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A Treatment on Strategic Issues of Change-of-Control Transactions

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SECTION 1

Introduction

1.1 Agenda

The shareholders are the owners of a corporation. But they don't control the managers' day-to-day decisions intensively. The "right/obligation to management" is given to a management team that effectively controls much of the corporation's activities. In principle, the shareholders could monitor the management's activities. Minority shareholders owning few shares don't have a high incentive to gather the necessary information (this is a collective action problem). A shareholder that has a non-infinitesimal block has a larger incentive to monitor than minority shareholders but at the same time may collude with the management and extract private benefits. Given a large shareholder of this kind there is no improvement of the corporate's governance: The conflict of interests shifts from "manager vs. minority shareholders" to "controller vs. minority shareholders". The extend of opportunistic behavior may even be larger: Whereas managers must fear the punishment of the managerial labor market (in case of a takeover), a large shareholder is relatively well protected. A large shareholder loses his position only if a rival purchases his block or launches a takeover. His ownership protects him: a rival has to pay him a presumably high price.

We will consider corporations that are controlled by a manager or by a blockholder, where the other shareholders are small passive shareholders. These other shareholders are not involved in operative decisions and are more or less ignorant about strategic issues. They collect dividends, enjoy capital gains and vote (sometimes not even this). Most decisions of the firm are delegated to managers. Either these managers or the blockholder exercise control. The topic of the essay is the **transfer of this control**. There are two major types of change-of-control-transactions: Tender offers and private negotiations. The questions we are going to deal with are: Is/Should control (be) transferred? Which mode of transfer is/should be used to transfer control and how are/should gains be divided? How does the regulatory framework effect change-of-control transactions? Is there a regulation that can enhances efficiency?

We are going to analyze **change-of-control transactions** in three settings. Firstly, we consider widely held corporations. Secondly, we allow for one dominant controlling shareholder. Finally, we analyze pyramids where control over a firm's activities is executed through another firm.

The treatise begins with three non-theoretical sections. The rest of this section serves to motivate the analysis. Section two discusses the framework, introduces terminology and sketches empirical studies. The third section reviews the evolution of the German Takeover Law and the European Directive on Takeovers Bids. The following four sections are theoretical treatments of change-of-control transactions in the three just mentioned settings: "widely held", "one dominant controlling shareholder" and "pyramid".

1.2 Barbarians at the Gate?

In this section we will motivate the analysis by discussing the topic in a journalistic style. It highlights issues that the general public sees in hostile takeovers. This perspective must be contrasted with the view of a financial economist.

In February 2000 the largest *hostile* tender offer so far was accepted: Vodafone/Mannesmann. The final acceptance of the 200 bn. $ (about) tender offer was preceded by what many would call a battle. The flood of ad's was impressive and the combination of fierce statements in the mass media, the reaction of angry workers and the comments from high-ranking politicians gave the deal an enormous publicity: The Bild-Zeitung led its front page with the headline "Englishman's knock-out offer. Will greed for money win Mannesmann?" A picture in the Financial Times (Nov/20/1999) showed Mannesmann workers with banners: "Wir pfeifen Gent zurück!" and "Wir lassen uns nicht verhökern!". The german chancellor Gerhard Schröder noticed that a hostile bid destroys "the culture" of the target company. That Vodafone's bid was a cross country bid is a further nuance. Both parties aggressively advertised for their strategy, sometimes – as the Börsensachverständigenkommission argues – ignoring objectivity.[1] This special transaction has intensified the discussion about hostile takeovers, corporate governance and especially about the necessity of a german takeover code. Even more than three years after the completion of the transaction there is still

[1] The statement of the Takeover commission is available via Internet (www.kodex.de, click on New/Aktuelles). Höpner and Jackson (2001) offer an extensive case study of the Vodafone-Mannesmann takeover.

an epilogue going on, viz. the trail about the payments that some managers received in connection with the transaction.

One takeover battle – the auction of RJR Nabisco in 1989 – was so exciting that it provided the stuff for a movie and a bestseller (see Burrough and Helyar (1990)). Until the mid 90's this 25bn.$ Leveraged Buy Out was the largest hostile takeover. It attracted fierce comments, and for many it was and is a perfect example for the ugly face of capitalism, symbolizing greed and envy. Burrough and Helyar (1990, 400ff.) provide an impression of public perception. A cartoon shows the chart of the share price of RJR Nabisco with a picture of CEO Ross Johnson accompanied by the sentence: "It all started with a small lemonade stand in Manitoba. The next thing I knew I had sold my mother. The rest was easy." The magazine TIME had a cover with a picture of Ross Johnson and the headline was: "A Game of Greed."

The "legend" of Jay Gould is the most extreme case of public hate of hostile raids. Maury Klein has collected plenty of insults, where the following is a representative example.

> Gould was impeached as one of the most audacious and successful caneers of modern times. Without doubt he was so; a freebooter who, if he could not appropriate millions, would filch thousands; a pitiless human carnivore, glutting on the blood of his numberless victims; a gambler destitute of the usual gambler's code of fairness in abiding by the rules; an incarnate fiend of a Machiavelli in his calculations, his schemes and ambushes, his plots are counterplots.
>
> *Gustavus Myers (1909) cited in*
> *Maury Klein (1997, page 1)*

Obviously, hostile takeovers are a disputed subject. The language alone sounds exciting: There exists a pacman defence. A white knight may help against the barbarians at the gate. You have keep in mind poison pills. Maybe the threatened management can use a sharp-repellent device in the company's charter to defend themselves against the mercenaries. In the case of a defeat, the management can enjoy golden parachutes.[2]

[2] All these terms are explained in Brealey and Myers (2000, 959 – 963). Herzel and Shepro (1992) provide interesting comments on the language of takeovers.

Tender offers bids aren't new phenomena. For instance in 1953 Charles Clore bid for J. Sears & Co and "had thrown a large stone into calm waters and sent many ripples through the boardrooms across the country, ..." (see Littlewood (1998, 86)). The government came to the aid of the target with the (somehow curious?) argument: "takeover bids lead to the encouragement of higher dividends, dissipation and abandonment of conservative financial policies" (see Littlewood (1998, 86)). The description of these early hostile bids, especially the reaction of the affected management and the reception of the general public, combined with the analysis of managerial mis-behavior – e.g. slack – is very similar to reports of contemporary takeovers.

A hostile takeover is not a harmonic meeting of CEOs discussing a new or joint strategy. Yet this unfriendly environment must not necessarily be considered as bad. On the contrary, financial economists argue that (the threat of) a hostile takeover is an important tool of corporate governance. The ECONOMIST asserts: "Vodafone's hostile, and successful, bid for Mannesmann is the biggest and most visible example of the growth of shareholder power that promises to remake European capitalism" (The Economist Feb/12/2000). Other commentators assume – or hope – that the success of this bid was a major step away from the so called Deutschland AG (Financial Times Deutschland Feb/20/2000) or more concise: "Rheinish finished" (Economist Feb/20/2000).

Some observers are more sceptical. For example Charkham comments: "To require a take-over to change a CEO is like needing a revolution or foreign conquest to change a government." Several sound and even more unsound arguments can be found. Jensen and Chew (1995) remark that they don't know any area in economics today "where the divergence between popular belief and the evidence from scholarly research is so great". To get an impression of the sound arguments we sketch some. Firstly, the gain for the shareholders may not necessarily be the result of the removal of a misbehaving management, the consequence of economies of scale or synergies but the exploitation of other stakeholders (the tax authority, the bond holders, the customers, the employees) and actually "breach of trust" (Shleifer and Summers (1988)). Secondly, the threat of a takeover may induce managerial myopia (Stein (1988)). Thirdly, a takeover may be the result of an agency problem of the bidder rather than an attempt to solve one of the target (Jensen (1986 [1998])). And fourthly, the device "takeover" may be redundant if the competition in the output market is sufficiently severe to erase managerial slack (Allen and Gale (2000)).

Another reason for skepticism is hubris. A very often cited statement[3] of Warren Buffet makes the point clear.[4]

> Many managements apparently were overexposed in impressionable childhood years to the story in which the imprisoned handsome prince is released from a toad's body by a kiss from a beautiful princess. Consequently, they are certain their managerial kiss will do wonders for the profitability of the Company T[arget] ... Investors can always buy toads at the going price for toads. If investors instead bankroll princesses who wish to pay double for the right to kiss the toad, those kisses had better pack some real dynamite. We've observed many kisses but very few miracles. Nevertheless, many managerial princesses remain serenely confident about the future potency of their kisses – even after their corporate backyards are knee–deep in unresponsive toads ...
>
> We have tried occasionally to buy toads at bargain prices with results that have been chronicled in past reports. Clearly our kisses fell flat. We have done well with a couple of princes – but they were princes when purchased. At least our kisses didn't turn them into toads. And, finally, we have occasionally been quite successful in purchasing fractional interests in easily identifiable princes at toadlike prices.
>
> *Warren Buffet (1981) cited in Weston et. al. (2001, page 5)*

Even though hostile takeovers catch a lot of attention they are rare events. Even during the takeover wave of the 80's hostile takeovers were less than 15 % of all takeovers (Andrade et al., 2001, 106). However, counting completed takeovers underestimates their importance. A major function of hostile takeovers is to *threaten* bad managers with their replacement.

[3]For instance in Brealey and Myers (2000, page 946), and Weston et. al. (2001).

[4]A scientific foundation for hubris of bidders was presented by Richard Roll (1986).

SECTION 2

Context, Terminology & Empirical Synopsis

Strategic issues rather than empirical findings and institutional aspects are the focus of this study. However, to direct the analysis towards realism some empirical results are useful. Furthermore, this section introduces the “context” of the topic. It provides a common motto and introduce terminology.

2.1 The Context

The entity we study is a corporation that has issueed shares giving shareholders two kind of rights: The right to control (especially voting) and a claim on the income generated by the firm. We assume that there are at least some shareholders who own very few (of many) shares. We call theses shareholders *minority shareholders* even if they outnumber the other shareholders. Assume for a moment that all shareholders are minority shareholders, i.e. the firm is *widely held*. For reasons well known (viz. rational ignorance) minority shareholders will not engage in the operative decision making of the firm. They might be involved in designing the charter and will vote on changes of the charter but otherwise they are passive. Operative decisions are made by managers or by large shareholders. The delegation of operative decision making to managers is a defining characteristic of the conception of a corporation. This relationship resembles “division of labor” as managers specialize on managing and owners of the shares do whatever they are good in. Finally, the fact that many shareholders are small shareholders arises from their desire to diversify. A concentrated portfolio is much more risky than a diversified one. Hence, many investors hold only a small number of shares of a particular corporation.

The delegation of managing is not unproblematic. The source of the problem is the separation between control and ownership. The managers rather than the shareholders decide about operative problems and even about some strategic issues. To a large extend control is delegated to managers. The problem with this delegation is that the minority shareholders will suffer from opportunistic behavior of the managers. Managers have private information. This informational advantage allows them to shirk, enjoy private benefits or more generally behave opportunistically. The relationship between shareholders and managers is a standard principal-agent problem. The solution to a principal-agent problem is well known: design a contract that directs the incentive of the manager optimally. In addition to this standard solution of the principal agent problem there is the possibility that the right to control may be transferred to a rival management team. This additional opportunity enlarges the set of possible contracts. One mode of transfer of control for a widely held corporation is a tender offer. A tender offer concentrates voting power in one hand thereby dissolving the problem of rational ignorance. But, as will be discussed, it is not the execution of a takeover that often matters, but the threat of a takeover. We noted that shareholders are involved in some decisions, e.g. the design of the charter. This seems to contradict the claim that minority shareholders are passive. But decision making concerning the charter is different from decision making about operative decisions, since the latter are full of idiosyncratic elements whereas charters in principle don't differ that much among firms.

Many corporations have blockholders, i.e. shareholders who own a non-marginal fraction of the shares. For these shareholders the argument of rational ignorance does not hold. They have an incentive to engage in operative decisions, i.e. they will exercise control. The question is whether they are *entrenching* or *controlling* large shareholders. The latter kind of shareholders mitigate the problem of opportunistic behavior, the former are part of the problem. A controlling shareholder is an investor who owns the shares because of their value as a stock: dividends and capital gains. An entrenching shareholder intends to extracts private benefits (defined below), i.e. behaves opportunistically probably colluding with the management. There is another issue related to blockholders: Given that there is a blockholder, there are two modes of change of control. The initial blockholder may sell his block to a rival. In addition, if the initial large shareholders owns less than 50% of the shares the rival may launch a tender offer. Indeed, the rival may use the tender offer as threat during the negotiation with the initial blockholder.

The discussion so far takes as given a certain ownership structure. But the ownership structure is a consequence of decisions made by the firm's founders. The initial owner anticipates future control transactions. They may decide to hold a block to affect and benefit from a private change-of-control transaction.

They hope the raider will buy the block for a premium or make an expensive tender offer. So, it is an issue of this essay to analyze the effect of the market for corporate control on the founders' decisions about the block they keeps.

2.2 Tender Offers

To analyze the takeover process we need to clarify the economic and legal environment of the transaction. We need to name and characterize the players, define their strategies as well as the informational assumptions of the game. Weston et. al. (2001, page 137) give a table with 25 variables in models of takeovers. In principle the analysis of the function of takeovers – e.g. as a corporate governance device – necessitates to embed the takeover process in the overall economy. With this enormous degree of freedom a reasonable analysis is not possible. It is necessary to concentrate on specific aspects and ignore others. However, to avoid a totally isolated picture we interpret – following Jensen (1986 [1998]) – hostile takeovers as an aspect of the *managerial labor market*. Under this common motto the specific aspects are related to one another. The idea of this characterization of hostile takeovers runs as follows: Shareholders as the principles of the corporation delegate the right to manage the firm to a management team. The incumbent management team constitutes the agent in this relationship. However, the specific management team is no datum, but open to competition from other management teams or professional restructuring companies[5]. A hostile takeover is expression of this aspect of the managerial labor market (Jensen (1986 [1998], page 353)). In general, we formulate the situation within the framework of the standard Principal-Agent terminology. However, even if managers do not behave opportunistically, their jobs are and should be objects of competition and of efficiency considerations.

Even though not a necessary component of the job market of managers, their opportunistic behavior has received a large degree of interest. Many commentators view the market for corporate control, i.e. competition for the right to

[5]The "repair shops of capitalism" (Baker and Smith (1998, page 204)). These reconstruction firms "buy, fix and sell" corporations and are paid for this restruction service. The most famous example is the LBO firm Kohlberg, Kravis and Roberts. Usually their encounter with a company starts with an enormous redesign of the incentive structure and eventually the firm is deliberated into the market. Concerning KKR it is necessary to note that they avoid hostility. Their preferred strategy are MBOs. Baker and Smith (1998) extensively document the strategy of KKR.

manage the assets of the corporation, as a major device of *corporate governance*. The aspect, that received the major attention, is the problem arising from the delegation relationship between the shareholders and the management, where it is assumed that the management should strive exclusively to carry out the will of the shareholders (Fama and Jensen (1983a, b), Shleifer and Vishny (1997)). The problem that results from the separation of day-to-day decisions from ownership was already recognized by Adam Smith:

> The directors of such companies, however, being the managers rather of other people's money than of their own, it cannot well be expected that they should watch over it with the same anxious vigilance with which the partners in a private copartnery frequently watch over their own.
>
> *Adam Smith (1776, 700)*

Berle and Means (1932) extensively studied the problem highlighting the rational passivity of the shareholder:

> ... investors with small holdings or who hold stocks for a very short period and face low transactions costs for getting out of a position have very little incentive to learn about the business they invest in or to monitor the operational and business performance of the companies' executives. From the narrow point of view of any one investor, liquidity is good because it gives investor options and thus reduces that investor's risk. But, this argument continues, liquidity for individual investors may not be good for the economy as a whole because investors, in general, are less likely to be knowledgeable about or committed to specific investments.
>
> *Blair (1995, 136)*

Manne (1965) introduced the idea that hostile takeovers – or the threat of them – could work as a check of the opportunistic behavior. The raiders, the argument goes, are fighting on behalf of the shareholders for a higher shareholder value. T. B. Pickens claimed to have this intension, when he tried to raid Gulf Oil Co.: "I am fighting as an investor to create value for Gulf shareholders, and I am shocked at the hostile reaction from Gulf" (T.B.Pickens (1983) cited in Blair (1995, p.102)).

2.3 Private Benefits of Control

Definiton: *Benefits not shared among all shareholders in proportion of the shares owned, but exclusively by the party in control, are called* ***private benefits****.*

Enjoying private benefits is possible, as part of the firm's income is non-verifiable. Income is called *non-verifiable* if it is observable and all inside participants agree on its existence and size but an outside third party (a judge or mediator) cannot observe it. Hence, the inside participants cannot enforce a clause in the contract refereing to this income. The controller – who may be a blockholder or the management – can use non-verifiable resources for his own benefit. If he decides to do so, we say that he *diverts* income. We should not conclude that the controller exploits some shareholders. For the moment we don't know who bears the cost of non-verifiability.

It is convenient to introduce some notation/symbols. Suppose a firm generates an aggregate value of V, that there are N shares and that the controller owns a fraction α of the shares. Suppose the non-verifiable income is Y. The controlling shareholder can decide to distribute this income as dividend, i.e. in proportion to ownership. Alternatively he may decide for diversion. We denote by D the amount that the controller diverts $0 \le D \le Y$. Suppose the controller diverts D and distributeds the remainder, i.e. $V - D$, in proportion to shareholding. We call $V - D$ the *public value* of the firm. At the stock exchange, prices refer to this public value. Diversion is costly: not the complete amount D will be in the purse of the controller but $\Phi = \delta D$ where $0 < \delta \le 1$. Only in the boundary case with $\delta = 1$ the same amount that is diverted gets into controller's purse. The loss $(1 - \delta)D$ may be considered as camouflage costs necessary to hide the diversion. Another reason for a $\delta < 1$ is the suboptimal use of the resources (e.g. if private benefits are realized through patronage where a job is not done by the best worker but an accomplice).

We can decompose the value of the firm as follows

$$
\begin{aligned}
V &= V - D + D \\
&= \underbrace{(1-\alpha)(V-D)}_{\text{public value to outside shs.}} + \underbrace{\alpha(V-D)}_{\text{public value to inside shs.}} + \underbrace{\Phi}_{\text{private benefits}} + \underbrace{(1-\delta)D}_{\text{cost of camouflage}} .
\end{aligned}
$$

The first two term are the public value of the firm, where the first resp. the second term gives the value that the non-controlling resp. the controlling shareholder(s) receive. The third term is the private benefit and the fourth the loss through camouflage/diversion/inefficient use.

This decomposition can be used to obtain the distribution of the value of the firm: The non-controlling shareholders receive $(1-\alpha)(V-D)$, i.e. their proportion in the public value of the firm. The controller also receives his proportion in the public value but in addition a private benefit that equals Φ. Note, that private benefits don't depend on α directly, i.e. private benefits are benefits enjoyed exclusively and independently of the stake the controller owns.

The controller can distribute all or part of the non-verifiable amount Y as dividends or divert it as private benefits. His wealth is given by

$$\alpha(V-D)+\Phi=\alpha(V-D)+\delta D$$

and the choice variable of the controller is D, where $0 \leq D \leq Y$. If $\alpha < \delta$ he prefers to divert. With $\alpha = \delta$ he is indifferent and if $\alpha > \delta$ he will not divert. We assume that the controller does not divert if $\delta = \alpha$ holds.

We treat δ as a constant.[6] In general δ is dependent on D, i.e. $\delta = \delta(D)$. It is presumably more difficult to hide a large amount than a small. The income of the controller becomes

$$\alpha(V-D)+\delta(D)D$$

and under appropriate conditions the optimal amount of diversion is given by

$$\begin{aligned}\alpha &= \delta'(D)D+\delta(D)-\lambda_1+\lambda_2\\ \lambda_1 D &= 0\\ \lambda_2(Y-D) &= 0\end{aligned}$$

where inner solution are determined by $\alpha = \delta'(D)D+\delta(D) = \delta(D)\left(\frac{\delta'(D)D}{\delta(D)}+1\right) = \delta(D)(1-\epsilon_{\delta,D})$ or

$$\frac{\alpha}{1-\epsilon}=\delta.$$

2.4 Terminology

Before discussing specific issues several "technical" terms will be introduced. A *merger* is a transaction where two firms become one. An *acquisition* is the purchase of a firm by another firm, an individual or a group of individuals. Here a purchase of a firm should be understood as the achievement of the control of

[6]To large extend δ depends on the law and its enforcement.

the target, e.g. through a controlling fraction of all votes. Both, mergers and acquisitions, are takeovers. Takeovers may be friendly or *hostile*. A takeover is hostile if – at least at the beginning – the management of the target opposes the transaction. A hostile takeover is typically connected with a tender offer directly addressed to the shareholders without the consent of the board(s).

A tender offer may be restricted or *unrestricted* and *conditional* or unconditional. A conditional tender offer isn't binding unless a pre-specified number of shares is actually tendered. We call this number/fraction the quorum. If the offer is unrestricted then the bidder will – perhaps contingent on the success of the bid – buy all shares that are tendered.

The legal environment plays a crucial role since it determines the strategies that are permitted.[7] Here we sketch legal issues only.[8] It may be ruled that the bidder has to offer the same condition to all shareholders (Equal Opportunity Rule). In the case of an oversubscription a pro rata allocation is usually demanded. Alternatively, the bidder may have the right to offer every shareholder specific conditions. The Fair Price Rule regulates the price paid in a follow-up merger. This rule restrains two-tiered offers by enforcing that the price of the second tier is equal to the price of the first tier. Another regulation is the so called Mandatory Bid Rule (Monti (1999)). It rules that after obtaining control or after a change of control the bidder has to offer a fair way out for the minortity shareholders. Law regulates the conditions of this offer and it defines, whether there is a change-of-control. Usually the price is related to relatively recent share prices and to the price paid in the change-of-control transaction.

In principle, a rule could apply by law to all bids. Alternatively, a rule – if the corresponding freedom of contract is allowed – may be in the charter of the bidder respectively of the offeree. From a economic point of view, a rule should be obligatory if the outcome in the case of freedom-of-contract is inefficient. Furthermore note, that these regulations consider the targets in need of protection; especially their minority shareholders. This is a puzzle since empirical evidence (e.g. Jensen and Ruback (1983)) indicates that shareholders of the bidders are more likely to be in need of protection.[9] Indeed, according to a study by Stern & Stewart (cited

[7]Baums and Thoma (2002) offer a collection of Takeover Laws in Europe.

[8]More extensive treatments are von Rosen and Seifert (1999), Burkart (1999) and Berglöf and Burkart (2003) and section 3.

[9]Admittedly the minority shareholders of the targets Feldmühle Nobel and Krupp needed protection (Franks and Mayer (1998)).

by the ECONOMIST, Nov/29/2001) Vadofone was the biggest value destroyer in the period from 1996 to 2001. This value destruction was largely caused by the high price paid for Mannesmann.

2.5 An Empirical Synopsis of Tender Offers

Empirical studies usually use event studies to measure the effects of tender offers.[10] Day 0 denotes the date of the announcement. The purpose of the event study is to capture the effect of the event (e.g. tender offer) on the stock price. The consequence of the tender offer is measured by the abnormal cumulative return to be explained now. In a first step an event window is defined, e.g. 40 days before and after the event. In the second step a normal return R^n_{jt} at time t for all firms j in the sample is estimated.[11] Next, the residual $r_{jt} = R_{jt} - R^n_{jt}$ is calculated, where R_{jt} denotes the actual return of firm j at time t. Since individual data is very "noisy" the average $AR_t = \frac{\sum_j r_{jt}}{N}$ is usually taken, where N denotes the number of firms in the sample. Finally, we obtain the *cumulative abnormal return* (CAR) as a measure of the effect of the event:

$$\text{CAR} = \sum_{t=-40}^{40} AR_t.$$

Jensen and Ruback (1983) is a collection of 13 seminal empirical studies. They suggest some stylized facts. The most "famous" stylized fact is that in tender offers target's shareholders earn excess returns of 30 % on average (Jensen and Ruback (1983, 7)). There is much consensus about this empirical fact. Andrade et al. (2001) find for an extensive sample for the period 1973 – 1998 an average excess return 23.8 % for the target. Another quite extensive study of takeover premia is Schwert (1996). The table shows some of his results. It refers to the "Main" sample of Schwert (1996, 163) and some subsamples of this sample. The main sample contains merger and tender offers in the period 1975 - 91. "Runup" denotes the abnormal cumulative return for $t = -42 \ldots -1$ and "Markup" the abnormal cumulative return for $t = 0 \ldots \min[126, \text{delisting}]$. There exist several other similar studies, e.g. Bradley et al. (1988) and Jarrell et al. (1988). Weston et al. (2004, 195ff) offer a survey.

[10] For the methodology of event studies see Campbell et al. (1996), MacKinley (1997) or Weston et al. (2001).

[11] This sounds innocent but it is the most difficult point. The normal return is the return the stock would have had in absence of the tender offer. One must rely on a model and an estimate both of which are never unproblematic.

Sample	Sample Size	Runup	Markup	CAR
All (Main)	1523	13.3 %	10.5 %	23.8 %
successful	1174	14.3 %	15.8 %	30.1 %
unsuccessful	349	10.0 %	-7.4 %	2.6 %
Poison Pill	229	11.9 %	17.6 %	29.5 %
Auction	312	12.7 %	18.2 %	30.9 %
No Auction	1211	13.4 %	8.5 %	21.5 %
Tender Offer	564	15.6 %	20.1 %	35.6 %
Cash	931	14.1 %	14.2 %	28.3 %
Equity	254	9.2 %	7.7 %	16.9 %

The results shown in the table demonstrate that the "strategic environment" of the transaction determines the premium. It certainly matters whether there are several bidders or poison pills (defence weapons). An empirical study by Strassburg (2002) analyzes whether the performance of the industry relative to the market is an explanatory factor of the premium and finds no evidence. This result is supported by the observations of Andrade et al. (2001, 110) that "premia are fairly similar across different types of merger transactions".

Whereas the target's average abnormal return is significantly positive and large, the shareholders of the bidders don't gain much; some studies even find negative abnormal returns. Jensen and Ruback (1983) report an excess return of 4%. Andrade et al. find an insignificant negative abnormal return of -3.8%. There are studies where the bidder's shareholders are loser and some where they are winners. Andrade et al. (2001) conclude that "it is difficult to claim that acquiring firm shareholders are losers in merger transaction, but they are clearly not big winners like the target firm shareholders"

In addition to announcement-period event studies there are examination of *long run* abnormal returns, e.g. Franks, Harris and Titman (1991) and Loughram and Vijh (1997). Loughram and Vijh distinguish between the mode of the acquisition (cash vs. stocks). For stock offers they report large negative and for cash offers large positive returns. However, Andrade et al. (2001, 113f.) point to the methodological concerns with these studies and recommend to leave the priors from the announcement-period event studies unaltered.

