right]\right]$, it follows from Lemma 3 that an increase in K will induce a higher conditional expectation, and ipso facto a new value of $p^*(\alpha, e_B, z)$ that is at least as high as the previous one. Lemma 4 results; $p^*(\alpha, e_B, z)$ is increasing in α. **QED**

Proof of Lemma 5.

The derivative of $Z^0(e_B, \alpha, z) = (1 - e_B/\alpha)\cdot(p^*(e_B, \alpha, z) - y^I) - (t - z)/\alpha$ with respect to α is $\partial Z^0(e_B, \alpha, z)/\partial\alpha = (1/\alpha^2)\cdot\left[e_B\cdot(p^*(e_B, \alpha, z) - y^I) - (t - z)\right] + (1 - e_B/\alpha)\cdot\partial p^*(e_B, \alpha, z)/\partial\alpha$. This is non-negative since, by Lemma 0, $e_B \cdot (p - y^I) \geq t - z, \forall p \in [y^I, y^B]$, α is positive, and, by Lemma 4, $\partial p^*(\alpha, e_B, z)/\partial\alpha \geq 0$, implying $Z^0(e_B, \alpha, z)$ is increasing in α. **QED**

Proof of Lemma 6.

From the definition of the expectation and the max operator we obtain,

$E\left[\mathrm{Max}\left[\alpha\cdot(Z - Z^0(e_B, \alpha, z)), 0\right]\right] = \int_0^{Z_{max}} \left[\mathrm{Max}\left[\alpha\cdot(Z - Z^0(e_B, \alpha, z), 0\right]\right]\cdot f(Z)dZ$ which equals $\int_{Z^0}^{Z_{max}} \left[\alpha\cdot(Z - Z^0(e_B, \alpha, \gamma, z)\right]\cdot f(Z)dZ$. Using Leibniz rule, the derivative of this expression with respect to α is $\partial E\left[\mathrm{Max}\left[\alpha\cdot(Z - Z^0(e_B, \alpha, z)), 0\right]\right]/\partial\alpha = \int_{Z^0}^{Z_{max}} \left[Z - Z^0(e_B, \alpha, z)\right]\cdot f(Z)dZ -$

$\int_{Z^0}^{Z_{max}} \alpha\cdot(\partial Z^0(e_B, \alpha, z)/\partial\alpha)\cdot f(Z)dZ -$

$\alpha\cdot\left[Z^0(e_B, \alpha, z) - Z^0(e_B, \alpha, z)\right]\cdot f(Z^0(e_B, \alpha, z))\cdot\partial Z^0(e_B, \alpha, z)/\partial\alpha =$

$\int_{Z^0}^{Z_{max}} Z\cdot f(Z)dZ - Z^0(e_B, \alpha, z)\cdot\int_{Z^0}^{Z_{max}} f(Z)dZ - \int_{Z^0}^{Z_{max}} \alpha\cdot(\partial Z^0(e_B, \alpha, z)/\partial\alpha)\cdot f(Z)dZ.$

To evaluate the derivative, use the definition of conditional expectation on the first term on the right hand side $\int_{Z^0}^{Z_{max}} Z\cdot f(Z)dZ = \left[1 - F(Z^0(e_B, \alpha, z))\right]\cdot\int_{Z^0}^{Z_{max}} \frac{Z\cdot f(Z)}{\left[1 - F(Z^0(e_B, \alpha, z))\right]}dZ$

which equals $\left[1 - F(Z^0(e_B, \alpha, z))\right]\cdot E\left[Z|Z \geq Z^0(e_B, \alpha, z)\right]$.

Integrate the second term, and use the definition of $Z^0(e_B, \alpha, z)$:

$$Z^0(e_B,\alpha,z)\cdot\int_{Z^0}^{Z_{max}} f(Z)dZ = \left[1-F(Z^0(e_B,\alpha,z))\right]\cdot Z^0(e_B,\alpha,z) =$$
$$\left[1-F(Z^0(e_B,\alpha,z))\right]\cdot\left[(1-e_B/\alpha)\cdot(p^*(e_B,\alpha,z)-y^I)-(t-z)/\alpha\right].$$

From Lemma 5, substitute the derivative $\partial Z^0(e_B,\alpha,z)/\partial\alpha$ in the third term and simplify:

$$-\int_{Z^0}^{Z_{max}} \alpha\cdot(\partial Z^0(e_B,\alpha,z)/\partial\alpha)\cdot f(Z)dZ =$$
$$\int_{Z^0}^{Z_{max}} \alpha\cdot\left[(e_B/\alpha^2)\cdot(p^*(e_B,\alpha,z)-y^I)+(1-e_B/\alpha)\cdot\partial p^*(e_B,\alpha,z)/\partial\alpha-(t-z)/\alpha^2\right]\cdot f(Z)dZ =$$
$$-\left[1-F(Z^0(e_B,\alpha,z))\right]\cdot\left[(e_B/\alpha)\cdot(p^*(e_B,\alpha,z)-y^I)+(\alpha-e_B)\cdot\partial p^*(e_B,\alpha,z)/\partial\alpha-(t-z)/\alpha\right].$$

Make the three substitutions on the right hand side of the derivative, and simplify the expression

$$\partial E\left[\mathrm{Max}\left[\alpha\cdot(Z-Z^0(e_B,\alpha,z)),0\right]\right]/\partial\alpha =$$
$$\left[1-F(Z^0(e_B,\alpha,z))\right]\cdot\left[E\left[Z|Z\geq Z^0(e_B,\alpha,z)\right]-(p^*(e_B,\alpha,z)-y^I)-(\alpha-e_B)\cdot\partial p^*(e_B,\alpha,z)/\partial\alpha\right].$$

From the definition of $p^*(\alpha,e_B,z)$

$p^*(\alpha,e_B,\gamma,z)=\min\ p\ \text{s.t.}\ (p-y^I)\geq\left[E\left[Z|Z\geq(1-\alpha^{-1}\cdot e_B)\cdot(p-y^I)+\alpha^{-1}\cdot(t-z)\right]\right]$, we conclude that $(p^*(e_B,\alpha,z)-y^I)\geq E\left[Z|Z\geq Z^0(e_B,\alpha,z)\right]$, implying that the sum of the two first terms in the square brackets is non-positive. Consequently, we derive the following inequality.

$$\partial E\left[\mathrm{Max}\left[\alpha\cdot(Z-Z^0(e_B,\alpha,z)),0\right]\right]/\partial\alpha = \left[1-F(Z^0(e_B,\alpha,z))\right]\cdot\left[-(\alpha-e_B)\cdot\partial p^*(e_B,\alpha,z)/\partial\alpha\right]\leq 0$$

since $\alpha\geq e_B$, and, from Lemma 4, $\partial p^*(e_B,\alpha,z)/\partial\alpha\geq 0$. **QED**

Proof of Lemma 7.

From the definition of $B(S,e_B,\alpha,z)$ the bidders optimization problem is

$$S^*(e_B,\alpha,z)=\underset{S(e_B,\alpha,z)\in[0,1]}{\mathrm{argmax}}\left[B(S,e_B,\alpha,z)-c(S(e_B,\alpha,z))\right] =$$
$$\underset{S(e_B,\alpha,z)\in[0,1]}{\mathrm{argmax}}\left[S(e_B,\alpha,z)\cdot E\left[\mathrm{Max}\left[\alpha\cdot(Z-Z^0(e_B,\alpha,z)),0\right]\right]-c(S(e_B,\alpha,z))\right]$$

For parametric values of α and e_B, the first order condition is

$$E\left[\mathrm{Max}\left[\alpha\cdot(Z-Z^0(e_B,\alpha,z)),0\right]\right]=\partial c(S^*(e_B,\alpha,z))/\partial S.$$

The optimization problem is well defined since $c(S^*(e_B,\alpha,z))$ is an increasing, convex and continuously differentiable function. To obtain $\partial S^*(e_B,\alpha,z))/\partial\alpha$, differentiate the first order condition with respect to α and evaluate $S(e_B,\alpha,z))$ at the optimum $S^*(e_B,\alpha,z))$:

$$\partial E\left[\mathrm{Max}\left[\alpha\cdot(Z-Z^0(e_B,\alpha,z)),0\right]\right]/\partial\alpha=(\partial^2 S^*(e_B,\alpha,z)/\partial S^{2*})\cdot(\partial S^*(e_B,\alpha,z)/\partial\alpha).$$

From Lemma 6 we know that $\partial E\left[\mathrm{Max}\left[\alpha\cdot(Z-Z^0(e_B,\alpha z)),0\right]\right]/\partial\alpha \le 0$. Since $c(S(e_B,\alpha,\gamma,z))$ is an increasing and convex function, $(\partial^2 S^*(e_B,\alpha,z)/\partial S^{2*})$ is non-negative. Consequently, $\partial S^*(e_B,\alpha,z)/\partial\alpha \le 0$. **QED**

Proof of Lemma 8.