The empirical studies commented so far relate to the verdict of the capital market. Alternatively, one may study the post-merger performance. Healy et al. (1992), Ravenscraft and Scherer (1988) and Agrawal et al. (1992) are such studies. Healy et al. report that merged firms have higher operating cash-flows in comparison to their industry. They find no evidence that this increase has been achieved at the expense of long-run viability (measured by capital expenditures and R & D rates). A very important finding of Healy et al. (1992, 156 ff.) is that the after-merger performance is positively correlated with the event returns discussed above. This result supports the view that event returns, on average, correctly forecast future performance.

However, there is a high variance in the results of empirical studies of post-merger performance. Ravenscraft and Scherer (1988) for example find deteriorating post-merger operating performance. Their sample consists of 5000 mergers between 1950 and 1975, i.e. this data is relatively old and covers only the wave of the so-called conglomerate mergers. Results are very sensitive to sample selection and measurement methodology. For an accurate picture, a rather differentiated approach is necessary.[12] See Weston et al. (2001, 209 f.) and the literature cited therein.

M & A activities occur in waves. Consider figure 1 and figure 2 showing data for the US since 1968. In figure 1 the volume of M & As is shown relative to the GNP and in figure 2 relative to the DOW Jones 65 (the level of the last wave is mitigated in this case; stock prices were exaggerated implying an "exaggerated" M & A Volume). The third figure shows the number of deals. The first wave[13] ended in the late 60's, the second wave took place in the 80's and the current wave started in 1995 (see figure 1). Andrade and Stafford (2004) report industry clustering of mergers where the industry affected varied. A well-known hypothesis is that industries react via merger to exogenous shocks (Jensen (1993)). For the 90's, "deregulation" seems to be the driver of the merger wave (Andrade et al. (2001)). For other waves, supply shocks (oil prices) and technical change are the suspects.

Andrade and Stafford (2004) suggest and test a useful classification. Mergers may be triggered by the "necessity" of growth or decline (expansionary vs. consolidating mergers). Mergers are a device for sectoral adjustment. As noted above, at a certain point of time mergers are concentrated in certain sectors. Sec-

[12] However, a differentiated approach has the disadvantage that it is idiosyncratic.

[13] The first wave shown in the figure is not the first M & A wave in the US. There have been two earlier waves, viz. around 1900 and in the twenties (Wasserstein (2001)).

tors may be hit by favorable or unfavorable shocks.[14] If a sector is a growth sector then mergers have the role to increase capacity. These mergers are called expansionary mergers. If the sector needs consolidation then again mergers are used – but to downsize aggregate production. Andrade and Mitchell empirically demonstrate the usefulness of this characterization. Suppose, excess capacity drives the merger wave. In this case capacity utilization in a sector should be negatively related to merger activity in this sector. Andrade and Mitchell show that such a relationship holds for merger activity in the mid-70's and 80's and these findings are consistent with the arguments of Jensen (1993). Furthermore, the sign of the relationship between capacity utilization and merger activity should invert if merger activities are mainly of the expansionary type. Indeed, Andrade and Mitchell demonstrate such a relationship for the mergers of the 90's. However, Andrade et al. (2001, 104) remark:

> Of course, in the end, knowing that industry shocks can explain a large portion of merger activity does not really help clarify the mechanism involved, which brings us to the issues we know least about: namely, what are the long-term effects of mergers, and what makes some successful and others not. Here, empirical economists, and we include ourselves in this group, have had very little to say.

Is the higher Shareholder Value a result of Redistributions?

In the empirical synopsis we claimed that mergers increase shareholder value. Do shareholders merely profit at the expense of others? Several potential losers come to mind: Taxpayers, bondholders, customers and workers.

Taxpayers: The empirical study of Auerbach and Reishus (1988) finds no evidence that tax benefits are a significant factor in the M & As they studied. Lehn and Poulsen (1988) find in their sample of LBOs that premiums are dependent on the tax advantage. Jarrell et al. (1988, 56) conclude that even though tax considerations had some impact much takeover activity was not motivated by them (similarly Weston et al. (2001, 149)).

Bondholders: Most studies find no evidence that shareholders benefit at the

[14] Wasserstein (2001) gives an extensive verbal account of the industrial logic behind the specific takeover waves beginning with the takeover wave of the beginning of this century.

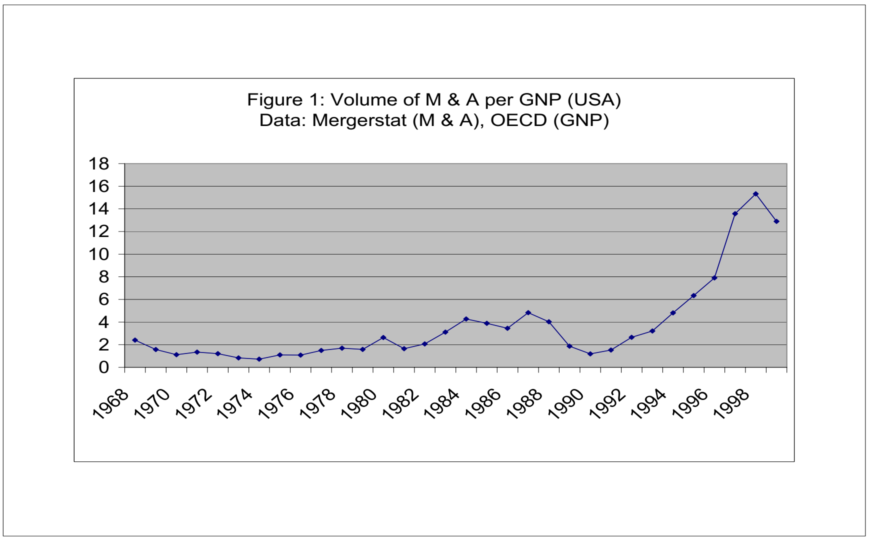

Figure 1: **Volume of M & A per GNP**

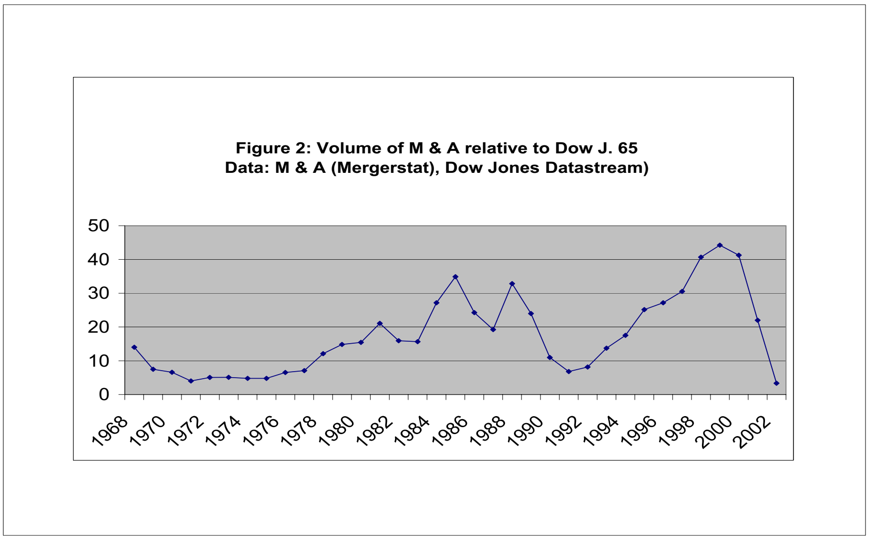

Figure 2: **Volume of M & A relative to Dow J.**

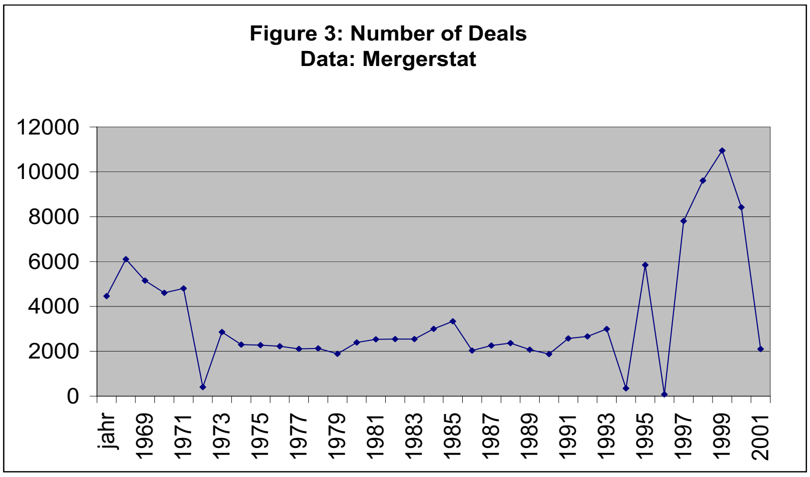

Figure 3: **Number of Deals**

expense of bondholders (Asquith and Kim (1982), Dennis and McConnell (1986), Weston et al. (2001, 149)). However, for LBOs resulting in a high leverage there is some evidence of a negative impact for bondholders (McDaniel (1986, 1988), Warga and Welch (1993)). But, even for LBOs the evidence is not unanimous. Lehn and Poulsen (1988) study LBOs and find no evidence for the redistribution theory (see also Marais et al., 1989).

Customers: Maybe mergers increase market power? The findings of Stillman (1983) and Eckbo (1983) are inconsistent with the market power hypothesis. The evidence comes from the analysis of the stock prices of firms that compete in product markets with the merging firms. The idea is that the merger leads to higher concentration which implies higher prices and the competing firms would benefit.

Workers: Maybe shareholders benefit from a breach of contract workers had with their pre-merger employer? In a seminal contribution Shleifer and Summers (1988) argued that the bidders, after obtaining control of a target, cut salaries to the benefit of the shareholders and at the expense of the employees. Furthermore, they argued that the salary cuts were a breach of trust. The high wages paid before the takeover include payments made for firm specific investment of the employees. Latter had – trusting on implicit contracts – invested in skills that cannot be transferred to other employers. The reduction of payments represented breach of trust. As a consequence if employees take takeovers into account, some implicit contracts become impossible and an efficiency loss results.

This interpretation is however not undisputable. Shleifer and Summers base their argument on the takeover of TWA by Icahn where indeed salaries of employees declined substantially (Weston et al. (2001, 150)). Weston et al. (2001, 152) question the breach of thrust argument by suggesting two alternative explanations of the decline of the salaries after the takeover. In the first scenario the higher pre-takeover wages resulted from the regulation of the airline industry that was removed before the takeover took place. The argument is based on the presumption that in regulated industries workers are able to negotiate high wages and thereby share in the rents existing in such non-competitive industries. Deregulation triggers more competition, erodes these rents and makes wage cuts inevitable – with or without takeovers. In the second scenario suggested by Weston et al. the high pre-takeover salaries resulted from a failure of the old management to bargain efficiently with their workers. The takeover removed this inefficiency.

Stylized Facts

In this subsection we discussed empirical studies that justify the following stylized facts:

- There are takeovers. Hence a model that predicts a zero gain for bidders is questionable.
- T's shareholder receive a large premium.
- The Bidder's *public* gain is low.
- The market for corporate control is unstable.

A theoretical analysis should follow the "comply or explain" approach. If a model is inconsistent with any of the stylized facts, then a comment is necessary.

SECTION 3

Legislation

> The Code is designed principally to ensure fair and equal treatment of all shareholders in relation to takeovers. The Code also provides an orderly framework within which takeovers are conducted ... *The Code is not concerned with the financial or commercial advantages or disadvantages of a takeover.* These are matters for the company and its shareholders. Nor is the Code concerned with those issues, such as competition policy, which are responsibility of government (*The City Code on Takeovers and Mergers [Introduction], see Baums & Thoma, 2002*)

The citation from the introduction of the City Code points to its hands-off attitude. In principle the City Code is not concerned with the business fate of the offerer or offeree after the transaction. The objective is to guarantee a fair and orderly *procedure* of the transaction itself. In this sense, the City Code directs to the *procedural correctness* and not to the "quality" of the *outcome*. For the City Code, this is a natural approach as it is a self-regulatory device. It is predictable that the financial institutions and professional associates (who are responsible for the City Code) don't want the regulations to interfere with the business decision of the investors. Indeed, they would limit their own market. However, the same hands-off approach is also build into the German Takeover Law. Indeed, in the general comments (Begründung – Allgemeiner Teil, Bundesdrucksache 14/7034, page 28) the German Government explains the objectives of their takeover law:

> Ziel des Gesetzentwurfs ist es, Rahmenbedingungen bei Unternehmensübernahmen und anderen öffentlichen Angeboten zum Erwerb von Wertpapieren in Deutschland zu schaffen, die den Anforderungen der Globalisierung und der Finanzmärkte angemessen Rechnung tragen, und hierdurch den Wirtschaftsstandort und Finanzplatz Deutschland auch im internationalen Wettbewerb weiter stärken. Insbesondere soll das Wertpapiererwerbs- und Übernahmegesetz
>
> - Leitlinien für ein faires und geordnetes Angebotsverfahren schaffen, *ohne Unternehmensübernahmen zu fördern oder zu verhindern*,
> - Information und Transparenz für die betroffenen Wertpapierinhaber und Arbeitnehmer verbessern,
> - die rechtliche Stellung von Minderheitsaktionären bei Unternehmensübernahmen stärken und

- sich an international üblichen Standards

We defend this hands-off approach indirectly. Suppose the regulator wants to use the takeover law to ease or stop takeovers because of presumed financial or commercial advantages or disadvantages. For two reasons such an interventionism is inadequate. Firstly, it is doubtful whether an intervention in the freedom of decision (concerning the assessment of the business advantage) is justified. It is doubtful whether the regulator can assess the financial or commercial profitability of takeovers better than the parties involved in the transaction. The latter are putting there mouth where their money is. Why should we mistrust the decisions of market participants in the case of a takeover but not in the case of the purchase of a book (say)? Secondly, even if the market fails and some interventionism is justified because of this market failure, it is doubtful whether the rules on takeovers are the best place to regulate this matter. For example, if the regulator fears that employees of targets are negatively affected by takeovers then it is superior to uphold their legitimate interests by safeguarding their rights directly (e.g. through the enforcement of the labor contracts) and, for that matter, the takeover law contains informational requirements; otherwise it is relatively passive.

Even though we should appreciate the hands-off approach of the German Takeover Law and the City Code, it would be naive to assume that the takeover regulation *is* neutral with respect to the financial or commercial advantages or disadvantages. For example, the regulator in Germany explicitly mentions the interests of the minority shareholders. But a rule that protects the interests of minority shareholders presumably makes takeovers more expensive. Because of this extra costs, some efficient takeovers might fail.[15] Consequently, the regulator trades off business advantages and minority protection.

Commentators (legal scholars and economists) are not naive in this sense: For example, Bebchuk (1994) discusses the Mandatory Bid Rule (explained latter) and (in some degree) rejects it as it leads to the frustration of to many efficient takeovers. Indeed, most papers on the economics of takeovers – and this treatment is no exception – assess takeover law using the criteria of an *efficient allocation* of control rights.[16] An efficient allocation of control rights is achieved if *and*

[15] The model von Bebchuk (1994) might be used to justify this claim (see section 6 and Burkart (1999)).

[16] E.g. Bebchuk (1994) or Berglöf & Burkart (2003). However, the criteria of an ex-post efficient allocation of control is not the only criteria that these authors use.

only if all takeover bids, where the firm's value is higher if the rival has control, succeed. For example, Berglöf and Burkart (2003, Box 4, page 201) criticize the break-through rule as it re-introduces problems associated with the takeover of a widely held firm.[17] The break-trough rule might make possible value-decreasing control transfers. Obviously, they assess the break-through rule using the criteria of ex-post efficiency and this is a criteria refereing to the commercial advantages of the takeover (viz. value of the firm).

A strict dichotomy between the financial or commercial advantages and the procedural correctness seems to be inadequate. Even though the hands-off approach is at least partially illusive it is nevertheless a useful conceptual benchmark rightly accentuated by the regulator. The German Takeover Law and the Directive on Takeover Bids[18] in principle follow the hands-off approach and concentrate on the rights of offeree's shareholders during the takeover bid. Nevertheless, lobbyist succeeded in "smuggling" some deviation from the hands-off approach into the German Takeover Law and the Directive on Takeover Bids. In the following we document the evolution of the German Takeover Law and European Directive on Takeover Bids to describe this "smuggling"-process. Even though it is not necessarily inefficient to deviate from the hands-off approach scepticism is advisable if the deviation resulted from the lobbyism of parties who benefit from the deviations, and the more so, if many scholars criticize the deviations on the base of scientific arguments. The analysis will document that the German Takeover Law and the Directive on Takeover Bids deviate from the hands-off-benchmark in two realms: the neutrality of the board of the offeree and the break-through rule (explained below).

3.1 The "Evolution" of the German Takeover Law

The takeover of Mannesmann initiated a discussion about a takeover act for Germany. Indeed, Germany had until 2002 no law regulating takeovers. The only regulatory device was a voluntary takeover code (the Kodex[19]). However – as

[17]See Mülbert (2004) for an assessment of the relevance of the argument of Berglöf and Burkart.

[18]We use "Directive on Takeover Bids" instead of "Directive of the European Parliament and of the Council on Takeover Bids".

[19]The code and information about it as well as general comments can be found on the web page www.kodex.de.

the commission responsible for the KODEX conceded – this voluntary institution failed because of an insufficient participation (e.g. Loehr (1999)). For example BMW, VW and VIAG did not subscribe the KODEX (Picot (2000, 142)). Only about 73 % of the corporation registered at the stock market have accepted the KODEX (Loehr (1999, 159)).

It is curios that a nation that dislikes hostility in economic transactions – the RHEINISH MODEL – did not have a takeover act. The absence of a takeover law had significant influence on the conduct of the three hostile bids that took place before Vodafone-Mannesmann.[20] Whereas the latter transaction seems to be essentially in accordance with fair rules of conduct, the three older bids must be criticized as the minority shareholders were not treated in accordance with e.g. the KODEX or the City Code (Franks and Mayer (1998)).

The evolution of the takeover act is quite revealing. We will focus on the so-called “neutrality of the board” (explained later). We have to deal with four texts. There are three proposals by the ministry of finance and there is the takeover act. At each stage the section of neutrality was changed and these changes document very well the effectiveness of lobbyism. Successively, the section on neutrality differs more from the rule that most financial economists would choose (I claim). The first proposal of the ministry of finance was published via Internet in June 2000. This proposal and its successor in March 2001 were very close to the KODEX and the CITY CODE, especially concerning the neutrality of the management of the target. Furthermore, the law was in accordance with the proposal of the European Commission of 2000 for a Directive on Takeovers[21]. Thus, all signs indicated that Germany would have a takeover law and more or less simultaneously Europe a directive. Consider the following citation from the 2000 and 2001 proposals and comments to the March 2001 proposal.[22]

from the June 2000 proposal:

§31 Verhalten von Vorstand und Aufsichtsrat der Zielgesellschaft, Abwehrmaßnahmen

[20] Flick ↪ Feldmühle Nobel, Krupp ↪ Hoesch and Pirelli ↪ Continetal (Franks and Mayer (1998, pages 645 – 652)).

[21] Monti (1999) discusses this proposal. Later we will discuss the European takeover directive. The fate of this very similar to the fate of the German takeover act.

[22] I chose to give the original German version of the text to provide unbiased evidence. Meanwhile, the old proposals are no longer available via Internet but upon request from the author (finomica@email.de).

(1) Nach Veröffentlichung der Entscheidung zur Abgabe eines Übernahmeangebots bis zur Veröffentlichung des Ergebnisses nach §25 Abs. 1 Nr. 3 haben der Vorstand und der Aufsichtsrat der Zielgesellschaft alle Handlungen zu unterlassen, die geeignet sind, den Erfolg des Übernahmeangebots zu verhindern.

(2) Ein Verstoß gegen die Pflicht nach Absatz 1 liegt vorbehaltlich Absatz 3 insbesondere bei folgenden Maßnahmen vor:

1. die Ausgabe von Aktien,
2. der Erwerb eigener Aktien durch die Zielgesellschaft,
3. der Abschluss von Rechtsgeschäften, die zur Folge hätten, dass der Aktiv- oder Passivbestand der Zielgesellschaft in bedeutender Weise geändert würde.

(3) Als Verstoß gegen die Pflicht nach Absatz 1 gelten nicht

1. die Suche nach einem konkurrierenden Übernahmeangebot,
2. Handlungen auf Grund eines Beschlusses der Hauptversammlung der Zielgesellschaft, der nach Veröffentlichung der Angebotsunterlage getroffen wurde,
3. die Ausgabe von Aktien unter Wahrung des Bezugsrechts der Aktionäre, sofern der zugrunde liegende Beschluss der Hauptversammlung der Zielgesellschaft nicht früher als 18 Monate vor Veröffentlichung der Angebotsunterlage erfolgt ist,
4. die sorgfältige Führung der laufenden Geschäfte im Interesse der Gesellschaft,
5. der Erwerb von Aktien der Zielgesellschaft mit der Absicht, diese im Handelsbestand zu halten, sofern die Voraussetzungen des 35 Abs. 2 vorliegen;
6. die Erfüllung von vertraglichen oder sonstigen Rechtspflichten, die vor der Veröffentlichung der Entscheidung zur Abgabe eines Übernahmeangebots begründet worden sind.

from the March 2001 proposal

§33 Verhalten von Vorstand und Aufsichtsrat der Zielgesellschaft, Abwehrmaßnahmen

(1) *unchanged*

(2) *unchanged*

(3) *unchanged*

(4) Dem Bieter und mit ihm gemeinsam handelnden Personen ist es verboten, Vorstands- und Aufsichtsratsmitgliedern der Zielgesellschaft im Zusammenhang mit dem Angebot ungerechtfertigte Geldleistungen oder andere ungerechtfertigte geldwerte Vorteile zu gewähren oder in Aussicht zu stellen.

> *from the general comments to the June 2000 proposal (Begründung – Allgemeiner Teil)*:
> **Verhalten des Vorstands und des Aufsichtsrats der Zielgesellschaft und Abwehrmaßnahmen**
>
> Durch die gesetzlichen Regelungen soll den Empfängern eines Übernahmeangebots, d.h. den Aktionären, ermöglicht werden, in voller Kenntnis der Sachlage eigenständig über ein Übernahmeangebot zu entscheiden. Diese Entscheidungsfreiheit würde eingeschränkt, wenn der Vorstand oder der Aufsichtsrat der Zielgesellschaft ohne weiteres durch eigenständige Entscheidungen den Erfolg eines Übernahmeangebots durch Abwehrmaßnahmen vereiteln könnten. Der Vorstand und der Aufsichtsrat der Zielgesellschaft werden daher in Übereinstimmung mit den Vorgaben der Übernahmerichtlinie dazu verpflichtet, grundsätzlich während des Übernahmeangebots Handlungen zu unterlassen, die geeignet sind, den Erfolg des Übernahmeangebots zu verhindern.
>
> Vorstand und Aufsichtsrat der Zielgesellschaft sind jedoch nicht wehrlos; sie können vielmehr unter bestimmten Voraussetzungen auch aktiv bei der Abwehr eines Bieters tätig werden. Erlaubt ist zum einen die Suche nach einem konkurrierenden Übernahmeangebot ("white knight"). Hierdurch wird Vorstand und Aufsichtsrat ermöglicht, durch Einbeziehung eines weiteren Bewerbers im Interesse aller Aktionäre für möglichst attraktive Angebotskonditionen zu sorgen.
>
> Zulässig sind ferner sämtliche Handlungen, die auf Grund eines Beschlusses der Hauptversammlung der Zielgesellschaft erfolgen, der nach Veröffentlichung der Angebotsunterlage des Bieters getroffen wurde. In diesem Fall basiert das Handeln auf einer Entscheidung der Aktionäre der Gesellschaft, die diese Entscheidung eigenständig vor dem Hintergrund der konkreten Übernahme getroffen haben. Durch verkürzte Ladungsfristen, eine freie Wahl des Versammlungsortes und die gleichzeitige Festlegung einer Annahmefrist von zehn Wochen für Übernahmeangebote bei Einberufung entsprechender Hauptversammlungen wird in diesen Fällen die Durchführung entsprechender Abwehrmaßnahmen ermöglicht.
>
> Zulässig ist darüber hinaus auch die Ausgabe von Aktien unter Wahrung des Bezugsrechts der Aktionäre, sofern der zugrunde liegende Beschluss der Hauptversammlung der Zielgesellschaft nicht früher als 18 Monate vor Veröffentlichung der Angebotsunterlage erfolgt ist.

These proposals demand strict neutrality of the target's management. They allow defence measures only contingent on a corresponding decision of the shareholder meeting held *after* the takeover bid arrived. This is in accordance with the 2000-proposal for a Directiveon Takeover Bids, which forbids a decision about defence of the general meeting in advance of a bid (Monti (1999, page 25)). The will of the ministry is obvious: The shareholders have the right to decide about the tender offer and the boards have to remain neutral. The freedom of choice were restrained if the management could by its maneuvers frustrate the bid. The fact that in the comments a shareholder meeting on short notice in case of a tender offer is mentioned, also underlines that at that time the ministry wanted the shareholders to decide. The ministry explains (in their specific comments/ Begründung – Besonderer Teil) that the neutrality in case of takeover is merely a interpretation of the current conception of corporate law: The management is safeguard of others’ interests. Hence, it would be inconsistent if they could affect the composition of the shareholders.[23] The ministry also mentions the conflict of interest. In case of a takeover the management must fear to lose their position. So, they won’t be impartial.

However, because of lobbyism by the trade unions, managers and the BDI the german government obviously went weak on the knees. The July proposal offers the target’s management more defence weapons. The corresponding part of the new proposal reads as follows:

> *from the 2001 July proposal:*
>
> **§33 Handlungen des Vorstands und Aufsichtsrats der Zielgesellschaft**
>
> (1) Nach Veröffentlichung der Entscheidung zur Abgabe eines Angebots bis zur Veröffentlichung des Ergebnisses nach 23 Abs. 1 Satz 1 Nr. 2 bedürfen Handlungen des Vorstands und des Aufsichtsrats der Zielgesellschaft, durch die der Erfolg des Angebots verhindert werden könnte, der Ermächtigung der Hauptversammlung. Dies gilt nicht für Handlungen, die auch ein ordentlicher und gewissenhafter Geschäftsleiter einer Gesellschaft, die nicht von einem Übernahmeangebot betroffen ist, vorgenommen hätte, sowie für die Suche nach einem konkurrierenden Angebot.
>
> (2) Ermächtigt die Hauptversammlung den Vorstand vor dem in Absatz 1 Satz 1 genannten Zeitraum zur Vornahme von Handlungen, um den Erfolg von Übernahmeangeboten zu verhindern, sind diese Handlungen in der Ermächtigung im Einzelnen zu bestimmen. Die Ermächtigung kann für höchstens 18 Monate erteilt werden. Der Beschluss der Hauptversammlung bedarf einer Mehrheit, die mindestens drei Viertel des bei der Beschlussfassung vertretenen Grundkapitals umfasst; die Satzung kann eine größere Kapitalmehrheit und weitere Erfordernisse bestimmen. Handlungen des

[23] Die in Satz 1 enthaltene Regelung ist eine gesetzliche Ausformung der bereits nach gegenwärtiger Rechtslage für den Vorstand bei Unternehmensübernahmen geltenden Verhaltenspflicht. Gesellschaftsrechtlich ist dieses Gebot abzuleiten aus der Funktion des Vorstands als Wahrer fremder Interessen, d.h. der Interessen der Gesellschaft. Mit dieser Funktion unvereinbar wäre eine Kompetenz des Vorstandes, die Zusammensetzung des Aktionärskreises zu beeinflussen.