From the definition of $\Pi(\alpha,e_B,z;y^I,t)$ and the conditional expectation operator we obtain

$$\left[\left[1-F(Z^0(\alpha,e_B,z))\right]\cdot E\left[Z\middle|Z\ge Z^0(\alpha,e_B,z)\right]\right] =$$

$$\left[\left[1-F(Z^0(\alpha,e_B,z))\right]\cdot\frac{\int_{Z^0}^{Z_{max}} Z\cdot f(Z)dZ}{\left[1-F(Z^0(\alpha,e_B,z))\right]}\right] = \int_{Z^0}^{Z_{max}} Z\cdot f(Z)dZ.$$

Use Leibniz rule to derive $\partial\Pi(\alpha,e_B,z;y^I,t)/\partial\alpha$:

$$\partial\Pi(\alpha,e_B,z;y^I,t)/\partial\alpha = -\cdot Z^0(\alpha,e_B,z)\cdot f(Z^0(\alpha,e_B,z)) \le 0$$

since $Z^0(\alpha,e_B,z)$ and $f(Z^0(\alpha,e_B,z))$ are non-negative. We are interested in the derivative

$$(\partial\Pi(\alpha,e_B,z;y^I,t)/\partial Z^0(\alpha,e_B,z))\cdot(\partial Z^0(\alpha,e_B,z)/\partial\alpha) =$$

$$-\left[Z^0(\alpha,e_B,z)\cdot f(Z^0(\alpha,e_B,z))\cdot(\partial Z^0(\alpha,e_B,z)/\partial\alpha)\right]$$

which is non-positive since $(\partial Z^0(\alpha,e_B,z)/\partial\alpha)\ge 0$, $Z^0(\alpha,e_B,z) > 0$, and $f(Z^0(\alpha,e_B,z)) > 0$, i.e. $\partial\left[\left[1-F(Z^0(\alpha,e_B,z))\right]\cdot E\left[Z\middle|Z\ge Z^0(\alpha,e_B,z)\right]\right]/\partial\alpha \le 0$. **QED**

Proof of Proposition 3.

The value of the firm can be expressed as

$$V(\alpha,e_B,z;y^I,t) = y^I + S^*(\alpha,e_B,z)\cdot\left[\left[1-F(Z^0(\alpha,e_B,z))\right]\cdot E\left[Z\middle|Z\ge Z^0(\alpha,e_B,z)\right]\right] =$$

$$y^I + S^*(\alpha,e_B,z)\cdot\Pi(\alpha,e_B,z;y^I,t).$$

Note that the first two terms of $S^*(\alpha,e_B,z)\cdot\left[\left[1-F(Z^0(\alpha,e_B,z))\right]\cdot E\left[Z\middle|Z\ge Z^0(\alpha,e_B,z)\right]\right]$ are decreasing in α. In particular, $\partial S^*(e_B,\alpha,z))/\partial\alpha \le 0$ by Lemma 7, and $\partial\left[1-F(Z^0(\alpha,e_B,z))\right]/\partial\alpha = -f(Z^0(\alpha,e_B,z)\cdot(\partial Z^0(\alpha,e_B,z)/\partial\alpha) \le 0$ by Lemma 5. However, while the last term is increasing in α. To show that $\partial E\left[Z\middle|Z\ge Z^0(\alpha,e_B,z)\right]/\partial\alpha \ge 0$, use the definition of conditional expectation, Lemma 3, and Leibniz rule to obtain $\partial E\left[Z\middle|Z\ge Z^0(\alpha,e_B,z)\right]/\partial\alpha =$

$$(\partial E\left[Z\middle|Z\ge Z^0(\alpha,e_B,z)\right]/\partial Z^0(\alpha,e_B,z))\cdot(\partial Z^0(\alpha,e_B,\gamma,z)/\partial\alpha) =$$

$$\left[\frac{f(Z^0(\alpha,e_B,z))}{(1-F(Z^0(\alpha,e_B,z))}\cdot E\left[Z\middle|Z\ge Z^0(\alpha,e_B,z)\right]-Z^0(\alpha,e_B,z)\right]\cdot(\partial Z^0(\alpha,e_B,z)/\partial\alpha)\ge 0$$

Since $\left[f(Z^0(\alpha,e_B,z))/(1-F(Z^0(\alpha,e_B,z))\right]\ge 0$, $E\left[Z\middle|Z\ge Z^0(\alpha,e_B,z)\right]\ge Z^0(\alpha,e_B,z)$ and $\partial Z^0(\alpha,e_B,z)/\partial\alpha\ge 0$, the derivative expression is non-negative.

Even though the premium- $E\left[Z \middle| Z \geq Z^0(\alpha, e_B, z)\right]$- increases with a higher value of α, the total effect on the value of the firm of an increase in α is non-positive- $\partial \mathcal{V}(\alpha, e_B, z; y^I, t)/\partial\alpha \leq 0$- since the decrease in the probability of a takeover- $S^*(e_B, \alpha, z) \cdot \left[1 - F(Z^0(\alpha, e_B, z))\right]$- dominates over the positive premium effect. To formally show this we need to determine the sign of the derivative $\partial \mathcal{V}(\alpha, e_B, z; y^I, t)/\partial\alpha =$ $(\partial \mathcal{S}^*(e_B, \alpha, z)/\partial\alpha) \cdot \Pi(\alpha, e_B, z; y^I, t) + S^*(e_B, \alpha, z) \cdot (\partial \Pi(\alpha, e_B, z; y^I, t)/\partial\alpha)$

Since $S^*(e_B, \alpha, z)$ and $\Pi(\alpha, e_B, z; y^I, t)$ are positive, $\partial \mathcal{S}^*(e_B, \alpha, z)/\partial\alpha \leq 0$ by Lemma 7, and $\partial \Pi(\alpha, e_B, z; y^I, t)/\partial\alpha \leq 0$ by Lemma 8, the whole derivative is non-positive: $\partial \mathcal{V}(\alpha, e_B, z; y^I, t)/\partial\alpha \leq 0$. **QED**

Proof of Corollary 3

A prohibition on partial bids is equivalent to an enforcement of a higher control threshold; a higher α. But by Proposition 3, this implies that the value of the firm decreases.

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Essay 5:

The Equal Bid Principle

An Analysis of The Thirteenth Council Takeover Directive of The European Community

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Abstract

This paper analyzes the economic consequences and policy conflicts of a recent draft proposal from the EC Commission: *The Amended Proposal for a Thirteenth Council Directive on Company Law, Concerning Takeover and Other General Bids* (1990). Its *primary* objective is *allocative*: to promote legislation that contributes to the continuous development of more efficient corporate structures by harmonizing the rules governing corporate control acquisitions and by eliminating legal impediments. The *secondary* purpose is *distributive*: to regulate the conflict of interests between the minority of small shareowners and large controlling ones in takeovers by enacting a set of rules that aims at protecting the interests of the fringe of small shareholders. In particular, by implementing the *Equal Bid Principle*, the Directive enforces a potential acquirer to extend the same tender offer price to all shareowners; price discrimination between large controlling blockowners and small stockholders is prohibited.

We demonstrate, formally, that it is only under a quite restrictive set of conditions that minority shareholders do in fact gain from a rule that entitle them to sell their shares at the same terms as the controlling shareholder. Accordingly, it is likely that the effect of the Equal Bid Principle is directly opposed to the declared goal of protecting the economic interests of shareholders in the target company. Moreover, under very general conditions, the paper shows that enactment of a distributive rule like the Equal Bid Principle is an impediment on the explicit and allocative goal of stimulating corporate acquisitions and transformation of corporate structures in Europe. Generally, we argue that as a legislative package The Thirteenth Takeover Directive is inconsistent and detrimental to the interests of the shareholders as a group since it results in fewer rather than in more efficiency promoting corporate acquisitions.

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1. Introduction

ONE OF THE MAIN TASKS of the Commission of the European Communities (EC) is to create "a level playing-field" in EC company law matters. Special emphasis is placed on the importance of legislation on corporate acquisitions in order to create more efficient corporate structures in Europe. Acquisition of corporate control is considered as an important ongoing method for monitoring and raising the efficiency of resource allocation in the Single market. Accordingly, to promote *allocative efficiency* is the *primary* objective of a recent draft proposal from the EC Commission: *The Amended Proposal for a Thirteenth Council Directive on Company Law, Concerning Takeover and Other General Bids* (1990). In particular, this legislative initiative emphasizes that the rules governing corporate control acquisitions shall be harmonized between countries and designed in a way that do not impede the continuous change of the European industrial structure.

However, the Takeover Directive also has a *secondary*, *distributive* objective: to regulate the conflict of interests between the minority of small shareowners and large controlling ones in takeovers by enacting *three* general principles or rules that aims at protecting the interests of the fringe of small shareholders. Specifically, by implementing the *Equal Bid Principle* (EBP), the Directive enforces a potential acquirer to extend the same tender offer price to all shareowners; price discrimination between large controlling blockowners and small stockholders is prohibited.[1]

Moreover, the *Mandatory Bid Rule* gives any shareholder the right to sell if a new controlling position is established where none existed before or an already operational controlling stake is transferred to a new owner. The principle is implemented by requiring any shareowner who has attained at least one third of the voting rights to extend an any or all offer for the remaining shares of the company. For an analysis of the economic effects of the rule, see Bergström, Högfeldt and Molin (1993).

The third principle concerns *Equal Access to Information*. The directive stipulates that the target shareholders shall be guaranteed detailed information from the acquirer in connection with a tender offer. Moreover, in order to enable the shareowners to evaluate the bid, it must be open for a specified minimum time period. As for defensive measures, they may only be adopted after permission obtained from the general meeting of

[1] This principle is supplemented with special rules governing certain situations. For example, if there are different classes of shares (dual class structure), the typical European legal system permits tender offers that price discriminate between the classes.

shareholders. As the draft directive is now worded, it also appears to presuppose establishment of a new control agency that will guarantee the sought standard.

Although the economic effects of the Takeover Directive are designed to be fundamental, comprehensive and far-reaching, the lack of formal economic analysis of its implications in the economic literature is conspicuous. The purpose of this paper is to rectify this shortcoming by providing an analysis of the economic consequences and policy conflicts between the allocative and distributive objectives of The Thirteenth Council Directive. Specifically, we focus on formalization of the EBP, but the closing discussion is broadened to encompass a general evaluation of all parts of the proposal.

The Equal Bid Principle, as well as the other parts of the distributive objective of the Directive, is motivated by considerations of equality and fairness emanating from the general social-political canon of equal treatment. The objective is to implement equal treatment de facto of all shareholders in the target company.[2] Concerning transition of control, the specific legislative objective is to prevent a raider from taking out the "widows and orphans" cheaply and pay the "real price" only to the controlling shareholders.

We pose and answer the following questions. Does a legal rule that enact an equal division of gains from corporate control transactions maximize investors wealth? Does enactment of the EBP, either through public legislation or by provisions in the corporate charter, really have a beneficial effect on firm value and on the minority shareholders wealth? Is the Equal Bid Principle a good policy instrument in the dynamic perspective of transforming corporate structures in Europe?

A proper, formal analysis of the economic consequences of the Equal Bid Principle must be rich enough to differentiate between (i) the effects of the rule on the firm value *ex ante* and *ex post*, and (ii) distinguish between disparate shareholder clienteles like large pivotal blockholders and the fringe of small stockowners. The first differentiation is essential since the value of the firm today contains an ex ante component that reflects the expected value of future takeovers: the likelihood of a takeover attempt times the expected tender offer premium. The focus of economic analysis of regulation is on how this ex ante value is affected by different legal rules like the EBP while legislative initiatives often are motivated by specific ex post events. Moreover, as will be demonstrated, though the EBP benefits the fringe of small shareowners if a successful takeover attempt actually occurs-- ex post-- the opposite conclusion may apply ex ante, i.e. implementation of the principle decreases the value of the shares of the corporation.

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[2] All holders of shares subject to identical conditions shall be offered identical payment per share. If special reasons exist with respect to certain shareholders, compensation in some other form, but having the same value, may be offered to them.

The necessity to differentiate between large, pivotal blockholders and small shareowners in a formal analysis of the EBP stems, of course, from the fact that the rule is predicated on the existence of such stockowner clienteles. In particular, the principle prohibits that control blocks are sold at a premium price over the shares acquired from the fringe. The crucial part of the theoretical analysis of the Equal Bid Principle consists of a comparison of the firm value with and without implementation of the rule. Accordingly, it is essential to build a takeover model that presuppose the existence of a concentrated target ownership structure with different shareholder clienteles, e.g. large pivotal shareholders who has the capacity to negotiate better terms than the small shareholders.

The traditional takeover model with atomistic ownership structure clearly needs to be modified to include large shareholders that exert a *strategic* influence on the tender offer price since they have the option to *block* the offer. The blocking potential implies that the bidder *must* reach an explicit or implicit agreement with these pivotal agents. The strategic interaction between the acquirer and the pivotal blockholders is modelled as a bargaining game.

The potential for strategic blocking by large shareholders in takeover attempts is substantial and manifests itself under different non-atomistic target ownership structures and circumstances. The most obvious case is, of course, when a single stockowner controls the simple majority of the equity. But even if the party in actual control of the firm operates with a block of less than 50% of the stocks, a bidder may be forced to negotiate with him. The alternative takeover strategy of acquiring the shares from the fringe of small stockowners over the market may be costly due to disclosure rules, transaction costs and lack of liquidity in the market.

Furthermore, when the fraction of shares needed to accomplish a takeover gain is large, the scope for blocking increases. When the bidder opts for 100 percent of the shares in the company, a legal rule called the *Compulsory Acquisition Limit* (CAL) opens up a window for blocking by large shareholders, at the same time as it eliminates this opportunity for the fringe of small stockowners. If already more than a certain percentage of the equity is tendered, normally 90% in the European corporate legal systems, the bidder has the option to compulsory acquire the remaining shares at the same price at which he attained the first part. The motivation behind it is to facilitate takeovers by not making any small stockowner decisive about the fate of the bid. The dual side of this rule is that by controlling a share of the equity corresponding to one minus this limit, i.e. at least 10% in e.g. Sweden and the UK, the stockowner becomes pivotal to the overall success of the bid, and forces the bidder to reach an agreement with him. In particular, due to the concentrated ownership structure that characterize

publicly listed corporations, especially in Continental Europe and in Scandinavia, the CAL provision implies that an acquirer may face *more than one* (max 10) large incumbent shareholder or potential arbitrageurs with blocking capability.

The pertinent theoretical contribution of the paper is the construction of a simple but rich enough takeover model that captures the interaction of all the essential elements necessary to evaluate the effects of implementation of the Equal Bid Principle: a differentiated ownership structure; bargaining between pivotal agents; the effect of other legal rules like the CAL; and discrimination between an ex ante and an ex post perspective.

Though the Equal Bid Principle at first may seem fair and innocuous, our analysis formally demonstrates, that it is only under a quite restrictive set of conditions that minority shareholders do in fact gain from a rule that entitle them to sell their shares at the same terms as the controlling shareholder. Although the target shareholders because of the EBP, ceteris paribus, obtain a *relatively* larger share of the takeover gain than if differentiated bids are allowed, the *frequency* of takeover attempts is likely to decrease enough to result in an overall negative effect, i.e. in an *ex ante* sense, the value of the firm actually becomes lower if the Equal Bid Principle is enacted. In particular, the minimal takeover gain needed for a profitable acquisition if differentiated bids are not prohibited is smaller than the corresponding threshold value if the EBP applies. Therefore, since it is more likely that an acquirer can accomplish this minimal synergy gain, the probability of a takeover is larger if the Equal Bid Principle is not observed.

Accordingly, it is likely that the effect of the EBP is directly opposed to the explicit objective of protecting the economic interests of shareholders in the target company. Moreover, under very general conditions, the paper shows that enactment of a distributive rule like the Equal Bid Principle is an impediment on the primary allocative goal of stimulating corporate acquisitions and transformation of corporate structures in Europe. Generally, we argue that as a legislative package The Thirteenth Takeover Directive is inconsistent and detrimental to the interests of the shareholders as a group since it results in fewer rather than in more efficiency promoting corporate acquisitions.

The paper is organized as follows. The next section presents the formal model. Tender offer prices as well as the distribution of the takeover gain with and without implementation of the Equal Bid Principle are derived in parts 3 and 4 respectively. The ex ante analysis, i.e. the effect on the value of the firm of enactment of the EBP, is reported in section 5. The penultimate part develops an illustrative numerical example. The paper concludes with a summary and an extended discussion of the economic effects of the Thirteenth Takeover Directive of the EC.

2. The Model

CONSIDER THE FOLLOWING stylized takeover scenario with two corporations: a target and an acquiring firm. The target produces a random cash flow $\tilde{y}$ with support $\tilde{y} \in [0, y_{max}]$. The probability distribution of $\tilde{y}$ depends on the ability of the management $\tilde{s}$ which is also a random variable with a continuously differentiable probability distribution F(s) with support $\tilde{s} \in [0, s_{max}]$.[3]

At first, the incumbent controls the firm and his management skills is normalized to 0. The *expected cashflow* under the incumbent equals Y(0). At a future date, a bidder with unknown ability $\tilde{s} \in [0, s_{max}]$ will consider acquiring the firm, i.e. the potential acquirer is drawn from the density function for $\tilde{s}$: f(s). The bidders ulterior motive behind a takeover attempt may be manifold; the number of shares sought by the bidder varies accordingly. To simplify the analysis, we assume that the positive synergy gain is not realized unless the bidder owns all equity.[4] If the takeover gain is large enough to accomplish a profitable acquisition, the acquiring firm extends a tender offer. If the takeover attempt succeeds, the expected discounted value of dividend rights under the acquiring firms management with ability s becomes Y(s). Let $X(s) \equiv Y(s) - Y(0)$ denote the synergy gain. To keep the analysis as simple and transparent as possible, we assume that all information in the model is common knowledge; there are no taxes and transaction costs; no private benefits of control; there is only one bidder who has no toehold in the target firm; and only takeovers with positive synergy gain occurs.