Vorstands auf Grund einer Ermächtigung nach Satz 1 bedürfen der Zustimmung des Aufsichtsrats.

(3) Dem Bieter und mit ihm gemeinsam handelnden Personen ist es verboten, Vorstands oder Aufsichtsratsmitgliedern der Zielgesellschaft im Zusammenhang mit dem Angebot ungerechtfertigte Geldleistungen oder andere ungerechtfertigte geldwerte Vorteile zu gewähren oder in Aussicht zu stellen.

Justification for the July 2001 proposal:

Handlungen des Vorstands und Aufsichtsrats der Zielgesellschaft während des Angebotsverfahrens

Durch die gesetzlichen Regelungen soll den Adressaten eines Übernahmeangebots, d.h. den Aktionären, ermöglicht werden, in Kenntnis der Sachlage eigenständig über das Übernahmeangebot zu entscheiden. Diese Entscheidungsfreiheit würde eingeschränkt, wenn Vorstand oder Aufsichtsrat der Zielgesellschaft ohne weiteres durch eigenständige Entscheidungen den Erfolg eines Übernahmeangebots verhindern könnten. Vorstand und Aufsichtsrat der Zielgesellschaft bedürfen daher für Handlungen, durch die der Erfolg des Angebots verhindert werden könnte, grundsätzlich einer Ermächtigung der Hauptversammlung. Dies gilt jedoch nicht für solche Handlungen, die auch ein ordentlicher und gewissenhafter Geschäftsleiter einer Gesellschaft vorgenommen hätte, die nicht von einem Übernahmeangebot betroffen ist. Hierdurch wird sichergestellt, dass die Zielgesellschaft während des Angebots nicht unangemessen in ihrer Geschäftstätigkeit behindert wird. Die Suche nach einem konkurrierenden Angebot bedarf ebenfalls keiner Ermächtigung der Hauptversammlung.

Die Hauptversammlung kann den Vorstand zur Durchführung von Abwehrmaßnahmen ermächtigen. Erfolgt eine solche Ermächtigung ”auf Vorrat”, d.h. ohne dass ein öffentliches Angebot vorliegt, gelten auf Grund der sehr weitgehenden Folgen besondere Erfordernisse. Zum einen sind ”Blankettermächtigungen” unzulässig. Zum anderen bedarf der Beschluss einer Mehrheit von des bei der Beschlussfassung vertretenen Grundkapitals. Die Ermächtigung kann für höchstens 18 Monate erteilt werden. Handlungen des Vorstands auf Grund der auf Vorrat erteilten Ermächtigung bedürfen stets der Zustimmung des Aufsichtsrats.

July proposal of the Ministry of Finance

The major change is the possibility of an approval-in-advance (Vorratsbeschluss), which gives the management more freedom to defend. Obviously, the lobbyist were not satisfied. Indeed, the approval-in-advance device has some deficiencies. Firstly, the approval has to be renewed regularly. So, the topic will be on the agenda of the general meeting and there is some danger that shareholders will vote against it. Furthermore, each time the topic is on the agenda the firm signals that it perceives itself as a possible target; why would it need an approval-in-advance otherwise. Hence, this device is not very powerful.[24]

At the margin we note that approvals-in-advance are inconsistent with the EU directive on takeover. Section 9 (3) demands that any decision taken before the tender offer was launched and not yet implemented, needs the general meeting's approval (see also the report of the High Level Group (Winter et al., 2002, 42f.)).

So far we discussed proposals. Since 2002 the “Wertpapiererwerbs- und Übernahmegesetz” (German Takeover Law) regulates takeover bids in Germany. The first sentence of section 33 of the takeover act demands neutrality of the boards but the last phrase abandons – at least moderates – it.

> *the actual §33 of the takeover*
>
> **§33 Handlungen des Vorstands der Zielgesellschaft**
>
> (1) Nach Veröffentlichung der Entscheidung zur Abgabe eines Angebots bis zur Veröffentlichung des Ergebnisses nach 23 Abs. 1 Satz 1 Nr. 2 darf der Vorstand der Zielgesellschaft keine Handlungen vornehmen, durch die der Erfolg des Angebots verhindert werden könnte. Dies gilt nicht für Handlungen, die auch ein ordentlicher und gewissenhafter Geschäftsleiter einer Gesellschaft, die nicht von einem Übernahmeangebot betroffen ist, vorgenommen hätte, für die Suche nach einem konkurrierenden Angebot *sowie für Handlungen, denen der Aufsichtsrat der Zielgesellschaft zugestimmt hat.*
>
> (2) Ermächtigt die Hauptversammlung den Vorstand vor dem in Absatz 1 Satz 1 genannten Zeitraum zur Vornahme von Handlungen, die in die Zuständigkeit der Hauptversammlung fallen, um den Erfolg von Übernahmeangeboten zu verhindern, sind diese Handlungen in der Ermächtigung der Art nach zu bestimmen. Die Ermächtigung kann für höchstens 18 Monate erteilt werden. Der Beschluss der Hauptversammlung bedarf einer Mehrheit, die mindestens drei Viertel des bei der Beschlussfassung vertretenen Grundkapitals umfasst; die Satzung kann eine größere Kapitalmehrheit und weitere Erfordernisse bestimmen. Handlungen des Vorstands auf Grund einer Ermächtigung nach Satz 1 bedürfen der Zustimmung des Aufsichtsrats.
>
> *Gesetz zur Regelung von öffentlichen Angeboten zum Erwerb von Wertpapieren und Unternehmensübernahmen*

It is the author's opinion that the first sentence and the phase printed in italics are contradictory. Ekkenga and Hofschroer (2002, 21f): "*Die ein wenig*

[24]See Kraft et al. (2003) for further comments.

abrupt nachgeschrobene Vorschrift steht nicht nur in dem zweifelhaften Ruf, eine Gefälligkeitsklausel zu Gunsten der deutschen Automobilindustrie zu sein, sie ist auch in rechtssystematischer Hinsicht nicht gerade ein leutendes Beispiel für das Obwalten gesetzgeberischer Intelligenz. Denn erstens steht der Wortsinn in diametralen Gegensatz zur Verbotsaussage des Abs. 1 Satz 1, wenn man einmal die Möglichkeit beiseite lässt, dass der Aufsichtsrat in einer Übernahmesituation theoretisch anderer Auffassung sein könnte als der Vorstand. Zweitens darf man darüber rätseln, welchen Sinn die Hauptversammlung nach Abs. 2 Satz 1 eingeräumte Ermächtigungskompetenz noch haben soll, wenn Vorstand und Aufsichtsrat schon kraft Gesetz zur Einleitung repressiver Massnahmen autorisiert sind."

To legitimate a certain measure of the management board by the approvement of the supervisory board is not opportune. Firstly, the supervisory board's approval of a certain measure that is not a management right (keine Geschäftsführungsbefügnis) does not make this measure permissable. Indeed, the approval by the General Meeting is necessary (§§ 93 Abs. 4, 119 Abs. 2 AktG).[25] Hence, the regulator seems to refer to defence measures that are in the authority of the management board. Indeed, the Finanzausschuß (BT-Drucksache 14/7477, 2001, 53) argues that the inclusion of the last phrase allows the management board *within his authority as the management board* to defend against a takeover.[26] But this is not helpful as in a specific case it will be very doubtful whether a certain measure is a management right (Geschäftsführungsbefügnis) (Geibel and Süßmann, 2002, 492).

Secondly, the takeover law is not only very vague but also ignores the conflict of interests of the *supervisory* board not ignored in the June 2000 proposal. In the comment to the June 2000 proposal the ministry of finance explicitly mentioned the conflict of interests of both the management and the supervisory board.[27] Accordingly, our neighbor Austria demands neutrality of both (Takeover Act of Austria, §12): "The management board and supervisory board of the offeree company may not take any measures likely to deprive their shareholder of the opportunity to make a free and informed decision on the bid. ... ". The EU directive on takeover explicitly includes a reference to the two-tier case: " where

[25] See Geibel and Süßmann (2002, 492).

[26] Die Änderung in Absatz 1 ermöglicht dem Vorstand, innerhalb seiner Geschäftsführungskompetenz Abwehrmaßnahmen auch dann durch zuführen, wenn der Aufsichtsrat diesen Maßnahmen zuvor zugestimmt hat.

[27] Hinzu tritt der Konflikt, in dem Vorstand und Aufsichtsrat im Hinblick auf eigene Interessen stehen, nicht aufgrund einer Übernahme Einfluss und ggf. die eigene Position zu verlieren.

a company has a two-tier board structure 'board' shall mean both the management board and the supervisory board". Hence, there is another instance where the German Takeover Law is inconsistent with the article 9 of the Directive on Takeover Bids.

If the management board is in a conflict of interests so is the supervisory board. Indeed, this conflict of interests might be even more severe as half of the supervisory board represent employees (co-determination). Especially in the case of a takeover, the interests of shareholders and employees are diametral. Hence, it is inconsistent to protect the shareholder's opportunity to decide about the takeover by demanding the supervisory board's approval of measure made by the management board.

Kirchner and Painter (2002, 16) compare the German Takeover Law with the American approach of granting wide discretion to offeree board. They argue that the board's autonomy is even larger in Germany than in Delaware. There courts protect shareholder interests should they complain about the abuse of defence. In Germany however: "Nowhere does the German Takeover Code limit the authority of the supervisory board to approve a defensive measure that breaks up or sells the target company simply in order to keep it away from the hostile bidder (the Revlon mode in which takeover defenses are subject to strict scrutiny under Delaware law). Nowhere does the German Takeover Code even require that the takeover defense be reasonable in relation to the threat posed by the takeover bid (the proportionality rule at least purported to be applicable in Delaware under Unocal)."

For two reasons, it is difficult to draw this (or any) conclusion about the consequences of §33. Firstly, the article is vague and so far there are no cases with interpretations of courts. In the author's opinion it is difficult to predict how courts will interpret the will of the legislator. Secondly, many defence weapons known from the USA are prohibited by the company law (Aktiengesetz).[28] Even if we rarely observe defence against takeovers it will be difficult to attribute this absence of defence to the takeover act.

[28]Indeed, it is not the takeover law that shapes the opportunity for defence but the rather restrictive regulation of the Aktiengesetz (Kraft, Jäger and Dreiling, 2003)

3.2 Summary of the German Takeover Act

With a view to a preparation for the theoretical analysis of the section 4 and 5 we collect the most important rules of the German Takeover Act.

Equal Treatment Rule Holders of target companies' securities belonging to the same class must be treated equally.

Mandatory Bid Rule In case of a change of control the new controller has to make an offer to all shareholders.

Zaunkönigregel (extended acceptance period) A shareholder who has not approved the bid within the acceptance period may subsequently accept (within two weeks) the bid

Squeeze-Out If a bidder receives 95 % of the shares then he might squeeze out the remaining shareholders. The price in the freeze-out should not be the price of the takeover bid.

Conditional Bids The bidder can condition his bid on a quorum

Partial Bids Partial bids are not allowed.[29]

3.3 The Evolution of Takeover Directive

As with the German takeover act a disputed tender offer was a driving force for drafting a first proposal in 1989.[30,31] The City Code served as a model for this proposal. Hence, it contained the mandatory bid and the anti-frustration rule[32]. Controversies about the compatibility of the subsidiary principle with the directive, the UK's disapproval of an overregulation and the opposition of members that were hostile on takeovers caused a slowdown. Only in June 2000 the council under Germany's presidency agreed on a common position that demanded neutrality of the offeree's board.

[29] See §§32 and 24 for an exemption in case a of cross border bid.

[30] Benedetti $\hookrightarrow$ Sociéte Générale de Belgique in 1988.

[31] The legal and political process leading to the Directive on Takeover Bids is described in Hopt (2002) and Skog (2002). Grundmann (2004, 433ff) offers a survey and detailed references. Maul and Kouloridas (2004) summarize the Takeover Directive

[32] We use the expression "anti-frustration rule" as a synonym for the "principle of neutrality of the board" (Hopt, 2002, 9).

The almost simultaneous watering down of the anti-frustration rule in Germany and the defeat of the directive in 2001 is no coincidence. In June 2000 both the 2000-proposal of German Takeover Law and the common position demanded that the board must abstain from any action that might frustrate the bid.[33] In 2000 it seemed that the passing of the directive depended only on the "marginal" question of the status of Gibraltar. However, things changed in the course of a few days. The common position reached under German presidency was now opposed by Germany. On April 23 at a meeting of representatives of large German companies, their labor union representatives and the German government the former called for a change/cancellation of the anti-frustration rule. Two days later the Swedish Presidency was informed that Germany no longer backed the common position. The move of Germany was very controversial: "Not only the Members States that vociferously pushed for shareholders' sovereignty but also those that traditionally took a more relaxed stance toward poison pills took exception to the Germans, whom they felt were overstepping the rules ... (Skog, 2002, 309)". As a consequence, Germany was totally isolated in a 14:1 vote (Handelsblatt, 7.6.2001) and the Handelblatt commented that Gerhard Schröder got his ears boxed[34]. Presumably, he swallowed this criticism easily since eventually with an unprecedented stalemate of 273:273 the proposal was rejected by the European Parliament.

The opponents reasoned their opposition against the anti-frustration rule with absence of a level playing field (e.g. Lehne (2002, 39ff)). They pointed to the fact that e.g. German corporations cannot use devices other European corporations can; viz. Supermajorities, golden shares, dual shares, etc. These devices allow an entrenchment against a takeover. With the anti-frustration rule, limiting the

[33]This draft of the EU directive had a clause on approval-in-advance measures. It allowed to increase capital with prior authorization of the general meeting not earlier than 18 months before the launch of the bid. It is interesting that this clause is absent in enacted EU directive on takeovers. We may speculate: Either the supporter of strong defence lost interest in approvals-in-advance as they are ineffective. Or they don't care much about section 9 of the directive as they are going to opt out (this is explained later).

[34]"Schröder hat dem Standort Deutschland mit seinem Schlingerkurs in Sachen Übernahmegesetz schweren Schaden zugefügt." Blamiert habe sich allerdings auch die Crème der deutschen Unternehmen. "Schließlich waren es unter anderem die Vorstandschefs von VW und BASF, die Schröder den Kurswechsel in Richtung Protektionismus aufgedrängt haben. Exakt dieser Personenkreis lässt keine Chance aus, um bei jeder sich bietenden Gelegenheit mehr Internationalität und mehr Wettbewerb anzumahnen. Die Tatsache, dass Ferdinand Piëch und seine Mitstreiter dem Protektionismus das Wort reden, ist gleichbedeutend mit dem Eingeständnis, dass sie offenbar allein nicht in der Lage sind, durch unternehmenspolitische Maßnahmen den eigenen Börsenwert so zu steigern, dass eine Übernahme schwerer wird. (Handelsblatt, 7.6.2001)". (see `www.zeit.de/archiv/2001/24/200123_pressebrief_0607.xml`)

possibilities of defence, German corporation are handicapped too much as they cannot switch to the mentioned entrenchment devices.

The European Commission gave an expert group (the so-called High-Level Group) the task to provide independent advice. The High Level Group was mandated to consider the issue of "how to ensure the existence of a level playing field in the European Union concerning the equal treatment of shareholders across Members States". The High Level Group suggested the following solution:

- keep the anti-frustration rule[35] but
- demand a break-through rule.

There is no level playing field in Europe as several regulators allow their corporations to deviate from the one-share one-vote rule[36]. This is done through Golden shares, Ownership caps, voting caps, Supermajorities, etc.[37] The break through rule enforces the one-share one-vote principle in case of a takeover. It has two tiers. The first tier applies if a bid is announced and provides that

- any restriction on the transfer of securities shall not apply vis-*à*-vis the bidder during the period allowed for acceptance,
- restriction on voting rights shall not have effect at the general meeting of shareholders which decides on any defensive measures against the bid. Multiple-vote securities shall carry one vote at the general meeting of shareholders which decides on any defensive measures.

The second tier applies if the bidder holds 75% or more of the voting capital. It provides that

- the bidder has right to call a general meeting of shareholders at short notice

[35]Section 9 (2) states: *During the period referred to in the second subparagraph, the board of the offeree company must obtain prior authorization of the general meeting of shareholders given for this purpose before taking any action other than seeking alternative bids which may result in the frustration of the bid and in particular before issuing any shares which may result in a lasting impediment to the offerer in obtaining control over the offeree company. ...*

[36]For our purpose this characterization is sufficient. For details see the report of the Winter et al. (2002).

[37]For an extensive list Winter et al. (2002, 74).

- no restriction on the transfer of securities rights or voting rights nor any other extraordinary right concerning the appointment or removal of board member shall apply. Multiple-vote securities shall carry one vote at the first general meeting of shareholders following the closure of bid, called by the bidder in order to amend the articles of association or to remove or appoint board members.

If the deviations of the one-share one-vote principle were the reason of the no-existence of a level playing field then the break-through rule would suffice. If a bidder launches a bid then one-share one-vote applies in votes on defence. Additionally, if the bidder achieves or passes the threshold 3/4 of the capital carrying voting rights then one-share one-vote applies in votes on the appointment/removal of board members.

The break-through rule is a severe infringement on the property rights of the shareholders and clearly contradicts the principle of contractual freedom. Furthermore, anti-frustration rule is inconsistent with the German Takeover Code. One might expect that a directive that applies these rules unqualified would not find the approval of Germany and some other member states. As a compromise the directive includes optional arrangements (Article 12):

- Member states may decide not to require firms to apply the anti-frustration or the break-through rule; member states may *opt-out*.
- If a member state decides to opt-out it can grant companies the right to apply the anti-frustration or the break-through rule; companies can *opt-in*.
- If a firm decides to opt-in then the member states may exempt these companies from the anti-frustration or the break-through rule if they become the target of an offeree which does not apply the anti-frustration or the break-through rule[38].

We can draw some conclusions: To a large extend European takeover regulations remain heterogenous. If the idea of the directive was to achieve harmonization it failed (at least partially). However, one may argue that this is in accordance with

[38]See Article 12 (3, 5) of the Directive.

the principle of subsidiarity. Furthermore, it allows some regulatory competition or arbitrage.

Those member states sceptical about the anti-frustration rule "won". They got through the opt-out rule and will use it. The fact that firms can opt-in gives shareholders the opportunity to decide to apply the anti-frustration rule. Hence, for German corporation the non-protectionistic solution is still an option. It is conceivable that German corporations are requested by their shareholders to opt-in. In the author's opinion, it would be adequate to include the anti-frustration rule of the directive in a self-regulatory Code of Good Governance. Corporations that don't comply to this anti-frustration rule should be demanded to explain why (comply or explain). For that matter, the code should be completely independent of the Government. The German Corporate Governance Code *of the Government Commission* includes the following rule (German Corporate Governance Code, rule 3.7):

> In the event of a takeover offer, the Management Board and Supervisory Board of the target company must submit a statement of their reasoned position so that the shareholders can make an informed decision on the offer.
>
> After the announcement of a takeover offer, the Management Board may not take any actions outside the ordinary course of business that could prevent the success of the offer *unless the Management Board has been authorized by the General Meeting or the Supervisory Board has given its approval*. In making their decisions, the Management and Supervisory Boards are bound to the best interests of the shareholders and of the enterprise.
>
> In appropriate cases the Management Board should convene an extraordinary General Meeting at which shareholders discuss the takeover offer and may decide on corporate actions.

Hence, the Code uses the same approach as the German Takeover Law and is not offering a path to circumvent it.

The break-trough rule was adopted to achieve a "level playing field". Several commentators argue that the concept of a level playing field is vague and inadequate[39]. Here, we don't repeat these arguments but refer to the literature. However, it is useful to consider the break-trough rule as the result of a protec-

[39]E.g. McCahery et al. (2003), Hertig and McCahery (2003) and Becht (2004).

tionistic attitude.[40] In the main, the break-through rule does not refer to equal terms between offerer and offeree in a given takeover battle (PacMan defence is very rare). The fear of some member states is that takeovers will occur in one direction only, e.g. French bidders will take over German corporations but not the other way round.

Is this fear justified? It is useful to consider the US–UK case. At the bottom line, the UK employs a strict neutrality rule whereas US-American corporations can defend more effectively. Hence, we might expect that UK corporations are taken over by US-American corporations but not the other way round. Weston et al. (2004, 450) lists the 25 largest cross border transactions involving US acquirers resp. targets. The list contains 7 transactions where the acquirer was US-American and the target from the UK.[41] The same statistic contains 9 transactions where the target is a US firm but the acquirer from the UK.[42] The comparison of the numbers of deals does not corroborate the fear discussed above. If we compare the volumes of the transactions then the fear is even less justified: the aggregate value is 57837 million dollars for the UK targets and 204879 million dollars for the US targets. Even if we ignore the two largest transactions – as they are very large indeed – the aggregate value of the US targets is still larger than of UK targets, viz. 96418 million dollars. Even though this is only casual evidence it casts doubt on the fear that the volume of cross border transactions is affected by the defence arsenal of corporations.

Furthermore, even if (say) German corporations are disproportionally often taken over, shareholders of German corporations benefit from the large takeover premia. If the rights of the employees or other third parties need protection then the regulator should not use the takeover law to do so but protect the endangered right directly. For example, if there is a danger of market concentration then competition law should be used to assure competition. In the author's opinion, if there is a danger of a tilted market of corporate control then it stems from exertion of power of the governments but not from market forces.

[40] Kirchner and Painter (2002) for a similar argument about the German Takeover Law.

[41] Texas Utility Co. $\hookrightarrow$ Energy Group PLC, Wal-Mart $\hookrightarrow$ ASDA Group PLC, TRW $\hookrightarrow$ Lucas Varity PLC, NTL Inc. $\hookrightarrow$ CWC ConsumerCo, Chase Manhattan $\hookrightarrow$ Robert Fleming Holdings Ltd., Schlumberger Ltd. $\hookrightarrow$ Sema PLC, Merrill Lynch $\hookrightarrow$ Mercury Asset Management

[42] Vodafone $\hookrightarrow$ Air Touch, British Petroleum $\hookrightarrow$ Amoco Corp., BP Amoco $\hookrightarrow$ Atlantic Richfield, Unilever $\hookrightarrow$ Bestfoods, Scottish Power $\hookrightarrow$ PacifiCorp, National Grid Group $\hookrightarrow$ Niagara Mohawk Holdings, Beechman Group $\hookrightarrow$ SmithKlime Beckman, British Petroleum $\hookrightarrow$ Standard Oil, HSBC $\hookrightarrow$ Republic New York Corp.

3.4 Summary of the EU Takeover Directive

Equal Treatment Rule Holders of target companies' securities belonging to the same class must be treated equally.

Mandatory Bid Rule In case of a change of control the new controller has to make an offer to all shareholders.

Squeeze-Out If a bidder receives 90 % of the shares then he might squeeze out the remaining shareholders. Member states may set a higher threshold. However, the threshold should not be higher than 95%. The price in the squeeze-out should be the price of the takeover bid.

Breakthrough Rule In case of takeover one-share one-vote applies (see the preceding section for details)

Optional Arrangements Members states may opt-out the anti-frustration and/or the breakthrough rule. Firms may opt-in. Targets that opted-in can get an exemption if the anti-frustration or the breakthrough rule does not apply to the offerer.

3.5 Squeeze-out

Both, the German Takeover Law and the Directive on Takeover Bids have a squeeze-out rule. They differ with respect to the threshold and the consideration in the squeeze-out. The directive rules that the price in the squeeze-out shall be the price offered in the bid. Initially, the German squeeze-out rule had a corresponding instruction (Hirte, 2002, 279). It was deleted as the Upper House Parliament had reservations. Hence, the European and the German regulation of squeeze-outs are inconsistent.

3.6 Regulatory Competition

A major aspect of a EU regulation is the degree of freedom it leaves for the member countries. If one interprets the principle of subsidiarity very far, then regulatory competition or at least regulatory arbitrage may evolve. Loosely speaking, the subsidiary principle makes the competition/arbitrage the rule and harmonization the exception. The American conditions shed light on this subject. In the US the federal states have much freedom with respect to corporate law and there exists a well developed discussion about this aspect, the so called "incorporation debate".[43] Two theses have crystalized: "Race to the bottom" vs. "Race to the top".

Race to the bottom (RtB) This theory claims that the preferences of the *managers* are decisive decide about the place of incorporation and that the interests of shareholders are less relevant. Therefore a jurisdiction with a law friendly to managers will attract many corporations. Shareholders suffer as opportunistic behavior of managers is only weakly restrained.

Race to the top (RtT) This theory claims that the jurisdiction that offers superior conditions for *shareholders* has a competitive advantage since there the costs of capital are lower.[44] These jurisdictions attract more capital. Competition in the capital markets enforce an efficient law.

Some commentators questions the relevance of regulatory competition as the states don't have a strong enough incentive to compete in this market (Kahan and Kamar (2002), Bebchuk and Hamdani (2002)). However, the US experience suggests that at least some "suppliers" of law compete for incorporations. The empirical evidence about RtB versus RtT is mixed but the dominant view is "race to the top" (Bebchuk et al., 2002). Because of its opt-out rule, the Directive does not obstruct regulatory competition (at least with respect to the anti-frustration rule/break-through rule). Consequently, we might observe some regulatory variety and because of the *Centros* and *Überseering* decisions also the European Court of Justice "sympathizes" with regulatory competition as these decisions eliminate some barriers to the freedom of establishment. Consequently, Europe moves towards the US-American framework. However, it is questionable whether we can use the US experience to predict the path of European regulatory competition. The major problem is that the *incentive structure* in Europe differs from

[43] E.g. Easterbrook and Fischel (1991, chapter 8), Romano (1985, 2001), Bebchuk and Farrell (2001), Bebchuk et al. (2002), Daines (2001), Grundmann (2001), Heine and Kerber (2002), Hertig and McCahery (2003), Grundmann (2004).

[44] "Moreover, rational corporations would not incorporate in a state that provided no protection to creditors or shareholders. For if they did they would have to pay very high interest rates to creditors (or else have to agree in their loan agreements to elaborate protective provisions), and they would find it difficult to interest investors in their shares" Posner (1998, 458).

the US-American one; if not in quality then in degree. The incentive structure of several states of *one political unit* is less biased by political obstacles and protectionism than the incentive structure of the sovereign European nations. If we also take into account the weak incentives for competition (Kahan & Kamar, 2002 and Bebchuk & Hamdani, 2002) then it is unlikely that regulatory competition will resemble economic competition (market equilibria). More likely it will resemble political competition (political games).

3.7 Conclusion

Takeovers are controversial; especially cross-border acquisitions. The evolution of the Directive on Takeover Bids and the German Takeover Law document quite well that protectionism and lobbyism distort the decision process. In the realm of takeovers the interests of the management and of the employees are relatively well aligned. Consequently, the antagonism between shareholders and managers is further complicated by the joint effort of the employers' association and the trade unions.

SECTION 4

Tender Offers with a Single Bidder

4.1 Introduction and Framework

One of the most often cited papers related to public tender offers is the article of Grossman and Hart (1980). They highlight a free-rider problem that renders the inspection of a target and bidding for it pointless. It is unprofitable as the bidder has to pay the *post* takeover value of the firm. Only the target's shareholders profit from the activity of the bidder. The empirical fact that in successful takeovers shareholders of targets receive a large premium whereas shareholders of the bidders don't profit seems to support the arguments of Grossman and Hart. But why do we observe takeovers if they are unprofitable for the bidder? To find and investigate a target and to develop a strategy to improve its operations is costly. An agent has an incentive to investigate and bid if at least these expenses are covered. In the basic framework of Grossman and Hart the bidder can't even cover these costs. From the outset, research has concentrated on *private benefits* (also called dilution) that the bidder can extract after the takeover as the device to solve the free-rider problem.[45] However, private benefits come with their own problems. They cause the pressure-to-tender effect which contaminates the takeover process with a coordination problem. In a nutshell: The takeover process is trapped between the pressure-to-tender effect and the free-rider problem.

It is rather simple to grasp the free-rider problem and its solution through dilution. The bidder needs the majority of the votes to implement a better strategy (this is an assumption). Therefore the "exit" of a majority of the shareholders is a necessary condition for the improvement to take place. However, why should an investor exit for low today if the firm has better operations tomorrow? Private benefits offer an explanation. If the extra value of the firm is a private benefit, then exit may be the optimal choice as shareholders will not participate in this private benefit. A non-selling investor might even be caught in an uncomfortable minority position if the other investors sell.

[45] Indeed, at the beginning private benefits were considered as a modelling device (Dyck and Zingales, 2004, 537). Meanwhile private benefits are a cornerstone of research on corporate finance.

Usually private benefits are not considered as a device to solve the free-rider problem but a symptom of an imperfection in the corporate governance system. The design of the corporation is built on proportionality: The principle of "one share – one vote" and the fact that dividends and capital gains are proportional to ownership is proof of this. Private benefits are by definition exclusively – and not proportionally – enjoyed by the controller. So, it is natural to suspect that private benefits are an economically *unjustified* rent. But it depends. Suppose the bidder has developed a device to improve the operations of the firm. Why should we allow the initial shareholders to benefit from the – presumably costly – innovation the bidder invented. If the shareholders of targets receive some of the value improvements then the ex-ante incentive to search for value increasing measures is diluted. In this situation "privacy" of benefits may guarantee that marginal costs equal marginal benefits. But there are complications. Suppose that the extra benefit is verifiable but with some extra effort the bidder may convert it to a non-verifiable income; say via camouflage. The bidder will use the camouflage because otherwise the shareholders demand part of the extra benefit. Since camouflage is costly it would be first best to avoid it. If shareholders could credibly commit to concede the extra value to the bidder first-best could be achieved. However, it is doubtful whether a credible commitment is possible.

The game theoretic foundation of the free-rider problem has been criticized. A problem of the theoretical framework is the assumption that shareholders are *non-pivotal*. A shareholder is called pivotal if, given the actions of the other shareholders, his decision to tender or not to tender determines whether the bidder obtains control (Hirshleifer, 1995, 853). Bagnoli & Lipman (1988) and Holmstrom & Nalebuff (1992) studied the takeover processes where small shareholders are pivotal. It turns out the assumption of non-pivotal shareholders is indeed crucial. However, I will argue at length that the problem's relevance is merely theoretical.[46]

It should be clear from the casual discussion in chapter 1 – 3 that the regulatory framework is crucial for the strategic framework. We are going to discuss several rules.

[46]Hirshleifer (1995) discusses tender offer with pivotal shareholders.

Timing of the Game

In this section we assume that there is only one *outside* bidder. The incumbent management may launch/organize a counter-bid. We assume that the management controls all operations of the target even though they don't own (or only a infinitesimally small number of) shares. If the takeover attempt is unsuccessful the current management will operate the firm in the same manner as if no bid has been made. In this case the value of the firm will not change. If the bidder achieves control of the firm – by assumption this takes place if he obtains more than 50% of the votes – then the value of firm will increase. We are not going to discuss where the value improvement comes from. All shareholders of the target own an infinitesimally small number of shares and are rationally ignorant about operative decision making. The management however – even though not engaged as shareholders – has private interests (low effort, job security etc.) and is better informed. They have the incentive and the opportunity to distort the operations and firm's payoffs. Even if the incentives of the management are aligned with those of the shareholders they might – if incompetent – not achieve the maximum possible value of the firm. One function of the market of corporate control is to give control to the better management wherever the improvement comes from. A second is to affect the action taken by the incumbent at $t = \tau$. The latter function is the incentive effect that the threat of a takeover exerts.

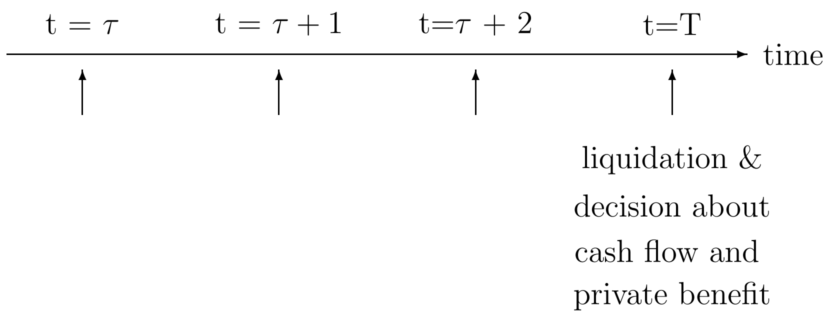

Figure 4: **Timing of the Game**

Before discussing the free-rider problem, we introduce two modelling devices that will be used repeatedly. Consider figure 4. At $t = \tau$ the firm is controlled by the incumbent.[47] At $t = \tau + 1$ a rival appears and puts forward a tender offer.

[47]In this chapter "the controller" is the management, in the next chapter it will be a blockholder.

At $t = T$ the firm is liquidated. We ignore discounting and for the moment what happens at $t = \tau + 2$. As a consequence the value of the firm depends only on the proceeds of the liquidation at $t = T$. At $t = T$ the controller (whoever it is) decides how much to distribute as cash flow to the shareholders in proportion to shareholding (called public value) and how much to extract as private benefits. We call the sum of the cash-flow and the private benefits the *value of the firm*. Note, that the value of the firm is not necessarily the same as the aggregate benefit for all persons involved. The latter is smaller than the former if $\delta < 1$ (see section 2.3 for the meaning of $\delta < 1$). The assumption of liquidation at $t = T$ is made for the sake of simplicity. This assumption allows to ignore what happens after T.

Strategic Table

The second modelling device is the "strategic table". We will use this table to describe the strategic situation of a *typical small* shareholder (minority shareholder) who faces a tender offer. We consider the case with many small shareholders. Every player can choose between three actions (the columns of the table). For example: He may tender to the rival, he may tender to the incumbent or he may not tender at all. If a certain quorum (as a rule 50 %) chooses an action $i \in \{A, B, C\}$ the outcome is i (this corresponds to the i'th row of the table). The entry π_{ij} is the payoff if the outcome is i and the player chooses j.[48] The table tacitly uses the assumption that small shareholders perceive themselves as non-pivotal. If a small shareholder switches the action, then the outcome he anticipates does not change. We are going to discuss this assumption in section 4.5.1.

	action A	action B	action C
outcome A	π_{AA}	π_{AB}	π_{AC}
outcome B	π_{BA}	π_{BB}	π_{BC}
outcome C	π_{CA}	π_{CB}	π_{CC}

To find an equilibrium we proceed in two steps.

[48] Note, that this table is not the kind of table normally used to study games in normal form. In standard tables row and columns correspond to actions of respective players.

- First, we rule out weakly dominated actions. If there is an action i such that all payoffs in the i'th column are never larger and at least for one outcome smaller than for another action k then i is not an equilibrium action. Correspondingly, the outcome i is not an equilibrium outcome.
- If there remain several actions and outcomes after deleting the weakly dominated ones we choose the pareto-better: we determine the diagonal entries π_{ii} that are maximal. Such an outcome i is an *equilibrium outcome* of the table.

As a rule, we will consider games with a unique equilibrium of this kind. The solution uses the technique of ruling out weakly dominated strategies. It is well known that this assumption may lead to counter-intuitive equilibria. Obviously, the equilibrium so determined is a Nash-equilibrium.

4.2 Disciplining Managers by Takeovers

Usually, our analysis focuses on $t = \tau + 1$ as the change-of-control transaction – here it is a tender offer – is attempted at $\tau + 1$. In this section we consider the situation at $t = \tau$. At least since Manne (1965) change-of-control transactions are seen as a disciplining device that restrains the management's opportunistic behavior. The argument is that the threat of a takeover gets the management to perform well and it performs well as a good performance protects it from a takeover. The following discussion substantiates this argument.

In case of a takeover the target's shareholder receives a large premium. The target's shareholder have an obvious reason to design the charter in a way that takes into account the takeover premium. In this section we derive the charter that the shareholder would like to implement. The meaning "would like" and "optimal" will be clarified below.

We make the following assumptions.[49] At $t = \tau$ the incumbent management controls all operations of the firm and thereby determines the value of v_I p.s. (= per share). With $\mathcal{O}$ we denote all actions (operations) the management may execute. The management will choose an action that maximizes its expected utility. When deciding about the action the management takes into account the

[49] The analysis is similar to Grossman and Hart (1980) but generalizes their argument.

direct utility from the action. In addition, the management affects the initial value of the firm v_I and thereby the probability of a takeover.

The indirect utility function of the management is $U(v_I) = \max_{a \in \mathcal{O}}\{u(a)|v(a) = v_I\}$ and the objective is

$$\mathcal{U}_I = (1 - p(v_I))U(v_I) + p(v_I)U_0,$$

where U_0 denotes the utility of the management if a takeover is successful and $p(v_I)$ denotes the probability of a successful takeover. Presumably, $p'(v_I) < 0$ holds, i.e. the higher the shareholder value the lower the probability that a takeover takes place. For the sake of simplicity, we assume $U_0 = 0$. We can characterize the shareholder value under current management via the first-order condition (assuming that first-order condition can be applied):

$$\begin{aligned} & -p'(v_I)U(v_I) + (1 - p(v_I))U'(v_I) = 0 \\ \Leftrightarrow\ & -p'(v_I) + (1 - p(v_I))\frac{U'(v_I)}{U(v_I)} = 0 \\ \Leftrightarrow\ & -\frac{(1-p)'}{1-p} = \frac{p'}{1-p} = \frac{U'}{U}. \end{aligned}$$

Hence the current management trades off the percentage increase in job-security $\frac{(1-p)'}{1-p}$ against the percentage decline in utility $-\frac{U'}{U}$ caused by the higher effort necessary to generate a higher shareholder value.

In the following we will substantiate the claim that a stronger takeover threat gets the management to increase the initial shareholder value v_I. To determine the behavior of the management we need the probability p. Generally, the probability of a change-of-control depends on the value of the firm under current management v_I and under the rival v_R. We assume that there is a function $f(\cdot, \cdot)$ such that an offerer successfully obtains control of the target if he bids $b = f(v_I, v_R)$ p.s. The function f depends on the strategic framework, the regulatory framework, the clauses in the corporate charter etc. All these dependencies are suppressed; we treat f as a black box. With this definition, the probability of change-of-control is $p = \text{Prob}(v_R - f(v_I, v_R) - c \geq 0)$, where c denotes the cost of bidding p.s. The meaning of the claim mentioned above is the following: If we alter the definition of f thereby lowering the corresponding probability of a change-of-control then the management will choose a lower v_I.

In addition to this claim we derive the function f^* that maximizes the ex-ante value of the shares (the ex-ante shareholder value). Consider the objectives of the shareholders. The expected ex-ante shareholder value is

$$\mathcal{V}_S := (1-p)v_I + p\mathbf{E}(f(v_I, v_R)|v_R - f(v_I, v_R) - c \geq 0),$$

where $p = \text{Prob}(v - f(v_I, v_R) - c \geq 0)$. By assumption, the optimization problem that the shareholders solve is the following: Implement a function $f(v_I, v_R)$ such that $\mathcal{V}_S$ is maximal, where $v_I = \text{argmax}\,\mathcal{U}_I$ solves the optimization problem of the current management (that, in turn, depends on the function f), i.e.

$$v_I = \text{argmax}(1 - p(v_I))U(v_I).$$

In general, the objectives of the social planner and of the shareholders differ. The social planner's objective (in this partial equilibrium analysis) is

$$\begin{aligned} \mathcal{V}_W &:= (1-p)v_I + +p\mathbf{E}(v_R - c|v - f(v_I, v_R) - c \geq 0) \\ &= (1-p)v_I + p\mathbf{E}(v_R - f(v_I, v_R) - c + f(v_I, v_R)|v - f(v_I, v_R) - c \geq 0) \\ &= (1-p)v_I + p\mathbf{E}(v_R - f(v_I, v_R) - c|v - f(v_I, v_R) - c \geq 0) \\ & \quad \mathcal{V}_S + p\mathbf{E}(v_R - f(v_I, v_R) - c|v - f(v_I, v_R) - c \geq 0) \end{aligned}$$

where $p = \text{Prob}(v - f(v_I, v_R) - c \geq 0)$. From the perspective of the social planner, not the bidder's payment $f(v_I, v_R)$ matters but the value $v_R - c$. The former is merely a redistribution from the bidder to shareholders whereas the latter is a value-added. The difference $v_R - c - f(v_R, v_I)$ is ignored by the shareholders. For aggregate welfare it must be added to the shareholder value $\mathcal{V}_S$.

From the perspective of positive theory the solution that the shareholders prefer is of greater relevance. The shareholders decide about the charter of the corporation and thereby determine the takeover framework. Of course, the regulator can interfere by limiting the clauses that are allowed in the firm's charter. For the moment we assume contractual freedom. Hence, we will determine the takeover framework the shareholders of the target want to establish. We say "want to establish" since we have not described how the shareholder can implement f. The following result is needed for this sake but it is of interest for itself. It shows that with *a more intense threat of a takeovers the initial management has an incentive to choose a higher initial shareholder value.*

Proposition: Consider the following optimization problem

$$\max_{x \in \mathbb{R}_+} u(x)\text{Prob}(v \leq x), \tag{1}$$

where $u(x) > 0$ is a bounded and continuous function. If the optimization problem (1) has more than one solution we take the larger value of x. If

$$x_1^* = \operatorname{argmax} u(x)\mathrm{Prob}_1(x)$$
$$x_2^* = \operatorname{argmax} u(x)\mathrm{Prob}_2(x)$$

and $\mathrm{Prob}_1(k) = \mathrm{Prob}(v \leq k), \mathrm{Prob}_2(k) = \mathrm{Prob}(v \leq k \vee (v, k) \in A)$ for a set $A \subset \mathbb{R}^2$. It follows

$$x_2^* \leq x_1^*.$$

A is an auxiliary set. If we add the condition $(v, k) \in A$ we cut the set of successful takeover. In this way we reduce the likelihood of a takeover.

The proposition has the following interpretation: If the probability of no takeover increases then the current management chooses a lower initial value of the firm. In this sense incentives are diluted. The following argument is often made: A high shareholder value demands a high effort but the management prefers a low effort. This argument might be true. In the proposition however, no assumption about the utility function u is made (beside continuity). In this sense the result is very general.

Proof: Assume otherwise, i.e. $x_2^* > x_1^*$. Because of the optimality of x_1^* resp. x_2^* it holds

$$u(x_1^*)\mathrm{Prob}_1(x_1^*) \geq u(x_2^*)\mathrm{Prob}_1(x_2^*),$$
$$u(x_2^*)\mathrm{Prob}_2(x_2^*) \geq u(x_1^*)\mathrm{Prob}_2(x_1^*).$$

If the inequality $u(x_1^*)\mathrm{Prob}_1(x_1^*) \geq u(x_2^*)\mathrm{Prob}_1(x_2^*)$ held with equality then x_2^* would be the solution of the optimization problem $\max u(x)\mathrm{Prob}_1(x)$. By assumption, it is not the case. Hence

$$u(x_1^*)\mathrm{Prob}_1(x_1^*) > u(x_2^*)\mathrm{Prob}_1(x_2^*).$$

It follows $\mathrm{Prob}_1(x_1^*) > 0$ and $\mathrm{Prob}_2(x_1^*) > 0$. A rearrangement of the inequalities gives

$$\frac{u(x_1^*)}{u(x_2^*)} > \frac{\mathrm{Prob}_1(x_2^*)}{\mathrm{Prob}_1(x_1^*)}$$

and

$$\frac{u(x_1^*)}{u(x_2^*)} \leq \frac{\mathrm{Prob}_2(v \leq x_2^*)}{\mathrm{Prob}_2(v \leq x_1^*)}.$$

Hence

$$\frac{A}{B} = \frac{\mathrm{Prob}_2(v \leq x_2^*)}{\mathrm{Prob}_2(v \leq x_1^*)} > \frac{\mathrm{Prob}_1(v \leq x_2^*)}{\mathrm{Prob}_1(v \leq x_1^*)} = \frac{A - \Delta_1}{B - \Delta_2}$$

and furthermore

$$A(B - \Delta_2) > B(A - \Delta_1) \Rightarrow -A\Delta_2 > -B\Delta_1 \Rightarrow A\Delta_2 < B\Delta_1.$$

As a consequence $\Delta_2 < \Delta_1$. However

$$\begin{aligned}
\Delta_1 = \mathrm{Prob}_2(x_2^*) - \mathrm{Prob}_1(x_2^*) &= \mathrm{Prob}(v \leq x_2^* \vee (v, x_2^*) \in A) - \mathrm{Prob}(v \leq x_2^*) \\
&= \mathrm{Prob}(A \setminus (\Omega_2 \cap A)) \\
&\leq \mathrm{Prob}(A \setminus (\Omega_1 \cap A)) \\
&= \mathrm{Prob}(v \leq x_1^* \vee (v, x_1^*) \in A) - \mathrm{Prob}(v \leq x_1^*) \\
&= \mathrm{Prob}_2(x_1^*) - \mathrm{Prob}_1(v \leq x_1^*) \\
&= \Delta_2,
\end{aligned}$$

where $\Omega_i = \{v : v \leq x_i^*\}$. Therefore $\Delta_1 \leq \Delta_2$. But this is a contradiction to $\Delta_2 < \Delta_1$.

Proposition: $f(v_R, v_I) = \max\{v_I, v_R - c\}$ is optimal for the shareholders.

Proof: Suppose the charter implements a bid function $f(v_I, v_R)$ such that a tender offer with bid price $b = f(v_I, v_R)$ is successful. We assume $f(v_I, v_R) \geq v_I$ as a counter-bid by the incumbent will frustrate any bid with $b < v_I$. Furthermore, a bid will occur iff $f(v_I, v_R) \leq v_R - c$ (otherwise the bidder has no incentive to bid).

Firstly, we show $f(v_R, v_I) \geq v_R - c$. Suppose there are (v_R, v_I) such that $f(v_R, v_I) < v_R - c$. Define

$$\widetilde{f}(v_R, v_I) = \begin{cases} f(v_R, v_I) & \text{iff } f(v_R, v_I) \geq v_R - c, \\ v_R - c & \text{otherwise.} \end{cases}$$

It follows $f(v_I, v_R) \leq v_R - c$ iff $\widetilde{f}(v_I, v_R) \leq v_R - c$. Hence $\mathrm{Prob}(v_R - f(v_R, v) - c) = \mathrm{Prob}(v_R - \widetilde{f}(v_R, v) - c)$ and the current management has the same incentives with f as with $\widetilde{f}$. However, the payoff in case of a takeover is higher if the shareholders implement $\widetilde{f}$ instead of f and a takeover occurs in the same states of the environment. Therefore f cannot be optimal if there exists v_R, v_I such

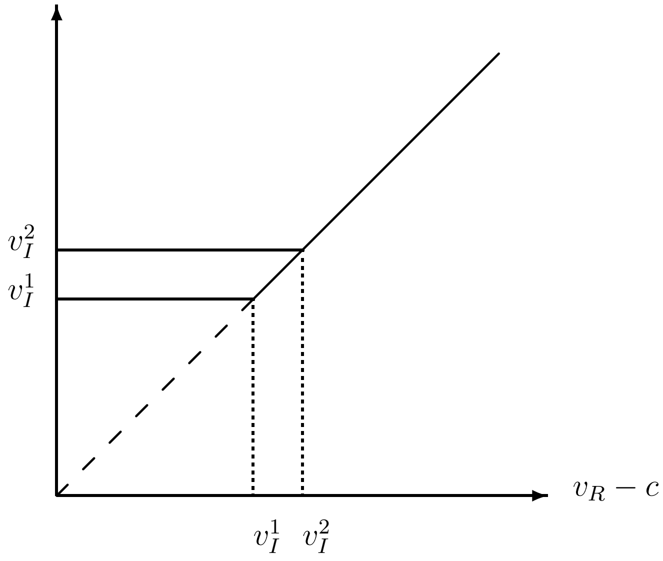

Figure 5: **Payoff of the target's shareholders.**

that $f(v_R, v_I) < v_R - c$. We have proved that the optimal f satisfies $f(v_R, v_I) \geq \max\{v_I, v_R - c\}$.

We finally prove that there are no (v_R, v_I) such that $f(v_R, v_I) > \max\{v_R - c, v_I\}$. Suppose otherwise and let $A = \{(v_R, v_I) : f(v_R, v_I) > \max\{v_R - c, v_I\}\}$. Define $\widetilde{f}(v_R, v_I) = \max\{v_R - c, v_I\}$. If $\widetilde{f}$ is used instead of f then a takeover is more likely. Let v_I^1 and v_I^2 be the shareholder value that the incumbent chooses if f respectively $\widetilde{f}$ is used. The proposition implies $v_I^1 < v_I^2$. The proof is complete if we can show that the ex-ante shareholder value is larger with $\widetilde{f}$ than with f. Consider figure 5. With f the payoff is v_I^1 for all $v_R - c < v_I^1$ and for all $(v_R, v_I^1) \in A$. For all $v_R - c > v_I^1$ but $(v_R, v_I) \notin A$ the payoff is $v_R - c$. With $\widetilde{f}$ the payoff is v_I^2 if $v_R - c < v_I^2$. It follows that for all $v_R - c < v_I^2$ the payoff with $\widetilde{f}$ is at least as high as with f. Trivially, the same is true for all $v_R - c \geq v_I^2$.

We draw the following conclusion: The target's shareholders will try to implement $f(v_R, v_I) = \max\{v_R - c, v_I\}$. If the initial shareholders are able to implement this function it follows:

- A takeover takes place if $v_R - c \geq v_I$. Hence the rule achieves ex-post efficiency. The takeover occurs iff it increases the value of the corporation net of the cost of bidding. *In this sense the shareholder's interest and (ex-post) efficiency are aligned.*

- The bidders payoff is $v_R - c - b = 0$. *The target receives the complete net gain.*

Even though we found the optimal "charter" f we have *not described/specified how to implement* f. The following subsections deal with practical problems connected with the takeover process for specified takeover frameworks.

4.3 The Free-Rider Problem

The following situation was analysed by Grossman and Hart (1980): A firm – we will call it T for target – currently has a value of v_I per share (p.s.).[50] The current shareholder value v_I is calculated assuming that the incumbent managers control the firm at $t = T$. Uncertainty and discounting are not considered and a tender offer is not anticipated. For the moment we ignore private benefits. We assume that every shareholder owns only a very small number of the shares, i.e. we employ the so-called atomistic shareholder assumption. With this assumption we mean that the shareholders perceive themselves as non-pivotal.

At $t = \tau + 1$ an individual or a group of individuals – called R for rival – appear. If they obtain the control of T the shareholder value will be $v_R > v_I$ p.s. R announces a tender offer with a bid price $b, v_I < b < v_R$. Specifically, R announces a conditional[51] unrestricted tender offer. The quorum is 50 %, i.e. the offer is binding if more than 50 % of the shares are tendered. We assume that v_R is publicly known.

If the bid is successful, i.e. R eventually receives a controlling proportion of the shares, then all participants gain. Those who sell their shares receive b p.s., whereas those who don't tender end up with v_R p.s. The rival's profit is $v_R - b$ per share that is tendered. However, it is not an equilibrium that a majority tenders. If $b < v_R$ holds then there is no incentive for the shareholders to tender. The argument is the following: A representative shareholder may either tender his shares or keep them. As he owns only a marginal fraction of the shares his

[50]The subscripts I and R of v abbreviate respectively incumbent and rival.

[51]Grossman and Hart consider an unconditional bid. For the sake of simplicity, we analyze a conditional bid. However the conclusion is very similar. Grossman and Hart deduce the non-existence of an equilibrium. With a conditional bid there exists an equilibrium, but it has unfortunate features (see below).

decision will not influence the probability p, that the bid is successful. Thus, if he doesn't tender, his expected payoff is $pv_R + (1-p)v_I$ and, if he tenders, his expected gain is $pb + (1-p)v_I$ p.s. Since $v_R > b$ the representative shareholder of T won't tender. Another way to confirm this proposition is to inspect the following table:

	tender	don't tender
bid is successful	b	v_R
bid is not successful	v_I	v_I

Since a shareholder owns only a marginal proportion of the firm's shares his decision does not affect which of the two rows of the table is valid. He deduces that "to tender" is a (weakly) dominated strategy and "to tender" is not an equilibrium outcome.

If the bid price b equaled v_R then the bid would be successful (remember, we assume that the pareto-better outcome occurs if there is an strategic ambiguity). Actually, in this case the shareholders of T are indifferent. The problem is apparently a free-rider problem. The shareholders want to reap the improvement that B can implement and to free-ride on the tendering decision of the other shareholders. A crucial observation of the analysis (that will reappear many times) is the following: *The bidder has to bid at least the post-takeover public value of a share of a minority shareholder.*

4.4 Take-It-or-Leave-It Assumption & the Free-Rider Problem

Note that we employed a take-it-or-leave-it assumption, i.e. should the shareholders of T reject the offer, then the game ends and the shareholder's payoff is v_I. There is no improved re-bid nor a second takeover attempt. For the analysis of the free-rider problem the take-it-or-leave-it assumption is not unproblematic.

Consider the basic case with a take-it-or-leave assumption. Let $v_R = 120, v_I = 100$ and $b = 110$ and assume that the bid is conditional on the quorum of 50 %. The strategic table is

	tender	don't tender
bid is successful	110	120
bid is not successful	100	100

and the equilibrium outcome is "don't tender". Suppose we question the take-it-or-leave assumption. Does the possibility of a higher bid or a second takeover attempt matter? If we assume that "don't tender" is the equilibrium outcome of the preceding game, then we also agree that "don't tender" is the equilibrium outcome of the following game

	tender	don't tender
first bid is successful	110	120
first bid is not succ'ful but the second is	$d119 + (1-d)120$	$d119 + (1-d)120$
no bid is successful	100	100

where $d = 1$ or $d = 0$ if the shareholder accepts respectively don't accepts the second bid. Here, the shareholder takes into account a third alternative namely that the bidder rebids (or there is a second takeover attempt by another bidder). This enforce the free-rider problem. The shareholder not only has an incentive to wait for the success of the high bid but also – as a further alternative – for a re-bid/second bid.