The sequence of events is as follows. At time t = 0, the rules governing the acquisition process are determined. In particular, either the Equal Bid Principle is enacted through corporate or security law or by provisions in the corporate charter *or* the principle is not enforced, and, as a consequence, differentiated bids are allowed. The skill of a potential future bidder is not known at this juncture. At time t = 1, the potential acquirer observes his actual management ability, and then considers acquiring it. If his

[3] The model is inspired by Israel (1991).

[4] There are at least three general reasons why ownership of all target shares is more beneficial than just operational control. (i) If full ownership is established, the operations of the two firms can be restructured without any objections from minority shareholders. (ii) With a controlling interest of less than 100% of the shares, taxes must be paid separately on both firms' profits whereas with full ownership profit and losses can be transferred between the firms in order to minimize the total sum of tax payments. (iii) Finally, if the acquirer intends to invest heavily in the firm but does not expect the minority shareholders to invest a proportionate amount, he may prefer full ownership. The model does not only apply to this special case but can be developed into a more general theory, see Bergström, Högfeldt and Högholm (1993).

ability is sufficiently high, he extends a bid for the entire company. If the takeover attempt succeeds, the bidder owns the firm at point of time t = 2.

How is the equilibrium tender offer price determined in this model? Depending on whether the Equal Bid Principle is enacted at t = 0, the acquirer may or may not discriminate against any shareholder in terms of price. The procurement of 100% of the equity is facilitated by the legal rule of Compulsory Acquisition Limit (α). It gives the bidder the right to purchase the remaining outstanding shares if more than α% has been tendered. In effect, the provision implies that no small shareholder can block the bid, but any large shareowner who controls (1-α)% or more of the equity has this option, i.e. unless the bidder offers a high enough premium to the pivotal shareholders, the tender offer foils. Expressed somewhat differently, this legal rule opens up a window for blocking of the takeover attempt by the large equityowners at the same time as it closes it for the fringe of small stockowners. Formally, a large equityholder has blocking potential if he owns a share of the firm (e_L^i) that is equal to or larger than (1-α). Accordingly, implicitly or explicitly, the bidder *must* reach an agreement on the tender offer price with each of the pivotal incumbent blockholders who have *bargaining power* due to their blocking potential.

To formalize the strategic interaction in this economic environment, we conjecture that, explicitly or implicitly, the bid price is the outcome of a *bargaining process* between the pivotal incumbent stockowners and the acquiring firm. Specifically, the model is predicated on the behavioral hypothesis that the decisive agents are acting individually rational by encompassing the fact that their own actions exert a significant influence on the final price outcome while the fringe of small stockowners price behavior is parametric; they accept the tender bid if they receive an offer at or above their reservation price (p). In order to obtain specific, simple and closed form solutions to the bargaining game, and isolate the salient parameters, we apply the Nash bargaining solution concept, see Osborne and Rubinstein (1990).

Because the model captures the fact that the ability of the potential bidder is unknown initially but disclosed at time 1 as a realization of a probability distribution, we can analyze the effects of implementation of the Equal Bid Principle both from an *ex ante* and an *ex post* perspective. The next two sections of the paper performs the ex post analysis for a given, realized management level of the acquirer with and without enactment of the EBP, respectively. Subsequently, we derive the ex ante effect on the firm value of implementation of the Equal Bid Principle.

3. Tender Offer Prices When The Equal Bid Principle Applies

WITHOUT ELABORATING on philosophical and juristic problems, we interpret the Equal Bid Principle straightforwardly to have two parts.[5] The first one concerns the equal treatment between different groups of shareholders, small and large ones, while the second applies within the subset of large block holders. (i) A bidder should extend a tender offer price to the fringe of small stockowners that is at least as high as the one he offers the large pivotal stockowners. (ii) The bidder cannot differentiate within the group of large and pivotal blockowners by offering them separate tender offer prices.

Assume, that there are n incumbent shareholders with blocking capability $(e_L^i \geq (1-\alpha))$ who bargain with the acquirer over the tender offer price. By requiring that the pivotal shareholders are offered identical prices, and that the atomistic equityowners obtain the same price as the large blockholders (p^E), we impose the Equal Bid Principle as a restriction on the bargaining mechanism. If an agreement is reached and the takeover attempt succeeds, the gain of a pivotal blockholder is

$$s_L^i(p^E; e_L^i, Y(0)) = e_L^i \cdot (p^E - Y(0)).$$

The acquiring firms gross profit from a realized takeover is

$$s_B(p^E, Y(s)) = Y(s) - p^E.$$

Adding up the profits, we get the size of the total gain (the pie) to be split in the bargaining process that determines the tender offer price p^E or

$$S^E(p^E, e_L, X(s), Y(0)) = X(s) - (1 - \Sigma_1^n e_L^i) \cdot (p^E - Y(0)),$$

where $X(s) \equiv (Y(s) - Y(0))$ is the synergy gain generated by the merger; $e_L = \Sigma_1^n e_L^i$ is the total share of the outstanding equity controlled by the large blockholders; and $(1 - \sum_1^n e_L^i) \cdot (p^E - Y(0))$ is the spillover to the fringe: the part of the gain that accrues to the small shareholders. Accordingly, the bidder and the pivotal incumbent stockowner bargain over the division of a pie that equals the synergy gain less the spillover to the fringe. In particular, the strategic agents rationally incorporates the restriction imposed by the Equal Bid Principle when determining the bargaining price. Applying the Nash

[5] For an analysis of the Equal Treatment Doctrine in the Swedish Corporate Law, and, particularly, the Equal Bid Principle from a Law and economics perspective, see Bergström, Högfeldt and Samuelsson (1993).

bargaining solution concept, we derive the tender offer price that all parties accept as the best possible to agree upon when the EBP applies as[6]

$$p^E(\bar{e}_L, X(s), Y(0)) = Y(0) + \frac{X(s)}{(1+\bar{e}_L)} \text{ where } \bar{e}_L = (\sum_1^n e_L^i)/n \text{ and } \forall i\, e_L^i \geq (1-\alpha).$$

This tender offer price constitutes an overall equilibrium price under EBP if it is also acceptable to the small shareholders, i.e. if it exceeds their reservation price: $p^E > p$.[7]

A characteristic feature of the Nash solution is that the resulting bargaining price is such that it splits the pie in shares of equal value. As easily verified, substitution of p^E into the bargaining parties expressions for their (net) profit yields $s_B(p^E) = s_L^i(p^E)$, i = 1,2....n. The tender offer premium $(p^E - Y(0))$ is determined as a share $(1/(1+\bar{e}_L))$ of the synergy gain $X(s)$ which depends on the average size of the pivotal blockowners position $(\bar{e}_L)$. An important implication of the result is that a lower average blockhold amounts to a higher tender offer premium, i.e. all incumbent stockowners should welcome a new but small pivotal blockowner that causes the average to go down.

If the set of pivotal incumbents had been measured as one agent by their total share of the voting shares, the resulting bargaining price would have been lower. Consequently, the pivotal shareholders have no private incentive to form a bargaining coalition to negotiate as one party; this property of the Nash bargaining solution is sometimes called the *Paradox of Bargaining*. It occurs because the Nash theory does

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[6] A formal proof amounts to solving for the bargaining price p_L that maximizes the Nash product $(s_B(p_L) - d_B)\cdot(s_L(p_L) - d_L)$ of a two party bargaining game. d_B and d_L are the so called outside options of the players, i.e. the gain if no agreement is reached. They are assumed to be zero in the present problem. For the generalization to bargaining game with more than two players, see Osborne and Rubinstein (1990).

[7] Since $p^E < Y(s)$, a discussion of how the equal bid price is related to the standard free riding price in takeover is called for. We argue that the free riding option is not a viable option in our model set-up. Since we have assumed that the bidder, in order to accomplish any takeover gains, has to acquire 100% of shares in the target company, there is no room for free riding. By definition, free riding cannot take place in this case, since all shareholders must tender their shares before the gains can be realized. Without any mechanism for the elimination of the minority, any atomistic stockholder becomes pivotal. But, due to the legal rule of compulsory acquisition, which is in effect in most corporate legal systems, we assume that no individual small shareholder has bargaining power to negotiate for a higher bid. The bidder can compulsory acquire outstanding shares if shareholders representing, e.g 90% of votes and equity accept the offer. Therefore, the small shareholders accept any offer above $Y(0)$, because accepting given a tiny premium is better than takeover failure and no premium. It is rational for them to accept the equal treatment price $p^E > Y(0)$ since no better offer exists when free riding is not a viable option. Hence, in this equilibrium, the fringe free rides on the pivotal and strategically acting parties in the bargaining model. Somewhat more drastically stated, enforcement of the Equal Treatment Principle is in effect a ticket to free riding.

not distinguish between how pivotal a negotiating party is; it only differentiates between being pivotal or not since all decisive player obtains an equal share of the bargaining pie.