4.5 Remedies of the Free-Rider

4.5.1 Non-Pivotalness of Small Shareholders

In this subsection we discuss the assumption of pivotalness. Theoretically, the bidder can solve the free-rider problem by making some shareholders pivotal.[52] From three perspectives we will argue that this argument is of theoretical relevance only. It doesn't matter quantitatively. In the first framework all shareholders act strategically. In the second framework some shareholders randomize for exogenous reasons. In the third framework we consider the link between the probabilities of pivotalness and of the success of the bid. In all cases we demonstrate

[52] The seminal contributions are Bagnoli & Lipman (1988) and Holmstrom & Nalebuff (1992). We extend their analysis. Especially, the numerical analysis is novel.

that *quantitative* arguments invalidate the idea that pivatolness is a remedy of the free-rider problem.

All shareholders act strategically

The free-rider problem caused by the non-pivotalness of small shareholders leads to the frustration of some value improving takeovers. In principle, the free-rider problem can be solved if the bidder can make shareholders pivotal. Consider a bid that is conditioned on a quorum of 100%, i.e. the bidder will buy the shares that are tendered if and only if *all* shareholders tender. In this case every shareholder is pivotal and the free-rider problem disappears. Arguably, such an offer is extreme and not observed. However, the free-rider problem can also be mitigated with more realistic strategies.

To circumvent the free-rider problem it is not necessary that *every* shareholder is pivotal with probability one. In the following example *some* shareholders are pivotal and this suffice to circumvent the free-rider problem. Suppose the target T has 1000 outstanding shares and fix a group of shareholders who own exactly 500 shares. Consider a conditional bid for 50% of the shares with a bid price of $b = v_i + \varepsilon$, where ε is small. We have the following Nash Equilibrium: All shareholders of the group tender their shares and all non-members don't tender. In this equilibrium every shareholder of the group is pivotal. Should any shareholder of the group decide not to tender and all other shareholders play their equilibrium strategy then the bid fails. All non-members are non-pivotal. In this equilibrium the bidder makes a profit of $v_R - v_I - \varepsilon$ per tendered share. This is about as large as the value improvement. Hence, the bidder makes non-trivial profit. The tendering shareholders make a profit of ε which is arbitrary small. Non-tendering shareholders gain $v_R - v_I$ and free-ride the value improvement that occurs because of the tendering decision of the other shareholders.

Superficially, without the assumption of non-pivotalness of small shareholders the free-rider problem dissolves. Indeed, there is a Nash-equilibrium such that the takeover occurs with probability one and a large positive profit for the bidder. However, the argument is not very compelling. In this equilibrium members of the group are pivotal with probability one whereas all other shareholders are non-pivotal. The problem is that there are many such equilibria. Indeed, any set of 500 shares implicitly defines such an equilibrium. All these equilibria are highly asymmetric and very unrealistic as there is no "natural" criteria to select the group. Moreover, nothing suggests a method of self-selection. On the contrary, since the members of the group make an arbitrary small profit shareholders will avoid to be in the group. Finally, in this equilibrium the premium $b - v_I = \varepsilon$ is approximately zero which contradicts the stylized facts.

The asymmetry of the equilibria just discussed can be avoided if we allow *mixed* strategies. Assume that each shareholder has one share. A symmetric equilibrium is a "natural" equilibrium as all shareholders are equal. Consider a conditional bid for $K < N$ shares; there are N shares outstanding. We determine a symmetric equilibrium where all shareholders tender with probability p. Consider the decision of the i'th shareholder who assumes that all other shareholders tender with probability p.

Proposition: For every bid price $b \in (v_I, v_R)$ there is a probability p such that a typical shareholder is indifferent of between "tender" and "don't tender" given that all *other* shareholders tender with probability p.

In an equilibrium with mixed strategies, a player is indifferent between all actions played with positive probability. Indifference between "tender" and "don't tender" holds iff

$$\begin{aligned}
&\underbrace{\sum_{l=0}^{K-2} \binom{N-1}{l} p^l (1-p)^{N-1-l} v_I + \sum_{l=K-1}^{N-1} \binom{N-1}{l} p^l (1-p)^{N-1-l} b}_{\text{tender}} \\
&= \underbrace{\sum_{l=0}^{K-1} \binom{N-1}{l} p^l (1-p)^{N-1-l} v_I + \sum_{l=K}^{N-1} \binom{N-1}{l} p^l (1-p)^{N-1-l} v_R}_{\text{don't tender}} . \qquad (2)
\end{aligned}$$

All cases with less than $K-2$ tendering shareholders cancel. Hence,

$$\begin{aligned}
&\binom{N-1}{K-1} p^{K-1} (1-p)^{N-K} v_I + \sum_{l=K}^{N-1} \binom{N-1}{l} p^l (1-p)^{N-1-l} v_R \\
&= \binom{N-1}{K-1} p^{K-1} (1-p)^{N-K} b + \sum_{l=K}^{N-1} \binom{N-1}{l} p^l (1-p)^{N-1-l} b.
\end{aligned}$$

This equation shows the trade-off that a typical shareholder faces. For all cases where K or more shareholders tender the typical shareholder prefers not to tender: his payoff is v_R (first row, second term) instead of b (second row, second term).

In these cases the shareholder free-rides the value improvement. He can free-ride as he is not pivotal. However, if $K-1$ shareholders tender then the typical is pivotal. If he does not tender the bid will fail and the payoff is v_I (first row, first term). If he tenders the bid will succeed and the payoff is $b > v_I$ (second row, first term). The equilibrium probability p trades-off these opposing effects. It is determined by the indifference between "tender" and "don't tender". We can rewrite the last equation:

$$\begin{aligned} & \mathrm{Prob}(T \geq K-1) \cdot b = \mathrm{Prob}(T = K-1) \cdot v_I + \mathrm{Prob}(T \geq K) \cdot v_R \\ \Rightarrow \quad & b = \mathrm{Prob}(T = K-1 | T \geq K-1) \cdot v_I + \mathrm{Prob}(T \geq K | T \geq K-1) \cdot v_R \\ \Rightarrow \quad & b = \alpha_p \cdot v_I + (1-\alpha_p) \cdot v_R. \end{aligned}$$

The bid price is a convex combination of v_I and v_R where the coefficient $\alpha_p = \mathrm{Prob}(T = K-1 |\, T \geq K-1)$ equals the probability of being pivotal in a successful takeover. The latter equation can be solved for the conditional probability

$$\alpha_p = \frac{v_R - b}{v_R - v_I}. \tag{3}$$

Equation (3) has a nice interpretation. The right hand side is the fraction of the value improvement that the bidder receives: For every share *tendered* he receives $\frac{v_R - b}{v_R - v_I}$. Note, that this is the profit for every share that is tendered; but not all shares are tendered.

Because of the assumption of a symmetric equilibrium we can employ the formula for the binomial distribution:

$$\alpha_p \quad = \quad \frac{\binom{N-1}{K-1} p^{K-1} (1-p)^{N-K}}{\sum_{l=K-1}^{N-1} \binom{N-1}{l} p^l (1-p)^{N-1-l}} = \frac{1}{\sum_{l=K-1}^{N-1} \frac{\binom{N-1}{l}}{\binom{N-1}{K-1}} \frac{p^l (1-p)^{N-1-l}}{p^{K-1}(1-p)^{N-K}}}$$

Note

$$\frac{p^l (1-p)^{N-1-l}}{p^{K-1}(1-p)^{N-K}} = \frac{p^l}{p^{K-1}} \frac{(1-p)^{N-1-l}}{(1-p)^{N-K}} \xrightarrow{p \to 0} \begin{cases} 1 & \text{if } l = K-1, \\ 0 & \text{otherwise } (l > K-1). \end{cases}$$

and

$$\frac{p^l (1-p)^{N-1-l}}{p^{K-1}(1-p)^{N-K}} = \frac{p^l}{p^{K-1}} \frac{(1-p)^{N-1-l}}{(1-p)^{N-K}} \xrightarrow{p \to 1} \begin{cases} 1 & \text{if } l = K-1, \\ \infty & \text{otherwise } (l > K-1). \end{cases}$$

As a consequence $\lim_{p \to 0} \alpha_p = 1$ and $\lim_{p \to 1} \alpha_p = 0$. It follows that there is a probability p such that $\alpha_p = \frac{v_R - b}{v_R - v_I}$. This completes the proof of the proposition.

The proposition suggests a solution of the free-rider problem. If the shareholders play mixed strategies then the offerer can succeed with positive probability and a bid price strictly less then v_R (hence make a strictly positive expected profit). The rest of this subsection deals at length with the question why this solution is only of theoretical relevance. Two approaches will be used: Firstly, pivotalness recurs in the limit, i.e. if $N \to \infty$. Since corporations have many shares, the limiting case may be relevant. Secondly, numerical "experiments" illustrate the quantitative irrelevance of the assumption of pivotalness.

Proposition: If $K = kN$ for some fixed k then

$$\lim_{N\to\infty} \alpha_p = 0.$$

The proposition follows from the fact that the binomial distribution converges to the normal distribution. Therefore the conditional distribution α_p converges to zero, as the probability of any zero set is zero. The intuition is clear: If the number of shareholders increases the likelihood of being pivotal in a symmetric equilibrium decreases. One may interpret the limit for $N \to \infty$ as the atomistic shareholder case. In this sense we can say that the non-pivotalness is a reasonable assumption for widely held firm (with a presumably large N).

Even though the assumption of non-pivotalness may be founded on the limiting case $N \to \infty$ a sceptic will argue that the number of shares *is* finite. To deal with this objection we consider some numerical examples. Firstly, we derive a closed formulae for the expected profit of the bidder. In the appendix of this section we prove that the expected profit is $K\binom{N}{K}p^K(1-p)^{N-K}(v_R - v_I)$. Note that $\binom{N}{K}p^K(1-p)^{N-K}$ is the probability that exactly K shareholders tender. We observe that the expected profit c.p. increaseS with p and K. We fix K for the moment. To calculate the optimal bid price we use the first order condition:

$$\begin{aligned} & K\binom{N}{K}\left(Kp^{K-1}(1-p)^{N-K} - (N-K)p^K(1-p)^{N-K-1}\right) = 0 \\ \Leftrightarrow\ & K(1-p) = (N-K)p \\ \Leftrightarrow\ & p = \frac{K}{N} \end{aligned}$$

and the optimal bid price is $b = \alpha_p \cdot v_I + (1-\alpha_p) \cdot v_R$.

Numerical Examples

We normalize the value improvement: $v_R - v_I = 1$. Assume that the target has $N = 50$ shares and that every shareholder own exactly one share. This is a case where the shareholders are relatively large and presumably the probability of being pivotal is also relatively large. Hence, the situation is relatively favorable for the bidder. Suppose that the bidder chooses $K = 25$, i.e. the quorum is $\frac{1}{2}$. With a small maple worksheet we can calculate $\alpha_p = 0.20$. Hence, the bidder receives 20% (i.e. 0.2) of the value improvement of every share that is tendered. The expected profit for the bidder is 2.81. The improvement of the firm's value is 50. Hence, the bidder expects to receive 5.6 % of the value improvement.

Suppose that the bidder chooses $K = 49$. It follows that $\alpha_p = 0.51$ and the expected profit is 18.21. The bidder expects to receive 36.4 % of the value improvement.

Now suppose that $N = 1000$ and $K = 500$. It follows $\alpha_p = 0.05$ and the expected profit is literally zero $(0.126 \cdot 10^{-498})$. Suppose the bidder chooses $K = 900$, i.e. the quorum is 90 %. It follows $\alpha_p = 0.08$ and the expected profit is 3.8% of the value improvement. If the bidder chooses $K = 999$ then the expected profit is 36% of the value improvement.

Conclusion: *If the bidder choose a "reasonable" K then the bidder receives a small fraction of the value improvement. With a very large K the bidder receives a considerable share of the value improvement. But K must be very large.*

The bidder can choose K and thereby alter the probability of the shareholders' pivotalness. The numerical example demonstrates this effect. Indeed, the profit is maximal – viz. $(v_R - v_I)N$ – and the probability of tendering p is one if $K = N$. With $K = N$ everybody is pivotal and the probability of success is one. However, tender offers with a quorum 100% are not observed. Indeed, this equilibrium breaks down if there are some shareholders that are not aware of the takeover or don't understand the procedures. The bid is "on the edge of the knife" and certainly unrealistic. For sake of realism, the model should include players that deviate from the equilibrium for exogenous reasons and the equilibrium should survive this test of stability.

Noise traders

Realistically, there will be some shareholders who don't act strategically but randomly. Note that the strategic shareholders also act randomly. However, they choose a probability of tendering according to a strategic calculation. *The probability has to satisfy the Nash-test*: The probability is a best response given the choice of all other players. We assume that non-strategic shareholders tender with *an exogenous probability.* It is appropriate to call the non-strategic shareholders noise traders.[53] We restrict the analysis to the case with one noise trader. The main argument is the same with many noise traders.

We consider three cases: (1) The noise trader always tenders, (2) the noise trader never tenders and (3) the noise trader strictly randomizes. Assume that the noise trader always tenders, i.e. $p^e = 1$. The bidder will choose $K = N$ and it follows $p = 1$. The profit is $N(v_R - v_I)$, i.e. the gain goes completely to the bidder. The other extreme case is $p^e = 0$: the noise trader never tenders. If the bidder keeps $K = N$ then the bid will fail independent of the choice of the other shareholders and the profit is zero. If the bidder sets $N = K - 1$ every strategic shareholder is pivotal and will tender with probability $p = 1$ as otherwise the bid fails. The profit is $(N - 1)(v_R - v_I)$. With a noise trader that never tenders the optimal choice is $K = N - 1$ and the profit is relatively large, viz. almost equal to the maximal possible gain $N(v_R - v_I)$.

Neither $p^e = 0$ nor $p^e = 1$ are reasonable (and don't fit the name "noise trader"). Curiously, the case with a probability between zero and one is very different. Especially, the profit in the case of $p^e > 0$ is likely to be *lower* than in the case of $p^e = 0$, i.e. the bidder suffers even though superficially the takeover becomes easier. Indeed, one might expect that the takeover is cheaper if the noise trader tenders with a higher probability. But this is not the case. The reason is the change of the behavior of the strategic shareholders.

Suppose the outsider does tender with probability $0 < p^e < 1$. Also assume that the bidder keeps $K = N$. All other shareholders will tender. If any of the other shareholders does not tender then the bid fails. The bid will be successful with probability p^e and the expected profit is

$$p^e N(v_R - v_I).$$

[53] See Kyle (1985)

If $p^e \approx 1$ is relatively large the noise trader does not cause a major problem as the profit is almost $\approx N(v_R - v_I)$. What happens if p^e differs much from 1, let's say $p^e = 0.5$ or 0.2? If the bidder keeps $K = N$ the profit decreases by 50% resp. 80%.

The bidder might sets $K = N-1$ to mitigate the dependency on the decision of the noise trader. As above we can calculate the probability p that a typical shareholder tenders in a symmetric equilibrium with mixed strategies. To do so, we calculate the probability such that the typical shareholder is indifferent between "tender" and "don't tender". All this is done assuming a symmetric equilibrium for the strategic shareholders. Consider the following equation. The left hand side (the right hand side) gives the expected pay-off of a representative shareholder who tenders (does not tender). The only difference of this equation to the equation (2) is the probability distribution (it is the convolution of the binomial distribution with parameters $N-2$ and p with the binomial distribution with parameters 2 and p^e).

$$
\begin{aligned}
&\underbrace{\left(p^e \binom{N-2}{N-2} p^{N-2}(1-p)^0\right) b}_{N-1 \text{ tender}} \\
&+ \underbrace{\left(p^e \binom{N-2}{N-3} p^{N-3}(1-p)^1 + (1-p^e)\binom{N-2}{N-2} p^{N-2}(1-p)^0\right) b}_{N-2 \text{ tender}} \\
&+ \underbrace{\left(p^e \binom{N-2}{N-4} p^{N-4}(1-p)^2 + (1-p^e)\binom{N-2}{N-3} p^{N-3}(1-p)^1\right) v_I}_{N-3 \text{ tender}} \\
&+\text{Prob(less than } N-3 \text{ of the others tender)} v_I \\
&= \underbrace{\left(p^e \binom{N-2}{N-2} p^{N-2}(1-p)^0\right) v_R}_{N-1 \text{ tender}} \\
&+ \underbrace{\left(p^e \binom{N-2}{N-3} p^{N-3}(1-p)^1 + (1-p^e)\binom{N-2}{N-2} p^{N-2}(1-p)^0\right) v_I}_{N-2 \text{ tender}} \\
&+\text{Prob(less than } N-2 \text{ of the others tender)} v_I
\end{aligned}
$$

The typical shareholder faces a trade-off. If he tenders then his payoff is b or v_I and his expected profit is a weighted sum of b and v_I. If he does not tender then his payoff is v_R or v_I and his expected profit is a weighted sum of these two payoffs. If he decides not to tender then he might get the high payment of v_R instead of $b < v_R$. However, he risks that the takeover fails because of his decision. The equilibrium probability resolves this trade-off. We obtain after some rearrangement (see the appendix 4.13.2)

$$\begin{aligned}&(p^e p + p^e(N-2)(1-p) + (1-p^e)p)\, b \\ &= p^e p v_R + (p^e(N-2)(1-p) + (1-p^e)p)\, v_I\end{aligned}$$

and

$$p = \frac{1}{\frac{p^e v_R + (1-p^e)v_I - b}{p^e(N-2)(b-v_I)} + 1} = \frac{1}{1 + \frac{v_R - v_I - \frac{b-v_I}{p^e}}{(N-2)(b-v_I)}}.$$

Note, even if $K = N-1$ the bidder can induce every shareholder to tender. If he sets $b = p^e v_R + (1-p^e)v_I$ then $p = 1$. Also note that with $b = v_I$ it follows $p = 0$.

To find the optimal strategy of the bidder we have to maximize the expected profit

$$\begin{aligned}\pi^e_{N-1} \;=\;& p^e p^{N-1} N(v_R - b) + p^e p^{N-2}(1-p)(N-1)^2(v_R - b) \\ &+ (1-p^e)p^{N-1}(N-1)(v_R - b).\end{aligned}$$

We use

$$b = \frac{p^e p v_R + (p^e(N-2)(1-p) + (1-p^e)p)\, v_I}{p^e p + p^e(N-2)(1-p) + (1-p^e)p}$$

to obtain expected profit as a function of p^e, N, v_I, v_R and p. We can determine the optimal strategy of the bidder – given that $K = N-1$ – if we maximize this function with respect to p. The bidder indirectly chooses p through his choice of b (b is a function of p and we may substitute the latter expression into the expression for the expected profit). With this "substitution" we can consider the probability p as the choice variable of the bidder.

We will use the a maple procedure[54] to solve the optimization problem of the bidder. The difficulty is the case $K = N-1$. The procedure finds the optimal p for this case. It compares the profit of this solution with the maximum profit for $K = N$. Hence, it completely characterizes the strategic situation of the bidder. For sake of transparency, it is useful to discuss the solution for two cases: $p^e < \frac{1}{2}$ and $p^e \geq \frac{1}{2}$.

[54]See appendix 4.13.3.

Case 1: $p^e < \frac{1}{2}$

$b = p^e v_R + (1-p^e)v_I$ is optimal if $K = N-1$.[55] For this value of b the equilibrium probability of tendering is $p = 1$.[56] Consider the expected profit if $b = p^e v_R + (1-p^e)v_I$ and $p = 1$

$$\begin{aligned}\pi^e_{N-1} &= p^e N(1-p^e)(v_R - v_I) + (1-p^e)(N-1)(1-p^e)(v_R - v_I)\\ &= (p^e N + (1-p^e)(N-1))(1-p^e)(v_R - v_I)\\ &= (p^e N + N - 1 - p^e N + p^e)(1-p^e)(v_R - v_I)\\ &= (N-1+p^e)(1-p^e)(v_R - v_I).\end{aligned}$$

For some value of $p < \frac{1}{2}$ the extreme choice of $K = N$ is still optimal. Indeed, $K = N-1$ is optimal iff

$$\begin{aligned}(N-1+p^e)(1-p^e)(v_R - v_I) > p^e N(v_R - v_I) \quad &\Leftrightarrow \quad (N-1+p^e)(1-p^e) > p^e N\\ &\Leftrightarrow \quad N > 1 + \frac{(p^e)^2}{1-2p^e}.\end{aligned}$$

The function $1 + \frac{(p^e)^2}{1-2p^e}$ has a pole at $1/2$. For p^e very close to $1/2$ the strategy $K = N$ is still optimal but this is a marginal case. For $p^e = 0.49$ the value of $1 + \frac{(p^e)^2}{1-2p^e}$ is 13 and certainly the number of shares is larger than 14. As a rule $K = N-1$ is optimal for $p^e < 1/2$.

Case 2: $p^e \geq \frac{1}{2}$

The optimal choice is $K = N$. This leads to the striking result that with *one* noise trader who tenders with probability of $1/2$ the expected profit of the bidder halves when compared with $N(v_R - v_I)$ and almost halves when compared with $(N-1)(v_R - v_I)$.

Figure 6 gives the typical shape of the maximum profit as a function of p^e. The expected profit is maximal at $p^e = 1$. $p^e = 0$ is another local maximum. The expected profit first decreases until $\underline{p}^e \approx \frac{1}{2}$ and then increases. If N is large then the expected profit is "almost" linear on the interval $[0, \underline{p}^e]$. It is linear on the interval $[\underline{p}^e, 1]$. The expected profit has a global minimum at $\underline{p}^e$.

[55] The optimization depends on v_I, v_R, N and p^e. We can normalize $v_I = 1$ (see the constraint for b). Hence, we have to vary N, v_R and p^e. All claims are based on extensive variation of these parameters.

[56] I was not able to prove that result mathematically. From the expression of the expected profits we obtain the conjecture that the bidder will choose a probability close to one as p enters the expression with N as exponent. If p were low and N large then expected profit would be small.

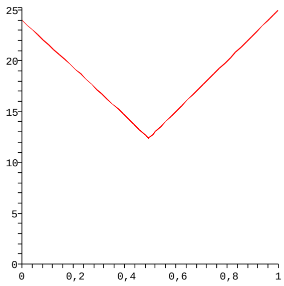

Figure 6: On the Abscise: the probability p^e. On the Ordinate: The maximum profit.

We have extensively studied the case of *one* noise trader. It serves as a kind of an upper bound that the bidder faces: Even with only one noise shareholder – e.g. one of 10 000 – the strategic situation changes drastically. The major insight is the following: If the noise trader tenders with an *intermediate* probability then the takeover premium is relatively large and the bidder is an uncomfortable situation as the strategic shareholders consider themselves as pivotal with a low probability only. The "noise" from the noise trader lowers the probability of pivotalness of a strategic shareholder and the bidder cannot influence the noise trader by increasing the quorum. To influence the strategic shareholders to tender, the bidder has to increase the bid price. With $p^e = 1$ or $p^e = 0$ the bidder can increase the quorum and thereby make every strategic shareholder pivotal with probability one. However, with $0 < p^e < 1$ the strategic situation changes. There is no way for the bidder to enforce pivotalness of shareholders with the effect that they tender with high probability only if the bid is relatively high.

The Probabilities of Pivotalness and Success of the Takeover

If the probability of pivotalness is small then the expected profit of the bidder is small. Assume, that a specific shareholder i thinks that he is pivotal with probability p_i^v. With probability p_i^v the alternatives are: b if he tenders and v_I if he does not tender (he is pivotal). With probability $(1 - p_i^v)$ the alternatives are $\pi_{\text{suc.}} b + (1 - \pi_{\text{suc.}}) v_I$ vs. $\pi_{\text{suc.}} v_R + (1 - \pi_{\text{suc.}}) v_I$. He tenders with positive probability if

$$
\begin{aligned}
& p_i^v b + (1 - p_i^v)(\pi_{\text{suc.}} b + (1 - \pi_{\text{suc.}}) v_I) \geq p_i^v v_I + (1 - p_i^v)(\pi_{\text{suc.}} v_R + (1 - \pi_{\text{suc.}}) v_I) \\
\Leftrightarrow \quad & p(b - v_I) + (1 - p_i^v)\pi_{\text{suc.}}(b - v_R) \geq 0.
\end{aligned}
$$

The equation gives an upper bound for the probability $\pi_{\text{suc.}}$ that the bid is successful:

$$
\pi_{\text{suc.}} \leq \frac{p_i^v}{1 - p_i^v} \frac{b - v_I}{v_R - b}.
$$

If the inequality does *not* hold for more than 50% of the shareholders then the bid will fail with probability one. Consider the set $\mathcal{T}$ of all shareholders such that the inequality holds, i.e. the set of all shareholders that tender with positive probability. Denote by $\underline{p}^v$ the minimal p_i^v of all shareholders in $i \in \mathcal{T}$. We obtain an upper bound for probability that the takeover bid is successful:

$$\pi_{\text{suc.}} \leq \frac{\underline{p}^v}{1-\underline{p}^v}\frac{b-v_I}{v_R-b}$$

Suppose that $\underline{p}^v$ is 0.2 – which I consider as relatively large – then the probability $\pi_{\text{suc.}}$ of success is lower than $\frac{1}{4}\frac{b-v_I}{v_R-b}$. If the bidder tries to get 50% of the gain per tendered share, i.e. $b = \frac{1}{2}v_R + \frac{1}{2}v_I$, then $\pi_{\text{suc.}} \leq \frac{1}{4}\frac{b-v_I}{v_R-b} = \frac{1}{4}$. The expected profit satisfies

$$\begin{aligned} \pi^e &= \pi_{\text{suc.}} \cdot \mathbf{E}(T(v_R-b)|\text{the bid is successful}) \\ &\leq \frac{1}{2}\pi_{\text{suc.}} \cdot (v_R-b) \cdot \mathbf{E}(T|\text{the bid is successful}) \\ &\leq \frac{1}{8}(v_R-b)N. \end{aligned}$$

That is an *upper* bound. In general $\mathbf{E}(T|\text{the bid is successful})$ is much smaller than N. The inequality implies that the expected profit of the bidder is at most 12.5% of the value improvement. If we assume $\underline{p}^v = 0.05$ it follows that the expected profit is 1.3% of the value improvement.

Conclusion

Even though there is no universal agreement whether the assumption of non-pivotalness is appropriate the majority of theoretical papers use this assumption. The numerical analysis of this section corroborates this assumption. *At the bottom line we can conclude that a widely held firm "with finite shareholders" only theoretically is saved from the free-rider problem.*

4.5.2 Voluntary Supply of the Public Good "Tender"

If a shareholder tenders then he contributes to the supply of a public good. Sometimes public goods are supplied even though individual rationality suggests that it will not be supplied.