The dual side of the theory of how the tender offer price is determined by bargaining between a bidder and pivotal shareholders is a theory of the distribution of the synergy gain $X(s)$ between the acquiring and the target firm: Substituting the expression for p^E in the profit functions for the acquirer, the pivotal blockholders and the fringe of small stockowners respectively yields the distribution result reported in Table 1 below. In particular, the acquirer obtains $\frac{\bar{e}_L}{(1+\bar{e}_L)} \cdot X(s)$ of the synergy gain while the target shareholders receive $\frac{1}{(1+\bar{e}_L)} \cdot X(s)$. One immediately verifiable trait is that the target shareholders, ceteris paribus, obtain a smaller and the acquiring firm a larger relative share of the takeover gain, the larger the average size of the pivotal blockholders position. This consequence emanates from the fact that a higher pivotal average results in a lower equal bid price, which implies that the cost of the shares the acquirer procures decreases.

The bargaining model also generates an endogenous condition for when it is profitable for a potential bidder to extend an offer. If the Equal Bid Principle is enacted, the bidder pays the tender offer price p^E and obtains the expected net cashflow of (Y(s)-t). t denotes the acquisition (transaction) cost entirely born by the bidder; it is regarded as a sunk cost in the bargaining game. His gain is non-negative if and only if $Y(s) - p^E - t \geq 0$. After substitution for p^E, we conclude that the bidder initiates a tender offer if only if

$$X(s) \geq \frac{1+\bar{e}_L}{\bar{e}_L} \cdot t,$$

i.e. the realized synergy gain must surpass a certain threshold. Let s_E^c be the minimal ability above which an acquisition becomes profitable; s_E^c is implicitly defined by

$$X(s_E^c) = \frac{1+\bar{e}_L}{\bar{e}_L} \cdot t.$$

Consequently, the cut off skill level s_E^c is a function of the average equity ownership of the pivotal blockholders and the acquisition cost. If the realized ability level s is above s_E^c, the acquiring firm extends a tender offer. This implies that the probability of a takeover attempt if the Equal Bid Principle applies is

$$(1 - F(s_E^c(\bar{e}_L, t)),$$

an expression that will be useful in the forthcoming ex ante analysis. However, let us first derive the corresponding equilibrium prices when the EBP does not apply.

4. Differentiated Tender Offer Bid Prices

WE NOW ALLOW the offers to be differentiated both within the set of pivotal blockholders and versus the fringe of small shareholders. The individual tender offer prices extended to each blockholders by the acquirer are denoted p_i^D, and the price offered the small shareholders equals their reservation price p. If differentiated bids are not banned, the size of the pie to be split between the large blockholders and the acquiring firm equals

$$S^D(p_L, e_L, n, Y(s), Y(0)) = X(s) - (1 - \sum_1^n e_L^i) \cdot (p - Y(0)).$$

The only difference vis-à-vis the corresponding expression for the bargaining pie under equal bid is the second term; the spillover to the small shareholders which is determined by their reservation price p instead of the equal bid price p^E.

Using the same type of reasoning as in the previous configuration with equal bid prices, it is straightforward to prove that if differentiated bids are allowed, the Nash bargaining price functionals that n large, incumbent and pivotal blockholders (L), and the acquiring firm agree on are

$$p_i^D(p; e_L^i, Y(0), Y(s)) = Y(0) + \frac{(Y(s) - p)}{(n+1) \cdot e_L^i} + \frac{\sum_1^n e_L^i}{(n+1) \cdot e_L^i} \cdot (p - Y(0)).$$

In contradistinction to the corresponding equilibrium price schedule under the equal bid principle, we immediately observe that the effect of the large pivotal stockholders on the bargaining price is measured by their individual weights separately (e_L^i) and their total size e_L, and not by their average size $\bar{e}_L$.

The Nash bargaining price functional explicitly incorporates the effect of the price paid to the fringe (p) on the size of the pie, and, ipso facto, on the bargaining outcome. The functional is uniquely determined; any other price solution would be blocked by at least one of the bargaining parties. It is easily verifiable that each pivotal blockholders share of the pie, $e_L^i \cdot (p_i^D - Y(s))$, is independent of any of his individual parameters; each bargaining party receives a share of equal value. Although, the existence of this virtue of fairness, it is worth emphasizing that the solution satisfies rather innocuous axioms based on strict individual rationality. It is simply the best mutually beneficial outcome, without any connotations of collective justice or equality.

Of special interest from an equal treatment perspective, however, is another property of the bargaining price schedules. Depending on the reservation price p of the small stockowners, the Nash bargaining prices extended to the pivotal blockholders, p_i^D, may be either greater than, less than or equal to p. In particular, since the price function p_i^D is decreasing in e_L^i, a shareholder who controls a significant block of shares may very well obtain a lower price than the fringe of small stockowners. Accordingly, the large blockholders make price concessions in a takeover bargaining game.

The reason is that the decisive players act strategically. In effect, the existence of a large pivotal blockholders who act strategically and internalize the effects of all agents actions on the overall outcome of the game, paves the way for a profitable takeover by making price concession strategies credible.[8] Even if the final bargaining price is lower, it is still profitable for the pivotal blockholder to accept the tender offer. Note in particular, if the bidders ability level s is high enough, he extends a tender offer which is mutually profitable for the bidder and the incumbent but lower than the free rider price demanded by the fringe of small shareholders ($p = Y(s)$). Consequently, the free rider mechanism, see Grossman and Hart (1980), does not necessarily foil the takeover attempt when a large pivotal blockholder who acts strategically is present since he partially internalizes the external effect emanating from free riding.

The implication of this is that being a small shareholder with limited action space in an environment with decisive strategic agents may be profitable since free riding is the only option available to the parametric agent. Contrary to the motivation behind the Equal Bid Principle, the acquirer does not extend an offer which price discriminate against the fringe of small shareholders; it is the large pivotal blockholders who are adversely treated. Consequently, the very perspective underlying the equal treatment doctrine in general, and the EBP in particular is a lot weaker and less self-evident than it at first appears in a takeover context.

Moreover, the bargaining price schedules are also informative in another sense. Since the potential acquirer, due to the common knowledge assumption of the model, knows the bargaining prices as a function of his skill level, they are instrumental when he

[8] The mechanism in our paper is different from the one of Grossman-Hart (1980). We allow actual free riding to occur while they show that potential free riding derails a takeover attempt if the ownership structure is fully atomistic. Furthermore, we do not postulate the option of value extraction as a circumventing avenue. Instead, the introduction of a large pivotal blockholder who acts strategically attenuates the misalignment of incentives causing the free rider problem. Expressed somewhat differently, while a small parametric agent cannot credibly commit to a lower price than the free riding price, the strategic agent can. Credibility emanates from the fact that a self interested strategic agent chooses the most profitable action that is possible to implement, i.e. the Nash bargaining solution. We alluded to this result in the introduction; see also Shleifer and Vishny (1986).

decides whether to extend an offer or not. Substitution of the expressions for the price functionals p_i^D into his profit function yields

$$s_L^{Di}(p_i^D; p, e_L^i, e_L, n, t, X(s), Y(0)) = \left[Y(s) - \sum_1^{n^i} e_L^i \, p_i^D \right] - (1 - \sum_1^n e_L^i) \cdot p - t =$$

$$\frac{X(s) - (1 - \sum_1^n e_L^i) \cdot (p - Y(0))}{n+1} - t.$$

Hence, his gain is non-negative if and only if

$$X(s) \geq (n+1) \cdot t + (1 - \sum_1^n e_L^i) \cdot (p - Y(0)).$$

Let s_D^c be the break-even ability level:

$$X(s_D^c) = (n+1) \cdot t + (1 - \Sigma_1^n e_L^i) \cdot (p - Y(0)).$$

Accordingly, the probability that an acquirer extending a tender offer for the shares of the target firm if differentiated bid are permitted is

$$(1 - F(s_D^c(n, \sum e_L^i, t, p, Y(0))).$$

If $s \geq s_D^c$, the acquiring firm initiates the takeover process, and the post bargaining distribution of the synergy gain under differentiated bids is displayed in the right hand column below. As a comparison, the corresponding distribution under enactment of the equal bid principle is displayed in the left column.

Table 1 shows that, ceteris paribus, the target shareholders as a group profits from implementation of the Equal Bid Principle.[9] But while the fringe of small shareholders obtains a larger share of the synergy gain, the class of pivotal incumbent blockholders attains a lower share. This observation implies that our model captures and is consistent with the implicit motive of the principle. However, as the table also depicts, enactment of the EBP results, ceteris paribus, in a lower profit for the acquisitor. Consequently, if a successful tender offer occurs, the Equal Bid Principle shifts part of the takeover gain from the acquirer and the large blockholders to the small shareholders of the target company.

[9] This is a generalization of results presented in Bergström and Rydqvist (1992): "Different Bids for Voting and Restricted Voting Shares in Public Tender Offers." Journal of Banking and Finance, vol 16, pp 97-114.

Table 1: *A ceteris paribus and ex post comparison of the distribution of the takeover gain between different clienteles when the Equal Bid Principle applies and when differentiated tender offer prices are allowed. Inequalities hold if* $p < p^E = Y(0) + \frac{X(s)}{1+\bar{e}_L}$, *i.e. the reservation price of the fringe of small shareholders is lower than the equal bid price.*

	Equal Bid Prices		Differentiated Bid Prices
Acquirer	$\frac{\bar{e}_L}{(1+\bar{e}_L)} \cdot X(s)$	$<$	$\frac{X(s) - (1 - \sum_1^n e_L^i) \cdot (p - Y(0))}{n+1}$
Target Shareholders	$\frac{1}{(1+\bar{e}_L)} \cdot X(s)$	$>$	$\frac{n}{n+1} \cdot X(s) + \frac{1 - \sum_1^n e_L^i}{n+1} \cdot (p - Y(0))$
Large blockholder i	$\frac{e_i}{(1+\bar{e}_L)} \cdot X(s)$	$<$	$\frac{X(s) - (1 - \sum_1^n e_L^i) \cdot (p - Y(0))}{n+1}$
Small shareowners	$\frac{1 - \sum_1^n e_L^i}{1+\bar{e}_L} \cdot X(s)$	$>$	$(1 - \sum_1^n e_L^i) \cdot (p - Y(0))$
Sum	$X(s)$		$X(s)$

However, while the *ex post* effect of implementation of the Equal Bid Principle is unequivocal and achieves the underlying objective of supporting the economic interests of the fringe of small shareholders, the corresponding impact on the value of the firm in an *ex ante* sense may be diametrically opposed; the fringe may actually lose. Let us demonstrate this possibility within the context of a more general analysis of the effect of the EBP on the firm value.

5. Ex Ante Analysis: The Value of The Firm

THE VALUE OF THE firm is defined as the sum of its status quo value, Y(0), and a term that measures the expected value of any future improvements accruing to tendering shareholders: the probability of a takeover attempt times the expected tender offer

premium. The value of the firm under the enactment of the Equal Bid Principle can therefore be expressed as

$$V^E(\bar{e}_L, t, Y(0), X(s)) = Y(0) + (1 - F(s_E^c(e,t)) \cdot E\left[\frac{1}{1+\bar{e}_L} \cdot X(s) \middle| X(s) \geq \frac{1+\bar{e}_L}{\bar{e}_L} \cdot t\right]$$

where $(1 - F(s_E^c(e,t))$ is the probability that a corporate acquisition takes place while the term $E\left[\frac{1}{1+\bar{e}_L} \cdot X(s) \middle| X(s) \geq \frac{1+\bar{e}_L}{\bar{e}_L} \cdot t\right]$ gauges the expected premium conditional on such an event happening. In the expectation operator, $\frac{1}{1+\bar{e}_L} \cdot X(s)$ is the ex post share of the synergy gain that the target shareholders obtain, while the conditional expression $X(s) \geq \frac{1+\bar{e}_L}{\bar{e}_L} \cdot t$ is the acquirer's profit condition; both expressions were derived in Section 3.

The corresponding firm value if the Equal Bid Principle does not apply is

$$V^D(n, p, \Sigma e_L^i, t, Y(0), X(s)) = Y(0) +$$
$$(1 - F(s_D^c(n, \Sigma e_L^i, t, p, Y(0))) \cdot \left[\frac{1 - \Sigma e_L^i}{n+1} \cdot (p - Y(0)) + E\left[\frac{n}{n+1} \cdot X(s) \middle| X(s) \geq (n+1) \cdot t + (1 - \Sigma e_L^i) \cdot (p - Y(0))\right]\right]$$

The premium term captures the total expected gain accruing to the target shareholders from future takeover attempts. In particular, it is the sum of the spillover to the fringe of small shareholders, $(1 - \sum_1^n e_L^i) \cdot (p - Y(0))$, and the gain obtained by the large, pivotal shareowners

$$E\left[\frac{n}{n+1} \cdot X(s) \middle| X(s) \geq (n+1) \cdot t + (1 - \Sigma e_L^i) \cdot (p - Y(0))\right] - \frac{n \cdot (1 - \sum_1^n e_L^i) \cdot (p - Y(0))}{n+1}.$$

Comparing, ceteris paribus, the probability of a corporate acquisition with and without enactment of the Equal Bid Principle, we infer that the EBP results in a lower likelihood of value increasing takeovers:

$$(1 - F(s_E^c(e,t))) < (1 - F(s_D^c(n, \sum e_L^i, t, p, Y(0))).$$

But as long as $p < Y(0) + \frac{1}{1+\bar{e}_L} \cdot E\left[X(s) \middle| X(s) \geq X(s_E^c)\right]$, the effect on the expected premium is the opposite:

$$E\left[\frac{1}{1+\bar{e}_L} \cdot X(s) \middle| X(s) \geq \frac{1+\bar{e}_L}{\bar{e}_L} \cdot t\right] >$$

$$\left[\frac{1-\sum e_L^i}{n+1} \cdot (p - Y(0)) + E\left[\frac{n}{n+1} \cdot X(s) \middle| X(s) \geq (n+1)t + (1-\sum e_L^i) \cdot (p - Y(0))\right]\right].$$

Both effects are caused by the fact that the acquirer's condition for a profitable takeover is more stringent if the EBP applies or expressed in terms of ability levels: $s_E^c(\bar{e}_L, t) > s_D^c\left(n, \sum e_L^i, t, p, Y(0)\right)$. Consequently, with respect to the EC Takeover Directive, the fact that enactment of the EBP unequivocally results in fewer takeover attempts shows that the principle operates as an impediment on the primary objective of stimulating efficiency raising corporate acquisitions.

We know from the previous analysis that the target shareholder's gain ***ex post*** if the EBP applies but do they also profit from its implementation ***ex ante***, i.e. does the value of the firm increase? The following result provides an answer.[10]

Proposition 1:

Enactment of the Equal Bid Principle increases the value of the firm (ex ante)--

$V^E(\bar{e}_L, t, Y(0), X(s)) > V^D(n, p, \sum e_L^i, t, Y(0), X(s))$ *-- if and only if*

$$\left[\frac{1}{1+\bar{e}_L}\right] \cdot \int_{s_E^c}^{s_{max}} X(s) \cdot f(s)ds - \left[\left[\frac{n}{n+1}\right] \cdot \int_{s_E^c}^{s_{max}} X(s) \cdot f(s)ds + \left[1 - F(s_E^c(e,t))\right] \cdot \left[\frac{1-\sum e_L^i}{n+1} \cdot (p - Y(0))\right]\right]$$

$$>$$

$$\left[\frac{n}{n+1}\right] \cdot \int_{s_D^c}^{s_E^c} X(s) \cdot f(s)ds + \left[F(s_E^c(e,t)) - F(s_D^c(n, \sum e_L^i, t, p, Y(0))\right] \cdot \left[\frac{1-\sum e_L^i}{n+1} \cdot (p - Y(0))\right]$$

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[10] A similar result is reported in Bergström and Högfeldt (1993): "The Equal Treatment Principle", Working Paper, Department of Finance, Stockholm School of Economics.