Consider the following example: If the bidder achieves control the firm's value is 120. Suppose he launches a conditional bid with a quorum of 50% and a bid price of 119, i.e. he offers a premium of 19 % which is "almost" as large as the value improvement.

	tender	don't tender
bid is successful	119	120
bid is not successful	100	100

If we rule out weakly dominated strategies then the bid will fail. However, it is doubtful whether the inabilities to deal with the coordination problem is so severe. I argue that many shareholder will scarify one dollar and tender. It is not implausible that shareholders play cooperatively even though it appears to be individually irrational. The circumstances are comparatively good: The bid is generous. The shareholders receive 95% of the value improvement. In this sense *exploitation* of shareholders by the bidder is not a problem. *Envy* between the shareholders is also not a problem as all shareholders receive almost the same (either 19 or 20).

4.5.3 Dilution

Grossman and Hart (1980) not only introduced the free-rider problem but they also suggested a remedy: dilution. After the successful completion of the bid the acquirer has the opportunity to dilute the value of T by the amount ϕ p.s., i.e. the new controller may extract private benefits. In this case the matrix that describes the alternatives for a representative shareholder is:

	tender	don't tender
bid is successful	b	$v_R - \phi$
bid is not successful	v_I	v_I

If ϕ is sufficiently large, viz. $\phi > v_R - b$, then "don't tender" becomes a weakly dominated strategy. All shareholders will tender their shares and receive b. The bidder anticipates this behavior and offers $b = v_R - \phi + \varepsilon$. The shareholders of T receive $v_R - \phi + \varepsilon$ and the raider gains $\phi - \varepsilon$, where ε is a "marginal but noticeable" amount.[57] In the equilibrium dilution will not be executed. The *threat* of dilution

[57] In the following we most of the time ignore the ε.

triggers the incentive to tender, making the execution of dilution unnecessary. But the threat must be credible.

The maximum price the bidder would pay is v_R. Shareholders would not tender if the bid price is less than $v_R - \phi$. If the bidder bids $v_R - \phi + \varepsilon$ and the shareholders are unable to coordinate, then the bidder is successful with this bid. A typical shareholder fears that the other shareholders tender with the consequence that he receives $v_R - \phi$ instead of $v_R - \phi + \varepsilon$. However, it is questionable whether shareholders are really that tightly trapped in a coordination failure (especially if ε is very small). If some "coordination" is possible then the bidder must bid more than the minimum $v_R - \phi$. We say that the coordination problem is *incomplete* if the bidder has to bid $v_R - \phi + \Delta, \Delta > 0$.

The situation between the bidder and the shareholders resembles a bargaining problem with the difference that one party (shareholders) is not a singleton. Hence, we may interpret ψ defined by $\Delta = \psi v_R + (1 - \psi)(v_R - \phi) - (v_R - \phi) = v_R - (1 - \psi)\phi$ as a measure of the bargaining power of the shareholders.

We conclude that dilution mitigates the free-rider problem. However, as will be discussed later, dilution may be abused (see section 4.6.1).

A Dilution Amendment to the Charter of the Target

If the rival has to bid v_R he won't gain from a takeover. If there are any transaction costs (e.g. for investment bankers) no takeover will occur. Observe that the shareholders miss a lucrative deal. Thus they have an incentive to solve the free-rider problem. As Grossman and Hart noted, a possible solution is to write a dilution amendment to the company's charter, i.e. explicitly allow and define post-takeover dilution.

The Cost of Bidding and the Optimal Dilution Amendment

Until now we haven't explicitly considered the costs of undertaking a bid (e.g. the fees for the investment bankers and the lawyers). Assume that these costs amount to c p.s. ("per share" relates to all shares and not merely to the shares tendered). To provide an incentive for a possible raider to attempt a bid and to bear the cost c, the gain has to be marginally greater than c. Within the dilution-framework we obtain the condition $\phi \geq c$ (ignoring ε).

Note, that a larger dilution implies a smaller bid-price and therefore a smaller gain for T's shareholders. Thus – if dilution is a policy variable of the target's shareholders – they will set dilution $\phi = c$. This gives the raiders a marginal incentive to bid, since their costs are covered. The shareholders will enjoy a gain of $v_R - c$. One may interpret this result as follows: The founders of the corporation have an incentive to induce a third party (the later bidder) to monitor and probably replace the incumbent management. Atomistic shareholders neither have the expertise nor the incentive to perform this task. However, in order to induce the bidder to bear the costs of finding a takeover target and to bid, T's shareholders have to pay this service. With a dilution of $\phi = c$ this is achieved with minimal costs. Since in equilibrium the transfer will take place for a price of $v_R - c$ p.s. the bidder earns c p.s. which compensates him for his costs.

Dilution is a Useful Device but Doubtful

From the perspective of the preceding subsection there is a sound reason for a dilution amendment, but there is no empirical evidence of such explicit devices. On the contrary: "Much of takeover bid law implicitly assumes that such dilutions are undesirable" (Grossman and Hart, 1980, 46)). Most legislators consider post-takeover watering as poor protection of minority shareholders and not a tool to solve the free-rider problem.[58] Within framework of Grossman and Hart the option of tunneling may enable efficient takeovers and cannot be condemned. Later we argue that dilution causes the pressure-to-tender problem and is a problem in itself. In this subsection we argue that even if we ignore the pressure-to-tender problem a dilution amendment provides only a doubtful solution.

One problem of the dilution amendment is that it can be altered. Assume that the initial shareholders – those who design the charter – write a well defined enforceable dilution amendment to the charter. It is likely that these shareholders eventually cease to be shareholders of the firm. The new shareholders aren't well

[58]However, even if *explicit* and visible dilution devices are absent, it is possible that all participants anticipate watering to take place. With respect to this the legal system plays an essential role. Prior to the KODEX there was a quite weak protection for the minority shareholders of German firms (Franks and Mayer (1998)). Furthermore Johnson et. al. (2000) argue that tunneling (as an example of dilution) is prevalent problem of developing and even of developed countries. We will discuss this "kind" of dilution later.

informed about the charter and about the dilution amendment (rational ignorance of atomistic shareholders). The target's management might find it easy to alter the charter and to get rid of or get around the dilution amendment. Since initial shareholders can anticipate this they won't write a dilution amendment into the charter in first place.

The dilution amendment might be ineffective if for some reasons the collective action problem is incomplete. Suppose that dilution is ϕ, i.e. the post-takeover public value of the target is $v_R - \phi$. If the collective action problem were complete then a bid price of $v_R - \phi$ would succeed. Assume otherwise, viz. the bidder has to bid $v_R - \phi + \Delta$, where

$$\begin{aligned} \Delta &= \psi v_R + (1-\psi)(v_R - \phi) - (v_R - \phi) \\ &= v_R - (1-\psi)\phi, \end{aligned}$$

or

$$b = (v_R - \phi) + \Delta = \psi v_R + (1-\psi)(v_R - \phi)$$

Δ is a mark-up over the minimal bid price of $v_R - \phi$. Here, ψ measures the bargaining power of the shareholders of T. If the collective action problem is complete, i.e. shareholders are very weak, then ψ is zero. If the shareholder are able to coordinate perfectly then ψ equals one.

With a bid price of $b = \psi v_R + (1-\psi)(v_R - \phi)$ the profit of the bidder is $v_R - b = (1-\psi)\phi$. Therefore, the bid is profitable if

$$(1-\psi)\phi \geq c \Leftrightarrow \phi \geq \frac{c}{1-\psi}$$

Suppose the dilution amendment defines $\phi = \frac{c}{1-\psi}$, i.e. dilution is sufficiently high to make the bid marginally profitable. The bid price is $b = \psi v_R + (1-\psi)(v_R - \frac{c}{1-\psi}) = v_R - c$. Superficially, we might assume the dilution amendment achieves its objective to facilitate the takeover and simultaneously guarantee a maximum bid price. However, if $\frac{c}{1-\psi} \geq v_R$ then the dilution amendment is incredible. It is impossible to extract more than v_R.

We draw the following conclusion: If the shareholders are able to coordinate well (ψ is close to one) then the dilution amendment is likely to fail. The functioning of the dilution amendment requires two preconditions: dilution must be credible and the coordination of the tendering decision of shareholders must be incredible.

In the preceding paragraph we argued that a dilution amendment is incredible if $\frac{c}{1-\psi} \geq v_R$. In this paragraph we argue that a dilution amendment $\phi > v_R - v_I$ is incredible. Even though v_R and ϕ are non-verifiable its difference $v_R - \phi$ can be verified ex-post. Suppose that $v_R - \phi < v_I$, i.e. the public value is lower under the rival's management. It follows that the share price will be lower after the takeover. It is not unlikely that the minority shareholders sue and at least receive v_I. As a consequence a dilution amendment such that $v_R - \phi < v_I$ is not credible. This is no problem if there is no mark-up. Without a mark-up the dilution amendment $\phi = c$ frustrates inefficient takeovers only (i.e. $v_R - c < v_I$). All efficient takeovers $v_R - c \geq v_I$ take place. Hence, this dilution amendment solves the free-rider problem.

With a mark-up the dilution amendment is less effective. Assume that $v_R - \phi \geq v_I$ holds. The maximal (minimal) bid price is v_R ($\max\{v_R - \phi, v_I\}$). With split-the-difference the bid is $b = \max\{v_R - \phi, v_I\} + \psi(v_R - \max\{v_R - \phi, v_I\}) = \max\{v_R - \phi, v_I\} + \psi \min\{\phi, \Delta v\}$. Suppose that $(1-\psi)\Delta v \geq c$ holds. By setting $\phi = \frac{c}{1-\psi}$ the dilution amendment works. The bid price is $b = v_R - \frac{c}{1-\psi} + \psi\frac{c}{1-\psi} = v_R - c$. Thus, the profit is zero. However, the dilution amendment does not work if $(1-\psi)\Delta v < c$ holds. Indeed, if the dilution amendment defines $\phi = \frac{c}{1-\psi}$ then the bid price is $b = v_I + \psi\Delta v$ and the profit is negative: $v_R - c - b = \Delta v - \psi\Delta v - c < 0$. The profit would be higher if the dilution were higher. But any $\phi \geq \frac{c}{1-\psi} > \Delta v$ is incredible by assumption. We conclude that the dilution amendment does not work if $\Delta v < \frac{c}{1-\psi}$.

There is a fourth reason to doubt the effectiveness of a dilution amendment. So far we assume that $\delta = 1$, i.e. there are no opportunity costs of diversion (see section 2.3). If $\delta < 1$ the dilution amendment may also fail. Indeed, if a bid is successful then the rival usually owns a large fraction of the shares of the target. If he owns more than the fraction δ then dilution is incredible. The dilution amendment is credible only if the bidder bids for less than δN shares, i.e. if he launches a partial bid. But partial bids are forbidden in many jurisdictions (e.g. Germany and UK).

We can conclude that *dilution amendments* deliberately designed to solve the free-rider problem *are practically irrelevant and theoretically doubtful.*

4.5.4 A Toehold

Another way to profit from a takeover despite the free-rider problem is to acquire a toehold $\alpha \ll 0.5$ of T's shares secretly. There are legal restrictions that regulate the acquisitions of large blocks[59] and it is furthermore difficult to acquire a large block without being noticed. Therefore the assumption $\alpha \ll 0.5$ (for example 5%) is sensible. If the raider has secretly acquired a proportion α of T's shares, he profits from the increase of the share price after the announcement of the takeover bid. He can launch a marginally profitable tender offer with a bid price of $b = v_R$ if $\alpha\,(v_R - v_I) > c$. It is implicitly assumed that the raider acquires the toehold for v_I, i.e. the takeover is not anticipated and a complete surprise.

4.5.5 Two Tier Offers

Yet, another possibility to circumvent the free-rider problem is to make a two tier offer. The bidder announces that in the first tier he is going to buy 50 % of the shares for $b_1 > v_I$. In the second tier he pays only $b_2 < b_1$. We assume that the threat of a post takeover squeeze-out with a consideration of b_2 for the non–selling shareholders is possible. The strategic dilemma for T's shareholders is described by the following table, where γ denotes the fraction of shareholders that accept the offer.

	tender	don't tender
bid is successful, $\gamma \geq 0.5$ tender	$\frac{0.5}{\gamma}\,b_1 + (1 - \frac{0.5}{\gamma})\,b_2$	b_2
bid is not successful	v_I	v_I

In a pro rata allocation of the first tier, tendering shareholders sell a fraction $0.5/\gamma$ of their shares for b_1. Independent of γ, the weakly dominant strategy is to tender. Without loss of generality we assume $\gamma = 1$.

If the bidder chooses $b_1 = v_I + \varepsilon$ and $b_2 = v_I$ then the bid will be successful. The bidder's profit is $v_R - v_I$. We conclude that a two tier offer like dilution mitigates the free-rider problem. Like dilution two tier offers can be abused (see section 4.6.2).

[59]In Germany there is a cascade of thresholds: 5%, 10%, 25%, 50%, 75% (WpÜG § 21). If the shareholding of a shareholder surpasses one of the thresholds, (s)he has to report to the Bundesanstalt für Finanzdienstleistungsaufsicht (BAFin), which provides this information on the internet (www.bafin.de).

4.5.6 Squezze-out Right

Suppose the bidder can squeeze out non-tendering shareholder if enough (usually 95%) shareholders have tendered. The strategic table is:

	tender	don't tender
bid is successful	b	b
bid is not successful	v_I	v_I

With a squeeze-out right the shareholders are indifferent between tendering and not tendering. If $b > v_I$ then "tender" is pareto-better and we argued that coordination is reasonable in this case.

4.6 The Pressure to Tender

Dilution and two tier bids are controversial as they induce a pressure to tender (Bebchuk, 1985). The problem emerges on the conditions that (1) in a successful bid non-tendering shareholders are worse-off than tendering shareholders and (2) all shareholders are better off if the bid fails. The following table describes the problem in its basic form. $v_M < b$ denotes the post takeover value of a share of a minority shareholder and the bid b is lower than $v_I > b$.

Shareholders tender as "don't tender" is weakly dominated. Collectively, the target's shareholders want the bid to fail. However, individually they fear that the other shareholders tender.

	tender	don't tender
bid is successful	b	v_M
bid is not successful	v_I	v_I

4.6.1 Dilution and Pressure to Tender

Dilution can be considered as a device to facilitate value improving takeovers that would be frustrated because of the the free-rider problem. But this coin has two sides. Bebchuk (1985) stressed that post takeover dilution causes a pressure-to-tender problem. If the private benefit is larger than the value improvement

$\phi > \Delta v = v_R - v_I$ then $v_R - \phi < v_I$. If the bidder chooses $b = v_R - \phi + \varepsilon$ then the bid generates a pressure to tender. In this case we would not consider dilution as device to solve the pressure-to-tender problem but as a minority exploiting measure.

	tender	don't tender
bid is successful	b	$v_R - \phi$
bid is not successful	v_I	v_I

4.6.2 Two Tier Offers and the Pressure to Tender

Two tier bids also induce a pressure-to-tender problem. Consider a bid with $0.5\,b_1 + 0.5\,b_2 < v_I$, $b_2 < b_1$. In the equilibrium the shareholders receive only $0.5\,b_1 + 0.5\,b_2$ p.s., which is smaller than v_I. If they could, they would coordinate and not tender. If $b_2 = 0$ and $b_1 = v_I$ the bidder indeed is a raider: He tries to buy the assets that have at least the value v_I for approximately $0.5 \times v_I$. He raids the corporation for much less then its current value by exploiting a strategic dilemma/collective action problem of the shareholders. Shareholders should coordinate in order to avoid the unwanted success of the bid, however individually they don't have an incentive to do so.

	tender	don't tender
bid is successful	$0.5\,b_1 + 0.5\,b_2$	b_2
bid is not successful	v_I	v_I

4.7 Remedies of the Pressure-to-Tender Problem

4.7.1 Two Tier Bids

We saw that a two tier offer with $0.5\,b_1 + 0.5\,b_2 < v_I, b_2 < b_1$ causes a pressure to tender. Necessarily, it holds $b_2 < v_I$. To exert a pressure to tender the bid price of the second tier must be lower than the current shareholder value. If the regulator forbids such bids and can enforce this ban then two tier offers do not generate a pressure-to-tender problem.

Assume, that the regulator does not enforce $b_2 \geq v_I$ and a bidder launches a bid with $0.5\,b_1 + 0.5\,b_2 < v_I, b_2 < b_1$. Such a bid will trigger a counter-bid (marginally profitable for the bidder)[60] with an aggregate value of v_I. The bid is put forward by a third party A who has no intention to change the policy of the corporation. Therefore they generate merely v_I. The counter-bid is a two tier bid parallel to B's bid. For the first tier he offers b_{C1}, for the second tier b_{C2} and it holds (by assumption) $v_I = 0.5b_{C1} + 0.5b_{C2}$. The strategic situation of a representative shareholder is given by the following table (we consider only the case with $\gamma = 1$):

	tender to B	tender to A	don't tender
B bid is successful	$0.5\,b_1 + 0.5\,b_2$	b_2	b_2
A bid is successful	b_{C2}	$0.5\,b_{C1} + 0.5\,b_{C2}$	b_{C2}
no bid is successful	v_I	v_I	v_I

There are two un-dominated actions, viz. "all tender to B" and "all tender to A". But the second pareto-dominates the first, since $0.5b_{C1} + 0.5b_{C2} = v_I > 0.5\,b_1 + 0.5\,b_2$. We assume that in this situation shareholders are able to coordinate and achieve the pareto-better equilibrium. Note that a *one* tier bid by A with $b = v_I$ does not work, as we can check with the next table.

	tender to B	tender to A	don't tender
B bid is successful	$0.5\,b_1 + 0.5\,b_2$	b_2	b_2
A bid is successful	v_I	v_I	v_I
bid is not successful	v_I	v_I	v_I

The reason why a one tier offer does not work as a counter offer is that it fails to destroy the *strategic hedge feature* of a two tier offer. Reconsider the first table in this subsection. The trick of the two tier offer is that "to tender" provides a *hedge* against ending up in the second tier.

The reasoning that a one tier counter offer does not work collapses if we assume that the alternative bidder has access to a weak but noticeable dilution technique, i.e. $\phi_A = \varepsilon$. This is illustrated by the next table. With this counteroffer the shareholders would tender to A.

[60] The counter-bid could come from a white knight, the management itself (MBO) or any third party.

	tender to B	tender to A	don't tender
B bid is successful	$0.5\,b_1 + 0.5\,b_2$	b_2	b_2
A bid is successful	$v_I - \varepsilon$	v_I	$v_I - \varepsilon$
bid is not successful	v_I	v_I	v_I

To summarize, we can conclude that raiding a corporation by triggering a coordination failure on behalf of the shareholders is not easy. It is therefore plausible to assume that $0.5\,b_1 + 0.5\,b_2 \geq v_I$ holds in a two tier offer. Note, that A cannot top a bid with $0.5\,b_1 + 0.5\,b_2 > v_I$, since by assumption he is unable to implement a value increasing measure.

4.7.2 Bebchuk's Rule

There is a simple and elegant remedy to the pressure-to-tender problem (Bebchuk, 1985, 1747 – 1752).[61] T's shareholder are given the option to qualify their tendering decision. They may either declare that they want to tender and approve the bid or they may decide to tender disapproved. A shareholder who wants to tender completes a form. The form includes a field where they qualify their tendering decision. The following table describes the strategic situation. The raider bids $b < v_I, b > \varepsilon$ and $v_M = \varepsilon$ holds.

	tender & approve	tender & disapprove	don't tender
more than 50% tender approved	b	b	ε
more than 50% tender disapproved	v_I	v_I	v_I
more than 50% don't tender	v_I	v_I	v_I

We observe that the strategy "tender & approve" is not the equilibrium outcome. So the predatory bid will fail.

4.7.3 Zaunkönigregel

The "Zaumkönigregel" is another tool to solve the pressure-to-tender problem. Should a shareholder not tender during the period of acceptance and the bid is successful then the shareholder can tender his shares for the same price as in

[61] This device is used in the corporate law of Israel. See Bebchuk and Proccacia (1988)

the offer in the extended acceptance period. This device is implemented e.g. in the City Code, the German and the Swiss takeover law. The Zaunkönigregel invalidates the pressure-to-tender problem. However, it renders takeovers too difficult. With the Zaunkönigregel shareholders are indifferent between "tender" and "don't tender". Since it is more convenient to do nothing, nobody will tender. In this sense the Zaunkönigregel overshoots (Bebchuk, 1985).

4.7.4 Shareholdermeeting

The pressure-to-tender problem is a coordination problem on behalf of the shareholders. A method to circumvent this coordination failure is to rule that a majority of the shareholders must approve the bid in a shareholder meeting (Bebchuk (1988), Burkart (1999) and Bebchuk and Hart (2001)). Without such an approval no transfer of control takes place, e.g. no votes are attached to the shares acquired by the bidder.

Note that in this context poison pills serve a purpose (Bebchuk and Hart, 2001). A unredeemed poison pill raises the price of the takeover. Bidders avoid the higher price by demanding the cancellation of the poison pill at the general meeting. The poison pills compels a general meeting and solves in this way the coordination problem.

4.7.5 Conclusion

There are three legal devices that protect shareholder from the pressure-to-tender problem. Furthermore, a bid with a pressure-to-tender is likely to trigger a counter-bid. In the author's opinion, pressure-to-tender problem is not very acute; it can be dealt with effectively.

4.8 Minority-Exploiting Partial Bids

Another important topic is whether minority exploiting partial bids are possible[62]. Assume that the bidder offers a conditional *restricted* bid for 50% of the shares. The price offered is b and dilution is ϕ. If the bid is successful, the value of

[62] For a similar analysis see Burkart (1999, 24ff)

a minority share is $v_R - \phi$. Furthermore, a bid is minority exploiting if $0.5b + 0.5(v_R - \phi) < v_I$. If this bid is successful then T's shareholders loose relative to the status quo. To be at least marginally profitable for bidder the condition $0.5(v_R - \phi) + \phi - 0.5b = \frac{1}{2}(v_R + \phi - b) \geq 0$ must hold. Consider a bid with $b = v_R - \phi\,(+\varepsilon\,)$, i.e. the bidder offers the post takeover value of a share. Note that the bidder makes a profit with this bid: $\frac{1}{2}(v_R + \phi - v + \phi) = \phi$. The table of payoffs is

	tender	don't tender
bid is successful	$0.5b + 0.5(v_R - \phi) = v_R - \phi \;\; (+0.5\,\varepsilon)$	$v_R - \phi$
bid is not successful	v_I	v_I

If no counter-bid arrives such a bid will be successful. Note the similarity of the payoff structures of this bid and a two tier offer. Both types of bids trigger a prisoner's dilemma on behalf of the shareholders (pressure-to-tender effect). When studying the possibility of success of such a bid it is crucial which kind of counter-bids we consider.

Suppose that two tier bids are not allowed, that the party that submits a counter-bid cannot bid more than v_I and cannot extract private benefits. Consequently, the counter-bid is v_I. Such a counter-bid is ineffective in frustrating the partial bid as it has not the hedge property that the partial bid has (see 4.7.1).

In principle, partial bids don't differ much from two tier bids. There is one major difference. In a two tier bid the bidder offers a specified price for the second tier. The payoff in a partial bid is "revealed" after the bidder assumes control. In a two tier bid shareholders and the regulator can verify b_1 and b_2. In a partial bid the post-takeover value is realized only after the takeover is completed. Hence, a two tier bid is more transparent.

The question is whether the bidder can exploit minority shareholder with a bid that satisfies $b \geq v_I$, i.e. whether a bidder can offer a premium over the current market value v_I and nevertheless exploit minority shareholders. The bidder offers $b = \max[v_I, v_R - \phi]$, where the condition $b \geq v_R - \phi$ is necessary to make "tender" an equilibrium action. Firstly, consider the case $b = v_I$, i.e. the dilution is relatively large ($\phi \geq v_R - v_I$). The strategic situation is as follows

	tender	don't tender
bid is successful	$0.5v_I + 0.5(v_R - \phi)$	$v_R - \phi$
bid is not successful	v_I	v_I

We have again a pressure-to-tender problem as $0.5v_I + 0.5(v_R - \phi) > (v_R - \phi)$ holds. Shareholders will tender. The bid is Minority-Exploiting since $0.5v_I + 0.5(v_R - \phi) < v_I$. In order to be marginally profitable the bid has to satisfy $v_R - v_I \geq -\phi$. This means that a Minority-Exploiting takeover will take place if the improvement the bidder can implement $v_R - v_I$ is in interval $[-\phi, \phi]$. If ϕ is sufficiently large a bidder with $v_R < v_I$ can obtain control of T. For the sake of completeness we consider the case where $v_R - \phi > v_I$, so that $b = v_R - \phi$. The condition that the bid is Minority-Exploiting becomes $v_R - \phi < v_I$, which contradicts the assumption. This case cannot occur.

The danger of a Minority-Exploiting bid, i.e. $0.5\,b + 0.5\,(v_R - \phi) < v_I$, necessitates measures to prevent their occurrence. Several measures are possible. A one tier bid can be used to defend against a partial bid if we assume that the alternative bidder A has access to a very weak but noticeable dilution technique $0 < \phi_A \approx 0$ (without dilution the bid has not the strategic hedge feature). The strategic table is

	tender to B	tender to A	don't tender
B's bid is successful	$0.5\,b + 0.5\,(v_R - \phi)$	$v_R - \phi$	$v_R - \phi$
A's bid is successful	$v_I - \phi_A$	v_I	$v_I - \phi_A$
no bid is successful	v_I	v_I	v_I

and the bid of B fails.

Another possibility is to allow two tier bids. The price A bids for the first tier is b_{C1} and b_{C2} is the price for the second tier. This counter-bid shall satisfy $0.5b_{C1} + 0.5b_{C2} = v_I$. Consider the following table:

	tender to B	tender to A	don't tender
B's bid is successful	$0.5\,b + 0.5\,(v_R - \phi)$	$v_R - \phi$	$v_R - \phi$
A's bid is successful	b_{C2}	$0.5\,b_{C1} + 0.5\,b_{C2}$	b_{C2}
no bid is successful	v_I	v_I	v_I

There are two equilibria and the outcome is – by assumption – the pareto-better. Two tier bids can prevent Minority-Exploiting partial bids. Since two tier bids are restrained by several legislators we discuss alternative measures to prevent Minority-Exploiting bids.

As in the case of the two tier offers Minority-Exploiting bids are possible if coordinating the shareholders is impossible. Therefore, all three measures discussed in section 4.7 can be used to frustrate minority exploiting bids, i.e. Bebchuk's Rule:

	tender & approve	tender & disapprove	don't tender
tender & approve	$0.5v_I + 0.5(v_R - \phi)$	$0.5v_I + 0.5(v_R - \phi)$	$v_R - \phi$
tender & disapprove	v_I	v_I	v_I
don't tender	v_I	v_I	v_I

Does the Equal Opportunity Rule (EOR) or the Mandatory Bid Rule (MBR) prevent Minority-Exploiting bids? The EOR is ineffective. It rules that all shareholders are treated equally. This holds if in case of oversubscription allocation is pro rata. But it fails to separate the approval from the tendering decision (Burkart (1999, page 26)).