Proof:

Using the fact that $(1-F(s_E^c(e,t))\cdot E\left[\frac{1}{1+\bar{e}_L}\cdot X(s)\middle| X(s)\geq\frac{1+\bar{e}_L}{\bar{e}_L}\cdot t\right]=$

$$\left[\frac{1}{1+\bar{e}_L}\right]\cdot\left[1-F(s_E^c(e,t))\right]\cdot\int_{s_E^c}^{s_{max}}\frac{X(s)\cdot f(s)}{\left[1-F(s_E^c(e,t))\right]}ds=\left[\frac{1}{1+\bar{e}_L}\right]\cdot\int_{s_E^c}^{s_{max}}X(s)\cdot f(s)ds,\text{ and}$$

$$\left[1-F(s_D^c(n,\sum e_L^i,t,p,Y(0))\right]\cdot E\left[\frac{n}{n+1}\cdot X(s)\middle| X(s)\geq(n+1)t+(1-\sum e_L^i)\cdot(p-Y(0))\right]=$$

$$\left[\frac{n}{n+1}\right]\cdot\int_{s_D^c}^{s_{max}}X(s)\cdot f(s)ds,$$

yields the result after substitution and simplification into the inequality expression

$$V^E(\bar{e}_L,t,Y(0),X(s))>V^D(n,p,\sum e_L^i,t,Y(0),X(s)).$$

Note that $s_E^c(\bar{e}_L,t)>s_D^c(n,\sum e_L^i,t,p,Y(0))$. **QED**

While the left hand side of the inequality expression in the proposition is the expected gain from enactment of the EBP, the right hand side gauges the loss. Specifically, the benefit stems from the fact that the Equal Bid Principle distributes a larger share of the takeover gain to the target shareholders if a corporate acquisition attempt occurs.[11] The first term is the expected value of the share of the synergy gain that accrues to the target shareholders if the EBP applies while the sum of the two terms in the square bracket correspond to the total expected value accruing to the target shareholders if the principle is not enacted. On the cost side, the two terms measure the expected loss to the target shareholders because the EBP increases the critical ability hurdle from $s_D^c(n,\sum e_L^i,t,p,Y(0))$ to $s_E^c(\bar{e}_L,t)$. Specifically, the first one gauges the expected loss in bid premium accruing to the large pivotal blockholders caused by elimination of takeover attempts if the EBP is adopted, while the second one is the loss in spillover to the fringe.

More intuitively stated, the condition says that the value of the firm increases by enactment of the EBP if and only if the expected value of the increased share of the synergy gain surpasses the expected loss due to a lower probability of future takeovers caused by the diminished profitability of the acquirer. Accordingly, an expected gain by a

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[11] The expected gain is positive as long as $p<Y(0)+\frac{1}{1+\bar{e}_L}\cdot E\left[X(s)\middle| X(s)\geq X(s_E^c)\right]$.

transfer of wealth (distributive gain) is traded off against an expected loss in the takeover *frequency*, i.e. implicitly implementation of the EBP amounts to a preference by the legislators of the distributive over the frequency aspect. But without any a priori assumptions about the size of the two effects, enactment of the principle may result in a lower, unchanged or increased firm value in a cross section of firms. In particular, while the target shareholders gain ex post from application of the principle, they may very well lose value in an ex ante sense since the value of their shares decreases when the rule is enacted.

Furthermore, by the same type of formal arguments, it is possible to demonstrate that the subset of target shareholders consisting of the fringe of small shareholders gains ex ante if the negative frequency effect is not significant enough to outweigh the positive distributive one. The condition is a reduced version of the general condition in Proposition 1 or

$$\left[1-e_L\right]\cdot\left[\frac{1}{1+\bar{e}_L}\right]\cdot\int_{s_E^c}^{s_{max}} X(s)\cdot f(s)ds > \left[1-e_L\right]\cdot\left[1-F(s_D^c(n,\Sigma e_L^i,t,p,Y(0))\right]\cdot(p-Y(0)).$$

The fringe gains from implementation of the EBP if the expected value of its share of the takeover gain if the principle applies surpasses the corresponding value when it is not enacted. By comparison with the general inequality restriction in Proposition 1, we immediately infer that it is less stringent than the corresponding one for all target shareholders. This implies that even if the *full* value of the firm may *become lower* ex ante as a result of enactment of the Equal Bid Principle, the ex ante value of the share of the takeover gain going to the *fringe* may *not decrease*. This statement captures precisely the intrinsic conflict in the EBP between a value maximizing founder of the firm and the distributive objectives of a policymaker.

Implicitly, we have imposed two restrictions on the formal arguments. First, we have not sufficiently modelled how the incentives of the bidder to invest in research to find synergy gains are affected by the lower expected profitability from such an activity as the EBP is enacted. From the previous analysis we know that the profit condition of a potential bidder becomes, ceteris paribus, more stringent, generating fewer takeover attempts. However, there may also exist an extra, induced effect resulting in a still lower frequency of takeovers if his marginal search intensity is very sensitive to the expected marginal loss in profitability; if this elasticity of search intensity is substantial the induced effect on the probability of takeovers may make it even more likely that this expected loss outweighs the expected distributive gain from adoption of the Equal Bid Principle.

In this sense, the previous analysis has presented the strongest case in favor of enactment of the Principle.

The second implicit restriction in the previous analysis of the effects of the EBP is the assumption that the fringe only owns shares in the target firm. But how does the analysis change if they also own equity in the acquiring firm? If this is the case they are not interested in the value of the ex ante component of the target firm value but in the **full** expected synergy gain under EBP in relation to the corresponding term when the principle does not apply or

$$(1-F(s_E^c(e,t))\cdot E\left[X(s)\middle|X(s)\geq X(s_E^c)=\frac{1+\bar{e}_L}{\bar{e}_L}\cdot t\right] \text{ versus}$$

$$\left[1-F(s_D^c(n,\sum e_L^i,t,p,Y(0)))\right]\cdot E\left[X(s)\middle|X(s)\geq X(s_D^c)=(n+1)t+\left(1-\sum e_L^i\right)\cdot(p-Y(0))\right].$$

or equivalently (see proof of the previous proposition)

$$\int_{s_E^c}^{s_{max}} X(s)\cdot f(s)ds \text{ versus } \int_{s_D^c}^{s_{max}} X(s)\cdot f(s)ds.$$

Since $s_E^c \geq s_D^c$, we immediately infer that for any probability distribution with continuous support in $[0,s_{max}]$, the latter term is always greater than the former. Accordingly, by making the profit condition of a potential future bidder more stringent, enactment of the EBP annihilates some synergy gains implemented by takeovers, i.e. a social economic loss results and the value of the firm decreases. Since neither policymakers nor shareholders know beforehand whether any firm will be the acquirer or the target in a takeover attempt, and equityowners, even small ones, are likely to hold portfolios of different stocks, the above reasoning generalizes into the following statement.

Proposition 2:

If shareholders own (reasonably) well-diversified portfolios of stocks, the value of a firm, not knowing if it will be the acquirer or the target firm in a future takeover attempt, will ***never increase*** *if the Equal Bid Principle is enacted.*

Moreover, since X(s) gauges the synergy gain, a legislator who wants to promote allocational efficiency ought to be interested in precisely how the expected value of future synergy gains of the firm

$$(1-F(s^c)\cdot E\left[X(s)\middle|X(s)\geq X(s^c)\right]$$

is affected by the enactment of the EBP. Accordingly, with respect to the EC Takeover Directive, which explicitly states this objective, we infer a very general and strong result.

Corollary:
If European equityowners hold (reasonably) well-diversified portfolios, the general enactment of the Equal Bid Principle across Europe, as suggested by the 13th Takeover Directive of the EC, is diametrically opposed to the goal of promoting dynamic efficiency of the European industry.

6. An Illustrative Example

IN ORDER TO GENERATE A BETTER understanding of how enactment of the Equal Bid Principle affects the distribution of the takeover gain and the value of the firm, we illustrate the implications of the model with a numerical example. Let us first delineate the implications on the *distribution ex post* of the synergy gain between different clienteles.

Specifically, assume that the target firm under the current management generates an expected cash flow of 100, but its value increases to 150 if another firm acquires it. Since the size of the share controlled by a large pivotal equityowner is a crucial determinant on the distribution of the synergy gain as well as on the value of the firm when we study the effects of implementation of the EBP, we discriminate between two ownership structures: either the single decisive blockholder controls 10% or 25% of the outstanding shares of the target firm. If differentiated bids are allowed, we postulate that the fringe of small shareholders demand a 20% premium over the current value of the expected cash flow of the firm; this corresponds to the empirically observed premium during the 1980's in Sweden. Table 2 reports the effects, in percentage terms, on the distribution of the synergy gain with and without enactment of the Equal Bid Principle using our previous bargaining model.

If differentiated bids are permitted, the distribution of the synergy gain between the acquirer and the target is a 32/68 split if the pivotal blockholder controls 10% of the equity compared to a division of 9/91 if the EBP applies. Moreover, if the decisive equityowner, instead, holds a 25% share of the target, the 35/65 split if differentiated bids are issued changes to a 20/80 outcome if the same tender offer price is extended to all shareholders of the target. But the distributive effect on the fringe of adoption of the EBP is even more salient: changing from 36% to 82% of the synergy gain for the first ownership structure, and doubles from 30% to 60% for the second, more concentrated one.

Table 2: *A comparison of the distribution of the takeover gain (in percentage) when the Equal Bid Principle does and does not apply.*

	Differentiated Bids		Equal Bids	
Size of Blockholder	$e_L = 0.10$	$e_L = 0.25$	$e_L = 0.10$	$e_L = 0.25$
Acquirer	32	35	9	20
Target Firm	68	65	91	80
Blockholder	32	35	9	20
Fringe	36	30	82	60
Sum	100	100	100	100

This illustrates the dramatic effect of the Equal Bid Principle on the distribution of the synergy gain ex post in favor of the fringe of target shareholders, and, ipso facto, the adverse effect on the profitability of the acquirer. In particular, the example corroborates the theoretical implications of the model presented in Table 1. Moreover, as expected, the larger the pivotal blockholder, the smaller effect on the distribution of the target's two clienteles. This, in turn, implies that we would anticipate less negative effects if the rule is adopted in a country with very concentrated ownership structure like Sweden than in the US where a much more dispersed structure is prevalent.