Whereas the EOR is ineffective the MBR indeed deters Minority-Exploiting bids (Burkart (1999, page 27)). Consider a Minority-Exploiting bid and assume that the devices described above (two tier bids and shareholder approval) are infeasible. A necessary condition for the minority exploiting bid is $v_R - \phi < v_I$. If a takeover bid with $b \geq v_I$ is successful, shareholders who have not tendered will exercise their option embodied in the MBR and sell for b. The MBR works like a two tier offer where the second tier price equals the first tier price.

4.9 Asymmetric Information

So far we assumed that information is symmetric – indeed perfect. One might expect that private information about the v_R helps to solve the free-rider problem. This is not the case. Suppose that the bidder knows v_R but T's shareholders consider v_R as a randon variable. Form the fact that the bidder bids they can infer that the bidder profits from the bid – i.e. $v_R \geq b$ (since he won't bid otherwise). As a consequence the shareholders don't tender. Consequently, the problem is even more severe than in the case of perfect information.[63]

[63] Shleifer and Vishny (1986a) analyze the free-rider problem with asymmetric information about v_R. Takeovers take place as the bidder has a toehold.

4.10 Asymmetric Information & Private Benefits

4.10.1 Unrestricted Bids

In the section 4.9 information about the value improvement Δv is private information of the bidder. With this kind of private information the free-rider problem does not disappear: Without a toehold no profitable takeover will take place. The model in this section extends the domain privacy of information: The value improvement *and* the private benefit are private information. The model is based on Schuster (2001).[64] In her model a takeover takes place even though the bidder has no pre-bid toehold.

We assume that there are two types of bidders. Type PVC is a pure value creator. He found a value improving measure such that the public value of the firm is $v_{\text{PVC}} > v_I$ if he controls the firm. The probability that the bidder is of this type is p. Type OVC is a also a value creator. If he controls the firm the value increases to $v_{\text{OVC}} > v_I$ but in addition he can extract private benefits ϕ. OVC is an "opportunistic value creator": He creates additional value only for his own private advantage. The value improvement may be completely private – i.e. $v_{\text{OVC}} - v_I = \phi$ – but it is also possible that he can extract less or more than the value improvement. Of course, the pure value creator creates value only if he benefits. But egoism is not already embodied in the measure he has found as is the case with private benefits. We assume that the type of the bidder is private information of the bidder. Furthermore, we assume that the bidder has no toehold. Finally, partial bids are disallowed.

We assume that $v_{\text{OVC}} - \phi \leq v_{\text{PVC}}$. An interesting special case is $\phi = \Delta v = v_{\text{OVC}} - v_I$. In this case the value improvement equals the private benefit, i.e. OVC a *pure* opportunistic value creator. We assume that $pv_{\text{PVC}} + (1-p)(v_{\text{OVC}} - \phi) > v_I$ and $pv_{\text{OVC}} + (1-p)\phi \geq pv_{\text{PVC}}$ holds. The necessity of these assumptions is explained later.

The post-takeover public value of a share is v_{PVC} if PVC and $v_{\text{OVC}} - \phi$ if OVC takes over. The a priori expected post-takeover public value of a share is $pv_{\text{PVC}} + (1-p)(v_{\text{OVC}} - \phi)$. If the shareholders use the a priori probabilities to assess the probability distribution of the type of the bidder, then the expected

[64] See also Yilmaz (1999).

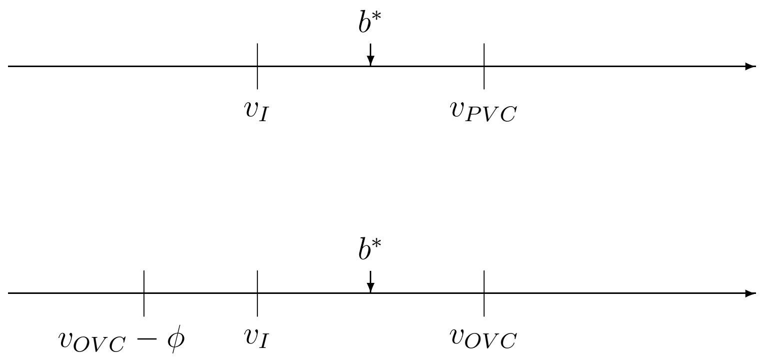

Figure 7: **Timing of the Game.** *We assume that* v_{PVC} *is to the right of* v_{I} *and also to the right of* $v_{\text{OVC}} - \phi$. *We also assume that* b^* *is to the right of* v_I.

value of a share of a minority shareholder is $pv_{\text{PVC}} + (1-p)(v_{\text{OVC}} - \phi)$.

If there were only one type of bidder then we would be in a situations already studied: With a pure value creator it would be the situation originally studied by Grossman and Hart (section 4.3), i.e. the basic free-rider framework. With an opportunistic value creator, the analysis of section 4.5.3 would be relevant. In the former case the bidder makes no profits from the takeover, in the latter he receives the profit.

The figure 8 outlines the timing and information structure of the game. Besides the collective action of the shareholders at their information sets the model is a standard signalling game (see the section 4.12 for a mathematical treatment). The game starts at the center of the figure. The nature draws the type of the bidder. With probability p the bidder is a pure value creator and with probability $1-p$ he is an opportunistic value creator. Next, the bidder submits a bid. The bidder may announce any positive real number but we draw only two "lines" for sake of transparency. The shareholders observe the bid but don't know the type of the bidder. A dashed line connects points of the same information set. We consider only equilibria where the bid either is successful and everybody accepts it or the bid fails and nobody tenders. Therefore we can summarize the shareholder's decision to the decision of one "as if" player. In principle, the game may have two kind of equilibria: a separating one, where the bid reveals the type of

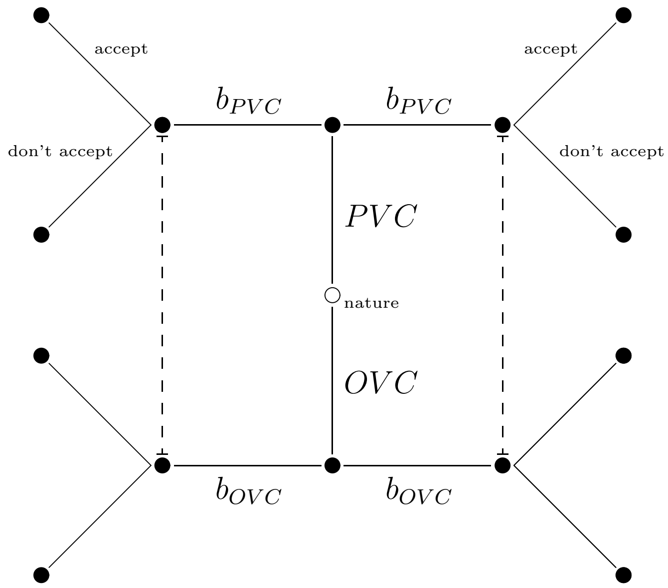

Figure 8: **Signalling Game.** *The figure sketches the takeover game. The game start at the center, where the nature chooses the type of the bidder.*

the bidder and pooling equilibrium, where both types bid the same. Firstly, we verify that a separating equilibrium is impossible.

Suppose there is a separating equilibrium. The opportunistic bidder bids b_{OVC} and the pure value-creator $b_{\text{PVC}} \neq b_{\text{OVC}}$. Since the equilibrium is separating, the shareholders infer the type of the bidder from the bid. If the bid is b_{PVC} the shareholders believe that PVC is bidding. This implies that the bid must be v_{PVC} since otherwise the shareholder won't tender (this is the basic free-rider problem). The bidder's profit is zero with this bid. If the bid is b_{OVC} the shareholders conclude that the opportunistic value creator has bid thus the bid price is $\max\{v_I, v_{\text{OVC}} - \phi\}$. Consider the pure value creator and make the Nash-test: Given the other players' actions and the beliefs, has the bidder an incentive to deviate from the suggested action of bidding v_{PVC}? Indeed, he has an incentive to deviate and to bid $b_{\text{OVC}} = \max\{v_I, v_{\text{OVC}} - \phi\}$. He would have a positive profit $v_{\text{PVC}} - b_{\text{OVC}}$ (remember, we assume $v_{\text{OVC}} - \phi < v_{\text{PVC}}$). So the bidder's strategy fails to pass the Nash-test. We conclude that a separating equilibrium does not exist.

There is a pooling equilibrium. Both types bid the same price $b^* = pv_{\text{PVC}} + (1 - p)(v_{\text{OVC}} - \phi) > v_I$ which equals the ex-ante post-takeover value of a minority share.

It is here where we employ the assumption that $v_{\text{OVC}} - \phi \leq v_{\text{PVC}}$. Otherwise, i.e. with $v_{\text{OVC}} - \phi > v_{\text{PVC}}$ the bid price b^* would be higher than v_{PVC} and the PVC would make a loss. With this bid both types of bidders make a profit from the raid even though none has a pre-bid toehold! On the one hand, the opportunistic value creator would make a higher profit if the pure value-creator weren't present. So the presence of the pure value creator hurts the opportunistic value creator indirectly. On the other hand, the pure value-creator benefits from the fact that opportunistic value creators occur with positive probability. The presence of the OVC is like a tacit threat. The situation resembles mimicry of some butterflies. The pure value creator is equivalent to a Leptalis and the OVC to a Ithomia. A Leptalis is eatable whereas Ithomia is not. But birds don't eat Leptalis' as they look like Ithomia. The target's shareholders would like to exploit the pure value creator but they fear the opportunistic value creators.

The bid price $pv_{\text{PVC}} + (1-p)(v_{\text{OVC}} - \phi)$ has the following property: If the shareholders believe that with probability p the bidder is of type PVC and with probability $1-p$ of type OVC, then acceptance is the optimal reaction to this bid. Furthermore, b^* is the minimal bid with this property. Of course, raiders want to make a minimal bid that is accepted.

In the equilibrium the profit of the opportunistic value creator is

$$\begin{aligned}\pi_{\text{OVC}} &= v_{\text{OVC}} - pv_{\text{PVC}} - (1-p)(v_{\text{OVC}} - \phi) \\ &= p(v_{\text{OVC}} - v_{\text{PVC}}) + (1-p)\phi.\end{aligned}$$

The PVC's profit is

$$\begin{aligned}\pi_{\text{PVC}} &= v_{\text{PVC}} - pv_{\text{PVC}} - (1-p)(v_{\text{OVC}} - \phi) \\ &= (1-p)(v_{\text{PVC}} - v_{\text{OVC}}) + (1-p)\phi \\ &= (1-p)(v_{\text{PVC}} - v_{\text{OVC}} + \phi).\end{aligned}$$

Note that $v_{\text{OVC}} - \phi \leq v_{\text{PVC}}$ implies that $\pi_{\text{OVC}} - \pi_{\text{PVC}} \leq \phi$ or $0 \leq \pi_{\text{PVC}} + \phi - \pi_{\text{OVC}}$. As a consequence the PVC's profit is non-negative. To guarantee that the OVC make a positive profit we have to assume $pv_{\text{OVC}} + (1-p)\phi \geq pv_{\text{PVC}}$. This assumption is reasonable. It is likely that the difference between v_{PVC} and v_{OVC} is small. The inequality defines an upper bound for the value improvement of the pure value creator ($v_{\text{PVC}} \leq v_{\text{OVC}} + \frac{1-p}{p}\phi$). It is evident that there must be limit for v_{PVC}. A large v_{PVC} implies a high price that the OPV (and the PVC) has to bid. If the pure value creator were able to create a very large value improvement then the high bid price would make bidding for the OPV unprofitable.

Proposition [Schuster (2001)]: In the unique perfect sequential equilibrium both types bid $b^* = pv_{\text{PVC}} + (1-p)(v_{\text{OVC}} - \phi)$. The shareholder strategy is to tender for all bids $b \geq b^*$. The belief on the equilibrium path, i.e. if the bidder bids b^*, is $p = \text{prob}(\text{type} = \text{PVC})$. If a bid off-the-equilibrium path is made then the shareholders believe that the bidder is of a type that would be better off with this bid iff the bid is accepted. If this condition is empty then the shareholder's beliefs are the a priori probabilities.

Proof: To prove that the suggested strategies & beliefs are a perfect sequential equilibrium we have to show that the suggested strategies are best responses. The strategy of the shareholders follow the usual logic of a tender offer game. If the bid price is not lower than the expected public post-takeover value of a share then it is an equilibrium strategy to tender. Furthermore, the expected post-takeover public value in the equilibrium is calculated using the a priori probabilities. Hence, the post-takeover value of a share is $pv_{\text{PVC}} + (1-p)(v_{\text{OVC}} - \phi)$. The strategy of the shareholders satisfies the Nash-test. The bidders have no incentive to deviate from the equilibrium. If they bid less then the bid fails given that the shareholders follow their equilibrium strategy not to tender if $b < b^*$. If they bid more the bid will be successful but the payoff lower. Thus, the strategy of the bidder also satisfies the Nash test. Trivially, the belief on the equilibrium path is calculated using bayesian up-dating.

It remains to check that the beliefs off-the-equilibrium are not inconsistent or $B_b(e) = \emptyset$. Suppose the shareholders observe a bid $b > b^*$. In this case both bidders lose relative to the equilibrium independent of the action of the shareholders. If the bid fails the payoff is zero which is lower than the equilibrium payoff. If the bid succeeds then the payoff is lower as the bid price is higher. Consequently, $\lambda \equiv 0$. Next, suppose that $b < b^*$. As suggested in the appendix 4.12 we check consistency using both actions of the shareholders. If the shareholder don't tender then both bidders lose. In this case $\lambda \equiv 0$. If the shareholders tender then both bidders gain relative to the equilibrium. Therefore $\lambda \equiv 1$. It follows that the a priori belief are supported by $\alpha =$ "tender". But with this belief "tender" is not a best response. Thus $B_b(e) = \emptyset$ for all $b \neq b^*$ off-the-equilibrium.

To underline the importance of out-of-equilibrium beliefs note the following:

The opportunistic value creator has an incentive to signal that he *is* of type OVC. If the shareholders trust the signal then the bid price $v_R - \phi$ will be accepted. In this case the bidder's profit is $v_{\text{OVC}} - \max\{v_I, v_{\text{OVC}} - \phi\}$ which is larger than the equilibrium payoff. However, if he bids less than b^* then the shareholders beliefs are the ex-ante probabilities. With ex-ante probabilities "don't accept" is optimal. The OVC's signal of a low bid does not work. Suppose the shareholder believe that the type of the bidder is OVC if a bid price $b < b^*$ is observed. The optimal action of the shareholders is to tender. However, these beliefs cannot be equilibrium beliefs. The pure value creator would have an incentive to deviate and also bid $b < b^*$.

Besides this theoretical justification there is another reason, why signalling might not occur. The signal is useful if it reveals that the bidder is an opportunistic value creator, i.a.w. that he wants to extract private benefits. If he reveals this then he risks litigation.

There is another reason why out-of-equilibrium beliefs are important, viz. to rule out unreasonable equilibria. Indeed, the pooling equilibrium of the proposition is the only possible perfect sequential equilibrium. Suppose otherwise, i.e. assume that $\widetilde{b} \neq b^*$ is the price of a perfect sequential equilibrium. A bid price $\widetilde{b}$ lower than b^* cannot be pooling equilibrium. In a pooling equilibrium both bidder bid $\widetilde{b}$ thus the equilibrium beliefs must be the a priori probabilities. But with the a priori probabilities $\widetilde{b} < b^*$ will not be accepted. Suppose $\widetilde{b} > b^*$ is the bid price of a pooling equilibrium. Consider the out-of-the equilibrium bid b^*. If the bid succeeded then both bidders would have an incentive to deviate from $\widetilde{b}$ and the equilibrium would fail the Nash test. Therefore the equilibrium strategy at b^* of the shareholders must be "don't tender". However, "don't tender" is optimal if the shareholders believe that the PVC has bid. We check whether the corresponding belief $\tau(0VC) = 0, \tau(PVC) = 1$ is consistent. The belief is consistent if there is an $\alpha \in BR_{b^*}(\tau)$ such that $\tau \in \mathcal{B}_m(\alpha)$. The unique best response to τ is don't tender. We have to check whether $\tau \in \mathcal{B}_{b^*}(\text{"don't tender"})$. But $\mathcal{B}_{b^*}(\text{"don't tender"})$ is empty as the corresponding indicator function $\lambda(\cdot, \text{"don't tender"}) \equiv 0$. This leaves the possibility that $B_{b^*}(e) = \emptyset$. But, it is not. Consider the a priori beliefs. With this belief the optimal response of the shareholders is $\alpha =$ "tender". Furthermore, $\lambda(\cdot, \text{"tender"}) \equiv 1$ and the a apriori beliefs are indeed in $\mathcal{B}_{b^*}(\text{"tender"})$.

We checked that there cannot be an equilibrium bid price $\neq b^*$. Consequently, the perfect sequential equilibrium of the proposition is unique.

Proposition: (1) If $v_{\mathrm{OVC}} = v_{\mathrm{PVC}}$ holds then profit is $(1-p)\phi$ *of both bidders*, i.e. the profit is independent of v_{PVC} and v_{PVC}.
(2) Both, the opportunistic value creator and the pure value creator benefit from a higher fraction of OPVs:

$$\begin{aligned}
\frac{d\pi_{\mathrm{PVC}}}{dp} &= -(v_{\mathrm{PVC}} - v_{\mathrm{OVC}} + \phi) = v_{\mathrm{OVC}} - \phi - v_{\mathrm{PVC}} > 0 \\
\frac{d\pi_{\mathrm{OVC}}}{dp} &= v_{\mathrm{OVC}} - \phi - v_{\mathrm{PVC}} > 0
\end{aligned}$$

The interpretation is straight forward. A higher fraction of OVCs leads to a lower equilibrium bid price. Shareholders accept a lower bid price as they expert post-takeover dilution with a higher probability.

Conclusion

We summarize: If there is asymmetric information about the value improvement *and* the private benefit then takeovers, where the bidder *cannot* extract private benefits, take place. The bidder makes a strictly positive profit. This is possible even though the bidder has no toehold. In an economy with asymmetric information both types of takeovers – with and without dilution take place. In an economy with perfect information takeover without dilution are frustrated. In this sense asymmetric information increases efficiency.

4.10.2 Partial Bids

We extend the model of Schuster (2001) and allow that the bidder makes a partial bid. Firstly, we argue that the OCV has an incentive to make a partial bids. Suppose the OVC launches a partial bid for 50 % of the shares. Assume that the bid price is $b^* = pv_{\mathrm{PVC}} + (1-p)v_{\mathrm{OVC}}$. The profit of the OVC is

$$\pi_{\mathrm{OVC}} = 0.5(v_{\mathrm{OVC}} - \phi) + \phi - 0.5b^* = 0.5p(v_{\mathrm{OVC}} - v_{\mathrm{PVC}}) + (1-0.5p)\phi.$$

If $v_{\mathrm{OVC}} - v_{\mathrm{PVC}} \approx 0$ holds then $\pi_{\mathrm{OVC}} \approx (1-0.5p)\phi$. This profit is larger than $(1-p)\phi$. The latter value equals the profit if bids have to be unrestricted (and $v_{\mathrm{OVC}} - v_{\mathrm{PVC}} \approx 0$). The assumption $v_{\mathrm{OVC}} - v_{\mathrm{PVC}} \approx 0$ simplifies the comparison but the result holds in general. Let $\pi_{\mathrm{OVC},1}$ and $\pi_{\mathrm{OVC},2}$ denote the profit of the

OVC if partial bids are forbidden respective allowed. It follows

$$\begin{aligned}\pi_{\text{OVC},1}-\pi_{\text{OVC},2} &= p(v_{\text{OVC}}-v_{\text{PVC}})+(1-p)\phi-0.5p(v_{\text{OVC}}-v_{\text{PVC}})+(1-0.5p)\phi \\ &= 0.5p\phi-0.5p(v_{\text{OVC}}-v_{\text{PVC}})=0.5p(v_{\text{PVC}}-(v_{\text{OVC}}-\phi))<0\end{aligned}$$

The pure value creator prefers an *unrestricted* bid. Indeed, with the partial bid the profit is

$$\pi_{\text{PVC}} = 0.5v_R-0.5b^* = 0.5((1-p)(v_{\text{PVC}}-v_{\text{OVC}})+(1-p)\phi).$$

It follows

$$\begin{aligned}\pi_{\text{PVC},1}-\pi_{\text{OVC},2} &= (1-p)(v_{\text{PVC}}-v_{\text{OVC}}+\phi)-0.5(1-p)(v_{\text{PVC}}-v_{\text{OVC}}+\phi) \\ &= 0.5(1-p)(v_{\text{PVC}}-v_{\text{OVC}}+\phi)>0\end{aligned}$$

The pure value creator and the opportunistic value creator have an opposing opinion about partial bids. The question is whose interests succeed.

Proposition: If partial bids are allowed then there is a unique perfect sequential equilibrium where both types bid $b^*=pv_{\text{PVC}}+(1-p)v_{\text{OVC}}$ for 50% of the shares.

First, we argue that a bid for more than 50% of the shares with a bid price of $b^*=pv_{\text{PVC}}+(1-p)v_{\text{OVC}}$ cannot be supported with consistent out-off-equilibrium beliefs.

Assume that there is a sequential equilibrium with bid price $b^*=pv_{\text{PVC}}+(1-p)v_{\text{OVC}}$ and a quorum $x>50\%$. Consider the out-off-equilibrium message $b^*=pv_{\text{PVC}}+(1-p)v_{\text{OVC}}$ and quorum 50%. As recommended in the appendix 4.12 we consider both actions "tender" and "don't tender". The equilibrium strategy at this out-of-equilibrium message cannot be "tender". In this case the OVC would have an incentive to deviate from the equilibrium and the equilibrium fails the Nash-test. However, "don't tender" is optimal only if the beliefs are $\tau(OVC)=0,\tau(PVC)=1$. Are these beliefs consistent? These beliefs are consistent if there is an $\alpha\in BR_{b^*}(\tau)$ such that $\tau\in\mathcal{B}_m(\alpha)$. The unique best response to τ is "don't tender". We have to check whether $\tau\in\mathcal{B}_{b^*}$("don't tender"). But $\mathcal{B}_{b^*}$("don't tender") is empty as the corresponding indicator function $\lambda(\cdot,\text{"don't tender"})\equiv 0$. This leaves the possibility that $B_{b^*}(e)=\emptyset$. But, it is not. Consider the belief $\tau(OVC)=1,\tau(PVC)=0$. With this belief the optimal response of the shareholders is $\alpha=$ "tender". Furthermore, $\lambda(PCV,\text{"tender"})=0,\lambda(OCV,\text{"tender"})=1$ and therefore τ is indeed in $\mathcal{B}_{b^*}$("tender").

There is a general principle behind this result: The OVC chooses between all sequential equilibria (if there are more than one). The PVC wants to imitate the OVC since otherwise his bid fails. Thus, the PVC follows the strategy of the OVC. This is the reason why a separating equilibrium fails and also the reason why the pooling equilibrium that the OVC prefers most results.

To show that the equilibrium is indeed an equilibrium we perform the Nash test for both players.

The opportunistic player: Suppose the opportunistic player makes a partial bid $b < b^*$. The shareholders know that both players gain if the bid is accepted. Their beliefs are the a priori probabilities. With these beliefs non-acceptance is optimal. Consequently, it is not worthwhile to deviate from the equilibrium and bid $b < b^*$. If he bids higher and an restricted bid, he can't make a higher profit. Suppose the opportunist makes an unrestricted bid. In order to be better off he must bid "much" less than in the equilibrium. The shareholders however know that both bidder are better with such a lower unrestricted bid. It follows that non-acceptance is optimal. A higher unrestricted bid can't increase the profit of the opportunistic bidder. This completes the Nash test for the opportunistic bidder.

The pure value creator: As above a lower restricted bid does not work. A higher partial bid means a lower profit. Suppose the pure value creator makes an unrestricted bid that makes him better off if accepted but the OVC is worse off with this bid. Shareholders conclude that PVC has bid. In this case, any bid below v_{PVC} won't be accepted. But v_{PVC} means a profit of zero. Any bid that triggers the belief that only PVC has bid does not work. Hence, both must be better off by deviating. But this is possible only if the bid price is lower then in the equilibrium (to compensate the opportunistic bidder for deviating from the partial bid). So, we must have an unrestricted bid $b < b^*$. But if the shareholder infer that both bidders are bidding a bid $b < b^*$ then they do not accept. This completes the Nash test for the pure value creator.

It is interesting to check why the equilibrium of the proposition of the preceding subsection is not an equilibrium if partial bids are allowed. The OVC has an incentive to deviate. Suppose he deviates. He bids b^* but restricted to 50 %. The shareholders form beliefs. They determine the type of bidder that can gain relative to the equilibrium. The profit of the PVC is lower than in the proposed equilibrium. The profit of the OVC is larger. The shareholders conclude that OVC has bid. Furthermore, the bid price $b^* = pv_{\mathrm{PVC}} + (1-p)(v_{\mathrm{OVC}} - \phi)$ is larger than the post takeover public value $(v_{\mathrm{OVC}} - \phi)$ of a share. The optimal strategy of the shareholders is to tender. Consequently, the OVC has an incentive to deviate and the strategies fail the Nash-test.

4.11 Conclusion

The free-rider problem and the pressure-to-tender effect encircle the takeover of a widely held firm. The free-rider problem thwarts the bidder's opportunity to profit from a takeover. Minority shareholders' interests are threatened by the pressure-to-tender effect.

Several remedies of the free-rider problem and the pressure-to-tender problem have been suggested. It is a matter of opinion whether the remedies are effective. A tentative conclusion is that to remedy the pressure-to-tender problem is easier than the free-rider problem. The pressure-to-tender problem is a collective action problem that can be solved via Bebchuk's Rule, a shareholder meeting and the Zaunkönigregel. Theoretically, the free-rider problem can be solved e.g. by a squeeze-out rule. However, the fact that premiums in takeovers are high cast doubt on any remedy of the free-rider problem.

The most plausible remedy of the free-rider problem is dilution. Private benefits allow to profit from a takeover. Furthermore – and probably the most important argument – the gain of the bidder is "invisible". If the bidder's profit is in the form of private benefits then the public value of the bidder remains unchanged. The latter is one of the stylized facts: The bidder's public value measured by the share price is approximately zero.[65] Even though dilution is the most plausible remedy to the free-rider problem, we argued that an amendment to the charter wittingly allowing dilution of a certain size is unpractical. Consequently, we have to rely on the ability of the *rival* to find a dilution technique.

The models of Schuster and Yilmaz combine the free-rider problem and the pressure-to-tender effect. The central insight of this model is that a takeover where the bidder cannot dilute may succeed. This happens as the pure value

[65] The author is unaware of any other source that makes this argument.

creator mimics the opportunistic value creator. As above, dilution – here in the form of some opportunistic value creators – is necessary to facilitate takeovers.