Turning to the *effects ex ante* of enactment of the Equal Bid Principle, but continuing the same example, we assume that the cost to implement the bid is 10 and that it is entirely borne by the acquirer. Then it is easily verifiable from the previously derived threshold (profit) conditions of the bidder, i.e. the lowest acceptable synergy gain which is profitable for him, increases from 38 to 110 if the ETP is enacted, and the large blockholder owns 10% of the target. However, for the more concentrated ownership structure, adoption of the principle has a less conspicuous effect; a rise in the threshold gain from 35 to 50. Assuming that the synergy gain follows a uniform distribution with support between 0 and 75, Table 3 presents the effects on the probability of takeovers, the value of the firm and the distribution of the synergy gain ex ante.

Table 3: *A comparison of the probability of a takeover attempt, the expected takeover gain, the value of the firm, and the ex ante value of the share of the target owned by small equityowners when the Equal Bid Principle does and does not apply.*

	Differentiated Bids		Equal Bids	
Size of Blockholder	$e_L = 0.10$	$e_L = 0.25$	$e_L = 0.10$	$e_L = 0.25$
Zero Profit Condition	38	35	110	50
Probability of takeovers	0.49	0.53	0.00	0.33
Synergy Premium	56.5	55	92.5	62.5
Expected Synergy Gain (ESG)	27.7	29.2	0.00	20.8
Targets Share of ESG in %	68	65	91	80
The Fringe Share of ESG in %	36	30	82	60
The Value of the Firm (V)	118.8	119	100	116.6
The Value of the Share of the Fringe	100	83.8	90	87.5

We immediately infer the following effects of enactment of the Equal Bid Principle from our numerical example. (i) Since the principle makes the zero-profit condition of the bidder more stringent, the *probability of takeovers* unambiguously *decreases*. (ii) Because of the same reason, the *synergy premium*, defined as the expected synergy gain conditional on the takeover being profitable, *increases*. (iii) The *expected synergy gain*, defined as the probability of a takeover attempt times the synergy premium, definitively *decreases*, i.e. the expected allocational improvements generated by future takeovers declines because of adoption of the EBP. (iv) *The value of the firm*, i.e. its status quo

value plus its share of the expected synergy gain, is *reduced* if the principle applies. Expressed somewhat differently, the expected gain generated by a larger share of the synergy gain accruing to the target if the principle applies, is not substantial enough to counteract the expected loss caused by a lower takeover frequency. (v) *The value of the share of the target firm owned by the fringe* may either *decrease* or *slightly increase* due to enactment of EBP. (vi) All of the above effects are most conspicuous for the less concentrated ownership structure where the pivotal blockholder owns 10% of the target's shares.

7. Discussion and Conclusions

THIS PAPER HAS MODELLED a simple idea: large blockholders vested with the potential to foil a takeover attempt have a bargaining position versus the acquisitor, and, ipso facto, exercise a significant and strategic influence on the resulting equilibrium tender offer price. A characteristic feature our model is the explicit modelling of institutional restrictions like the Equal Bid Principle. We have demonstrated that a proper analysis of the EC Directive to enact the EBP requires two things: (i) a model set-up with different shareholder clienteles and (ii) a proper distinction between the (*ex ante*) effect of the Equal Bid Principle on firm value and its effect on the returns of certain investors *ex post*.

We may summarize the economic content of the paper as follows. The Equal Bid Principle is motivated by consideration of equality and benevolence towards the fringe of small shareholders, but its actual imposition may ultimately result in making the target shareholders as a group less wealthy. Our conclusion is that the actual effect of an enactment of the EBP is very likely to be directly opposed to its explicit purpose of protecting the shareholders in the target company. In fact, one might ask whether the very starting point, namely, special protection of the small shareholders of the target firm is correct. The equityowners want to maximize the value of their portfolio which consists of shares *both* in the prospective target companies *and* in purchasing companies, and not just the value of a particular stock. Even an undiversified shareholder, who is interested in rules which transfer the profits to the target company if an offer materializes, does not know whether his company will be an acquiring or a target company.

The overall aim of the EC proposal for a Thirteenth Council Directive is to create more effective corporate structures in Europe. We have demonstrated that one of the basic principle underlying the Directive, the Equal Bid Principle, tends towards a direction opposite to the declared goal of stimulating acquisitions and transformation of

corporate structures in Europe. The drawback of attempting to reduce a bidder's advantage and to raise the price offered to the small shareholders is that it at the same time weakens the incentive for the acquiring firm to make a bid. Thus, the transformation of the European industrial structure is impeded and ultimately the shareholders lose.

Although we have not demonstrated it formally, the topical EC proposal for introducing a Mandatory Bid Rule has similar effects, see Bergström, Högfeldt and Molin (1993) and Högfeldt (1993). These rule de facto raises the limit for control to 100 per cent of the shares. The increased cost in the form of high interest expense and greater exposure to risk can make it unprofitable for a bidder who has already identified improvements in efficiency to acquire control, replace the management and change the production plan. A Mandatory Bid Rule can also prevent someone from acquiring a substantial shareholding in order to learn more about the company and its development potential before going the whole way and acquiring control. Furthermore, the Rule affects the incentives of any party outside the companies existing circle of owners from incurring costs for identifying suitable takeover candidates since the cost of a control acquisition increases. The value of a controlling block can also be large when two companies make investments directly linked to a joint project. If the control limit is raised, and thereby the cost of control, there is a larger risk that the two companies will not invest enough in relation-specific capital and that potential joint profits will be reduced, see Grossman and Hart (1986). On the whole, the enactment of a Mandatory Bid Rule may result in fewer productivity raising acquisitions. It is no coincidence that several US corporate managements have proposed that the Mandatory Bid Rule should be amended the articles of incorporation. The Rule serves as a defence against hostile takeovers; it checks rather than stimulates acquisitions.[12]

Besides the general principles of equal and mandatory bid, the Takeover Directive of the EC commission contains rules governing disclosure of substantial acquisition of shares and detailed prospectus requirement together with a minimum acceptance period. The underlying idea of these disclosure obligations is that the bidder can unduly utilize his information advantage. The information requirements are intended to create a safeguard for target shareholders.

Our view is that also the rules concerning equal access to information, make it less profitable to identify takeover candidates and look for improvements in efficiency. Economic analysis, e.g. Shleifer and Vishny (1986), indicates that the incentives to accumulate shares before the bid is made are large, since a major part of the acquirer's

[12] The second wave of takeover status in US include redemption rights that give shareholders cash redemption right against any buyer of at least 30 percent of the firms stock. Only three states adopted the redemption rights provision, see Karpoff and Malatesta (1989).

profit consists of the capital gain on his toehold established before the bid is issued. The bidder would prefer to buy anonymously since he would then make a greater capital gain. The rules governing disclosure of substantial share acquisitions make it more costly to accumulate shares before the bid. Acquisitions of corporate control therefore becomes less profitable and the incentives to seek improvements in efficiency declines, which afflict the shareholders in the prospective target company.

The same type of reasoning also holds for the requirement of an obligation to provide a detailed prospectus and a period of acceptance. These requirements not only give the target company's shareholders information and time to arrive at a decision in respect to the offer, but also provide potential competing bidders free information and time to examine the target company. This impairs the private economic value of the information, and thereby the incentives to produce it. Stringent information requirement can therefore imply that fewer players in the market will search for inefficiently run companies, seek more efficient production plans or identify synergy gains.

Empirical analysis of US data show that bid premiums rose and bidder returns declined significantly after similar rules (William's Act 1968) were introduced in US, e.g. Asquith, Brunner and Mullins (1983), Bradley, Desai and Kim (1988), and Jarrell and Bradley (1981). Competition for the target firm quite simply pushed up the premium. The proponents of the rules were not slow to pointing out that the rules benefited the target company's shareholders. However, if the bidders profit decreases, his incentives to identify target companies are lessened. This has a detrimental effect on the value of the fringe positions since the likelihood of a bid, and, thereby, a bid premium is reduced.

Our overall conclusion is that the implementation of the Equal Bid Principle and the Mandatory Bid Rule as well as the principle of Equal Access to Information now being considered in Europe impede a continuous change of the European industrial structure. Thus, the implied effects of the Takeover Directive are contrary to the declared purpose of transforming the corporate structures in Europe. This illustrates the old truth that reforms having the virtue of being motivated by good and well-meaning intentions are not seldom the worst enemy of what is actually the best solution.

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