4.12 Appendix: The Refinement of Grossman and Perry

This subsection defines the equilibrium refinement of Grossman and Perry (1986). This refinement is popular in financial economics.

4.12.1 The Signaling Game

The Game: The signalling game consists of the following elements: (1) Nature draws the type t of player 1 (the sender) according to a density function $\pi \in \Delta T$, where T is a finite set and ΔT denotes all probability measures on T. It is assumed that for all $t \in T$ it holds $\pi(t) > 0$.
(2) Player 1 having observed his type $t \in T$ sends a message $m \in M$, where M is a finite set and ΔM denotes all probability measures on M.
(3) Player 2 (the receiver) having observed the message m but not the type of the sender chooses an action $a \in A$.
(4) The payoffs are $u(t, m, a)$ and $v(t, m, a)$ for the sender resp. the receiver.

A (behavior)(mixed) strategy of the sender is a family of distributions $p = (p_t \in \Delta M, t \in T)$. Similarly, $q = (q_m \in \Delta A, m \in M)$ is the (behavior)(mixed) strategy of the receiver. Beliefs of the receiver are denoted by $\tau = (\tau_m \in \Delta T, m \in M)$. We write

$$u(t, p_t, q) := \sum_{m,a} p_t(m) q_m(a) u(t, m, a)$$

for the expected payoff of the sender of type t if he sends signals according to $p_t \in \Delta M$ and the receiver plays the strategy q. Similarly, we write

$$v(\tau, m, \alpha) = \sum_{t,a} \tau(t)\alpha(a) v(t, m, a)$$

for the expected payoff if the receiver has beliefs $\tau \in \Delta T$ and plays $\alpha \in \Delta A$.

$BR_t(q)$ is the set of best responses to q of a sender of type t. $BR_m(\tau)$ is the set of best responses of the receiver who has received the signal m and has beliefs

τ. We define

$$\tau_m^p(t) := \frac{\pi(t)p_t(m)}{p(m)},$$

if $p(m) \neq 0$, where $p(m) = \sum_t \pi(t)p_t(m)$. $\tau_m^p(t)$ constitutes Bayesian up-dating induced by the strategy p if the messages m was send. Naturally, Bayesian up-dating is only defined for messages sent with positive probability.

Definition: A **sequential equilibrium** is a triple (p, q, τ) such that

$$p_t \in BR_t(q), t \in T,$$

$$q_m \in BR_m(\tau_m), m \in M,$$

$$\tau_m = \tau_m^p, m \in M, p(m) > 0.$$

The "problem" with a the sequential equilibrium is that it does not restrict the beliefs for messages m off the equilibrium, i.e. for messages m with $p(m) = 0$. However these beliefs may be important as they trigger certain tactics suboptimal: When performing the Nash test one refers to deviating behavior and therefore to unsent messages. The consequences are that some equilibria are merely supported by "strange" beliefs. Refinements are tools that erase equilibria. Probably, the theme of refinements is the most disputed area of game theory. At any rate there is no consensus which refinement to use.

> *So what is the bottom line for refinements of Nash equilibrium? The philosophy espoused here can be paraphrased as: The bottom line is that there is no simple bottom line.* (Kreps (1990, 495))

This appendix explains the refinement of Grossman and Perry (1986) as it is popular in financial economics.

4.12.2 The Refinement

The Refinement of Grossman and Perry uses forward induction in addition to backward induction. When using backward induction a player bases his decision on calculation about what his opponents will rationally play later. We use forward induction to analyze what could have rationally happened previously.[66]

[66] Mas-Colell, Whinston and Green (1995, 292) offer a textbook treatment of forward induction. Van Damme (1991) is authoritative.

Consider a sequential equilibrium $e = (p, q, \tau)$ of the signalling game. Fix for a moment a specific message m that is not send in equilibrium: For all $t \in T$ it holds $p_t(m) = 0$. For a (mixed) strategy α of the receiver we define the "indicator" function

$$\lambda(t, \alpha) := \begin{cases} 0 & \text{if } u(t, m, \alpha) < u_e(t), \\ 1 & \text{if } u(t, m, \alpha) > u_e(t), \\ \in [0, 1] & \text{if } u(t, m, \alpha) = u_e(t). \end{cases}$$

This function has the following interpretation.

> **Heuristic 1:** The receiver receives the unexpected signal m. Furthermore, the receiver thinks that the sender presumes that the receiver will play α. In this circumstance the receiver will attach no (some) likelihood to those types $t \in T$ that lose (gain) from deviating from equilibrium and this fact is captured by the function λ. Finally, it attaches some probability to those types that are indifferent between deviating and not deviating.

Define the set $\mathcal{B}_m(\alpha)$ as follows $\mathcal{B}_m(\alpha) := \{\mu \in \Delta T | \quad \exists\, c > 0 : \mu(\cdot) = c\, \lambda(\cdot, \alpha)\, \pi(\cdot)\}$. $\mathcal{B}_m(\alpha)$ is empty if $\lambda(t, \alpha) = 0$ for all $t \in T$. This set has the following interpretation.

> **Heuristic 1':** In the considered circumstance the receiver thinks that the sender presumes that the receiver will play α. The posterior belief that the sender is of type t is then given by
>
> $$\mu(t) = \frac{\pi(t)\lambda(t, \alpha)}{\sum_{t' \in T} \pi(t')\lambda(t', \alpha)}. \tag{4}$$
>
> The sum in the denominator is the sum of the priories of those types that gain from deviating (where the probabilities of indifferent types are multiplied with a certain weight). Thus the probability in (4) is a Bayesian up-dating, recognizing the rationalization of the heuristic 1.

In order to reconcile the heuristic 1' with the definition of $B_m(\alpha)$ set $c := 1/(\sum_{t' \in T} \pi(t')\lambda(t', \alpha))$.

Definition: A belief $\mu \in \Delta T$ is called **consistent** at m with e if there exists an $\alpha \in BR_m(\mu)$ such that $\mu \in \mathcal{B}_m(\alpha)$. We denote the set of belief consistent at m with e by $\mathcal{B}_m(e)$.

> **Heuristic 2:** Consistent beliefs can be explained by the following **speech** of the sender: Dear Receiver! You received an unexpected messages m. First note that I am not stupid! I have deviated from the equilibrium therefore I must have something in mind. You can conclude that I do not expect to lose by deviation. When deviating I had some idea about your reaction. Your reaction will be clever, i.e. rational with respect to certain beliefs. If you put these fact together you can conclude that (1) your response should be best given your beliefs and (2) these beliefs should recognize that my type must be of kind that profits by deviating while anticipating your best response according to (1).

Consistency Check: In general the procedure for the verification of consistency run as follows: Consider an unsent message and the corresponding believe. For this belief calculate all best responses. For all these responses calculate (using the function λ) the beliefs that are supported by these responses, i.e. beliefs of the form (4). Is the belief you started with one of them? "Yes" $\rightarrow$ "Fine". "No" $\rightarrow$ "Is $\mathcal{B}_m(e)$ empty?". If it is empty then the criteria of perfectness is empty $\rightarrow$ "Fine". If it is non-empty then the equilibrium is not perfect.

Consistency Check if there are only two α's: In the takeover game of section 4.10 we had the case that only two actions of the receiver were possible, viz. "accept" and "don't accept". In this case there is a more straight forward way to determine consistent beliefs resp. to determine properties of consistent beliefs. Suppose the receiver's action set contains only two elements α_1 and α_2. For both αs we calculate $B_m(\alpha_i)$. A belief $\tau_i \in B_m(\alpha_i)$ is consistent if $\alpha_i \in BR_m(\tau_i)$.

Definition: A *perfect sequential equilibrium* is a sequential equilibrium (p, q, τ) such that

$$\tau_m \in \mathcal{B}_m(e) \text{ whenever } \mathcal{B}_m(e) \neq \varnothing.$$

Remark. Suppose $e = (p, q, \tau)$ is a perfect equilibrium and consider an unsent message m, i.e. for all $t \in T$ it holds $p_t(m) = 0$. Since the equilibrium is perfect either $\mathcal{B}_m(e) = \emptyset$ or $\tau_m \in \mathcal{B}_m(e)$ holds. Assume the latter is the case and additionally $BR_m(\tau_m) = \{q_m\}$, i.e. the best response of the receiver to m given the belief τ_m is unique. In this case q_m must be the equilibrium move of e at m since e would not be a sequential equilibrium otherwise. As a consequence

$u(t, m, q_m) = u_e(t)$ for all t such that $\tau_m(t) \neq 0$. Indeed, it is not possible that $u(t, m, q_m) > u_e(t)$ (see the definition of λ where it is possible in general). In this case the sender would have incentive to deviate from the equilibrium strategy, i.e. the equilibrium would fail the Nash test. Suppose the cardinality of $BR_m(\tau_m)$ is larger than 1 and denote by $\alpha_{m,e}$ the equilibrium move. Of course $\alpha_{m,e} \in BR_m(\tau_m)$. However, it is possible that $\tau_m \notin \mathcal{B}_m(\alpha_{m,e})$ but $\tau_m \in \mathcal{B}_m(\alpha)$ where $\alpha \neq \alpha_{m,e}, \alpha \in BR_m(\tau_m)$. I find this odd. Why should we use different actions at a certain information set for the Nash test respectively for the check of consistency. I would argue that the action used in the Nash test, i.e. the action of the equilibrium is also the action used for consistency check.

Definition: A *strict perfect sequential equilibrium* is a sequential equilibrium (p, q, τ) such that for all out-of-equilibrium messages m it holds

$$\tau_m \in \mathcal{B}_m(e) \text{ whenever } \mathcal{B}_m(e) \neq \varnothing \text{ and } \tau_m \in \mathcal{B}_m(\alpha_m).$$

4.13 Appendix: Mathematics of the Finite Shareholder Case

4.13.1 Close formula for the expected profit

We derive a close formula for the expected profit of the bidder. The profit of the bidder is

$$\begin{aligned}
&\left(\sum_{l=K}^{N} l \binom{N}{l} p^l (1-p)^{N-l}\right)(v_R - b) \\
&= \left(\sum_{l=K}^{N} l \binom{N}{l} p^l (1-p)^{N-l}\right) v_R - \left(\sum_{l=K}^{N} l \binom{N}{l} p^l (1-p)^{N-l}\right) b \\
&= pN \left(\sum_{l=K-1}^{N-1} \binom{N-1}{l} p^l (1-p)^{N-l-1}\right) v_R \\
&\quad -pN \left(\sum_{l=K-1}^{N-1} \binom{N-1}{l} p^l (1-p)^{N-l-1}\right) b \\
&= pN \left(\sum_{l=K-1}^{N-1} \binom{N-1}{l} p^l (1-p)^{N-l-1}\right) v_R \\
&\quad -pN \binom{N-1}{K-1} p^{K-1}(1-p)^{N-K} v_I - pN \sum_{l=K}^{N-1} \binom{N-1}{l} p^l (1-p)^{N-1-l} v_R \\
&= pN \binom{N-1}{K-1} p^{K-1}(1-p)^{N-K}(v_R - v_I) \\
&= K \binom{N}{K} p^K (1-p)^{N-K}(v_R - v_I)
\end{aligned}$$

where we used

$$\begin{aligned}
&\sum_{l=K}^{N} l \binom{N}{l} p^l (1-p)^{N-l} = \sum_{l=K}^{N} \frac{lN!}{l!(N-l)!} p^l (1-p)^{N-l} = \\
&= \sum_{l=K}^{N} \frac{N!}{(l-1)!(N-l)!} p^l (1-p)^{N-l} = N \sum_{l=K}^{N} \frac{(N-1)!}{(l-1)!(N-l)!} p^l (1-p)^{N-l} \\
&= N \sum_{l=K-1}^{N-1} \frac{(N-1)!}{l!(N-l-1)!} p^{l+1} (1-p)^{N-l-1} = \\
&= pN \sum_{l=K-1}^{N-1} \binom{N-1}{l} p^l (1-p)^{N-l-1}
\end{aligned}$$

and

$$\sum_{l=K-1}^{N-1} \binom{N-1}{l} p^l (1-p)^{N-1-l} b$$
$$= \binom{N-1}{K-1} p^{K-1} (1-p)^{N-K} v_I + \sum_{l=K}^{N-1} \binom{N-1}{l} p^l (1-p)^{N-1-l} v_R$$

4.13.2 A formulae for the probability to Tender

The typical shareholder is indifferent between "tender" and "don't tender" if

$$\underbrace{\left(p^e \binom{N-2}{N-2} p^{N-2}(1-p)^0\right) b}_{N-1 \text{ tender}}$$
$$+ \underbrace{\left(p^e \binom{N-2}{N-3} p^{N-3}(1-p)^1 + (1-p^e)\binom{N-2}{N-2} p^{N-2}(1-p)^0\right) b}_{N-2 \text{ tender}}$$
$$+ \underbrace{\left(p^e \binom{N-2}{N-4} p^{N-4}(1-p)^2 + (1-p^e)\binom{N-2}{N-3} p^{N-3}(1-p)^1\right) v_I}_{N-3 \text{ tender}}$$
$$+\text{Prob(less than } N-3 \text{ of the others tender)} v_I$$
$$= \underbrace{\left(p^e \binom{N-2}{N-2} p^{N-2}(1-p)^0\right) v_R}_{N-1 \text{ tender}}$$
$$+ \underbrace{\left(p^e \binom{N-2}{N-3} p^{N-3}(1-p)^1 + (1-p^e)\binom{N-2}{N-2} p^{N-2}(1-p)^0\right) v_I}_{N-2 \text{ tender}}$$
$$+\text{Prob(less than } N-2 \text{ of the others tender)} v_I$$

It follows

$$\left(p^e \binom{N-2}{N-2} p^{N-2}(1-p)^0\right) b$$
$$+ \left(p^e \binom{N-2}{N-3} p^{N-3}(1-p)^1 + (1-p^e)\binom{N-2}{N-2} p^{N-2}(1-p)^0\right) b$$
$$= \left(p^e \binom{N-2}{N-2} p^{N-2}(1-p)^0\right) v_R$$
$$+ \left(p^e \binom{N-2}{N-3} p^{N-3}(1-p)^1 + (1-p^e)\binom{N-2}{N-2} p^{N-2}(1-p)^0\right) v_I$$

or

$$\begin{aligned}&\left(p^e p^{N-2} + p^e(N-2)p^{N-3}(1-p) + (1-p^e)p^{N-2}\right) b\\ &= \left(p^e p^{N-2}\right) v_R + \left(p^e(N-2)p^{N-3}(1-p) + (1-p^e)p^{N-2}\right) v_I\end{aligned}$$

or

$$\begin{aligned}&(p^e p + p^e(N-2)(1-p) + (1-p^e)p)\, b\\ &= p^e p v_R + (p^e(N-2)(1-p) + (1-p^e)p)\, v_I\end{aligned}$$

or

$$\begin{aligned}
& pb + p^e(N-2)(1-p)b = p^e p v_R + \ p^e(N-2)(1-p)v_I + (1-p^e)pv_I\\
\Leftrightarrow\ & pb + p^e(N-2)b - p^e(N-2)pb\\
& = p^e p v_R + \ p^e(N-2)v_I - \ p^e(N-2)pv_I + (1-p^e)pv_I\\
\Leftrightarrow\ & p(b - p^e(N-2)b) + p^e(N-2)b\\
& = p(p^e v_R - \ p^e(N-2)v_I + (1-p^e)v_I) + \ p^e(N-2)v_I\\
\Leftrightarrow\ & p(p^e v_R - \ p^e(N-2)v_I + (1-p^e)v_I - b + p^e(N-2)b)\\
& = p^e(N-2)b - \ p^e(N-2)v_I\\
\Leftrightarrow\ & p(p^e v_R - \ p^e(N-2)v_I + (1-p^e)v_I - b + p^e(N-2)b)\\
& = p^e(N-2)(b - v_I)\\
\Leftrightarrow\ & p(p^e v_R + (1-p^e)v_I - b + p^e(N-2)(b-v_I)) = p^e(N-2)(b-v_I)\\
\Leftrightarrow\ & p\left(\frac{p^e v_R + (1-p^e)v_I - b}{p^e(N-2)(b-v_I)} + 1\right) = 1\\
\Leftrightarrow\ & p = \frac{1}{\frac{p^e v_R + (1-p^e)v_I - b}{p^e(N-2)(b-v_I)} + 1} = \frac{1}{1 + \frac{v_R - v_I - \frac{b-v_I}{p^e}}{(N-2)(b-v_I)}}.
\end{aligned}$$

4.13.3 Maple procedure

We sketch the maple procedure (ignoring some print commands): Firstly, the profit π^e_{N-1} (denoted by `profit`) and the constraint for b (denoted by `b`) are defined. Next, the maximum profit for the cases $p^e = 0, 1$ and the profit if the bidder choose $K = N$ are displayed. The rest of the programm solves the optimization problem for $K = N-1$ (the command is `A:=[maximize(f(x),x=0..1,'location')]`) and compares this solution with the solution for $K = N$ and picks the better.

```
noise := proc(vi,vr,N,pe)
```

```
local profit, b, f, A, xopt, profitopt: profit := (pe,p,N,vi,vr,b)
-> (pe*p^(N-1)*N+pe*p^(N-2)*(1-p)*(N-1)^2 +
(1-pe)*p^(N-1)*(N-1))*(vr-b): b:=(pe,p,N,vi,vr)->(pe*p*vr +
(pe*(N-2)*(1-p) + (1-pe)*p)*vi)/(pe*p + pe*(N-2)*(1-p) +
(1-pe)*p);

printf(  "profit if pe=1"   ); print(N*(vr-vi)); printf(  "profit
if pe=0"   ); print((N-1)*(vr - vi)); printf(  "profit if 0<pe<1
and K=N"   ); print(evalf(N*pe*(vr-vi)));

f := x ->  profit(pe,x,N,vi,vr,b(pe,x,N,vi,vr)):

printf(  "optimal p if 0<pe<1 and K=N-1"   ); A :=
[maximize(f(x),x=0..1,'location')];print(A); xopt :=
op(2,op(1,op(1,op(1,op(2,A))))):

printf(  "optimal profit if 0<pe<1 and K=N-1"   );
print(evalf(profit(pe,xopt,N,vi,vr,b(pe,xopt,N,vi,vr)))); printf(
"optimal profit if 0<pe<1"   );
profitopt:=max(profit(pe,xopt,N,vi,vr,b(pe,xopt,N,vi,vr)),
evalf(N*pe*(vr-vi)));

print(profitopt); printf(  "bid price if 0<pe<1 and K=N-1"   );
print(evalf(  b(pe,xopt,N,vi,vr) )); printf(  "premium  if 0<pe<1
and K=N-1"   ); print(evalf(  (b(pe,xopt,N,vi,vr)-vi)/vi ));
printf(  "probability p if 0<pe<1 and K=N-1 (copmare with p above
)"   ); print(1/(1+(pe*vr + (1-pe)*vi - b(pe,xopt,N,vi,vr))/
(pe*(N-2)*(b(pe,xopt,N,vi,vr) - vi))  )); printf(  "loss of profit
relative to pe=0"   ); print((profitopt - (N-1)*(vr -
vi))/((N-1)*(vr - vi)));

end:

prof := proc(pe)

local b, g, A, xopt, profitopt, pro, vi, vr, N, result; vi:=1:
vr:=2: N:=25;

pro := (pe,p,N,vi,vr,b) -> (pe*p^(N-1)*N+pe*p^(N-2)*(1-p)*(N-1)^2
+ (1-pe)*p^(N-1)*(N-1))*(vr-b):

b:=(pe,p,N,vi,vr)->(pe*p*vr + (pe*(N-2)*(1-p) +
(1-pe)*p)*vi)/(pe*p + pe*(N-2)*(1-p) + (1-pe)*p):

g := x ->  pro(pe,x,N,vi,vr,b(pe,x,N,vi,vr)): A :=
[maximize(g(x),x=0..1,'location')]: xopt :=
op(2,op(1,op(1,op(1,op(2,A))))): profitopt :=
```

```
max(pro(pe,xopt,N,vi,vr,b(pe,xopt,N,vi,vr)),
 evalf(N*pe*(vr-vi))):
result := profitopt: end proc:
```

SECTION 5

Ex-Ante Incentives of Takeover Specialists

5.1 Motivation

So far we did not discuss how the bidder found the value improvement. The value improvement was taken as given; either as a parameter or as an exogenous random variable. In this section we assume that strategies to improve the value of the target or techniques to extract private benefits must be produced like (m)any other good(s). We assume that there are agents that specialize on takeovers. These firms try to find possible targets and strategies to improve the target's value. Takeover specialists may search for value increasing strategies or/and for dilution opportunities.

On the one hand, a bidder who has to pay the post-takeover public value of a share won't gain from a pure value improvement. This dilutes his incentive to search for value increasing strategies. On the other hand, if he searches for dilution opportunities only he can't win a takeover contest; at least not if any device, that renders minority exploiting takeovers impossible, is applied. The main conclusion of the basic model is: takeover specialists search for a complementary combination of a value improvement and a dilution strategy.

Compared with first-best incentives this outcome is inefficient. If the bidder were able to appropriate the complete value improvement then he would reallocate resources from searching dilution techniques to searching value improvements. Searching for dilution is a kind of rent-seeking, as dilution is a redistributive activity. Here, "rent seeking" is necessary to compensate the bidder for his searching costs.

5.2 Basic Model

We assume that the value improvement and/or the dilution technique must be produced. We call a producer of such "goods" a *takeover specialist.* The takeover specialist is not necessarily the future bidder or acquirer of the target. It could be a department of an investment bank or a section of a firm. In this case the takeover specialist acts as an intermediary. We will ignore this separation and assume that the takeover specialist actually acquires the target.

Initially, the value of the target is v_I. The takeover specialist can find measures that increase the value of the target by $\Delta v = v_R - v_I$ if he invests $c_1(\Delta v)$ for research. Similarly, if he invests the amount $c_2(\phi_R)$ he can find a technique to extract a private benefit of ϕ_R. We assume that the functions c_i are twice differentiable and strictly concave: $c_i \in C^2$, $c_i(0) = 0$ and $0 < c_i', c_i''$.

The bidder (the takeover specialist) has to bid at least the post-takeover public value of a share. Furthermore, we assume that the bidder must bid at least v_I to prevent a counter-bid. The objective of the bidder is

$$v_R - b - c_2(\phi) - c_1(v_R - v_I).$$

The takeover specialist maximizes this objective subject to the constraints

$$\begin{aligned} b &\geq v_R - \phi_R, \\ b &\geq v_I. \end{aligned}$$

The first order conditions of this optimization problem are[67]

$$\begin{aligned} 0 &= 1 - c_1'(\Delta v) - \mu_1, \\ 0 &= -c_2'(\phi) + \mu_1, \\ 0 &= -1 + \mu_1 + \mu_2. \end{aligned}$$

and the complementary slackness conditions are

$$0 = \mu_1(b - v_R + \phi) = \mu_2(b - v_I).$$

Form the second first order condition we deduce $\mu_1 > 0$. Hence $b = v_R - \phi$. Suppose $\mu_2 = 0$. It follows $\mu_1 = 1$ and $c'(\Delta v) = 0$. But $c'(\Delta v) > 0$ and consequently $\mu_2 \neq 0$. Therefore $b = v_I$. We obtain the main conclusion of this subsection if we equate the two equations for b:

$$\Delta v = \phi_R, \tag{5}$$

i.e. the dilution equals the value improvement. In the terminiolgy of section 4.10 the takeover specialist is a pure opportunistic value creator. He creates a value added but he also develops a technique to appropriate this value improvement.

[67] The Lagrangian is $\mathcal{L} = v_R - b - c_2(\phi) - c_1(v_R - v_I) + \mu_1(b - (v_R - \phi_R)) + \mu_2(b - v_I)$

Because of $b = v_R - \phi_R$ we can rewrite the profit of the takeover specialist $v_R - b - c_2(\phi) - c_1(v_R - v_I) = \phi_R - c_2(\phi) - c_1(v_R - v_I)$. Hence, he profits form the private benefit ϕ_R only. Increasing the private benefit has two effect: it eases the takeover as the bid price decreases and it ends up in the purse of the bidder. The higher value improvement is necessary to enable the bidder to increase the private benefit. In itself, the value improvement is valueless for the bidder. In the basic model any unit of private benefit is accompanied by *one* unit of value improvement.

With the use of the first order condition and the equation (5) we derive

$$\begin{aligned} & c_1'(\Delta v) + c_2'(\Delta v) = 1 \\ \Leftrightarrow \quad & c_1'(\Delta v) = 1 - c_2'(\Delta v) = 1 - \mu_1. \end{aligned} \tag{6}$$

This equation characterizes the optimal value improvement. It is instructive to interpret this equation. The left hand side equals the marginal cost of improving the firm's value. The right hand side resembles a marginal benefit. The first term is the direct marginal benefit of the value improvement. The second term lowers the marginal benefit. The aggregate marginal benefit is lower as any value improvement requires a unit of dilution.

It is intuitive that the effort made to develop a dilution technique is waste. If the bidder were able to appropriate any value improvement he produces then the optimization problem would be

$$v_R - v_I - c_2(\phi_R) - c_1(v_R - v_I).$$

The solution is $\phi^* = 0$ and $c_1'(\Delta v^*) = 1$. From the first order condition $c_1'(\Delta v^*) = 1$ and equation (6) we deduce that $\Delta v^* > \Delta v$. Hence, the effort made to develop a dilution technique causes an efficiency loss of $\Delta v^* - \Delta v$. The size of the efficiency loss depends on the marginal cost of developing dilution tools and the marginal cost of creating value.

We can rewrite the first first order condition: $c_1'(\Delta v) + \mu_1 = 1$. The left hand side equals the aggregate marginal cost of implementing a value improvement. The marginal costs consists of two parts: the direct marginal costs (the first term) and the *marginal cost caused by the free-rider problem.* Indeed, μ_1 is the multiplier of the inequality $b \geq v_R - \phi_R$ and measures the marginal cost associated with this constraint. The inequality $b \geq v_R - \phi_R$ expresses the free-rider problem:

the bidder has to bid the post takeover public value of a share. In this sense it is legitimate to call μ_1 *the shadow price of the free-rider problem.*

5.3 Copying the Value Improvement

In its basic form the model does not fit with empirical evidence. It is well known that the bid price is higher than the pre-bid price of the shares. In the basic model the bidder bids $v_R - \phi = v_I$, i.e. the bid price equals the pre-bid price which contradicts stylized facts. We augment the basic model and assume that some parts of the measures the bidder wants to implement become public knowledge. Therefore, a second bidder may increase the value of the firm by $\chi\Delta v$. The parameter $0 < \chi < 1$ models the ease with which value improving measures can be copied. The magnitude of χ depends among other things on the informational requirements on a tender offer. These requirements are usually considered to be very demanding. The value of χ also depends on whether specific abilities of the bidder are necessary to implement the measures. We assume that dilution techniques are private information of the bidder. Because of the nature of private benefits this is plausible.

An imitator can bid at most $v_I + \chi\Delta v$. Therefore, the takeover specialist has to take the constraint $b \geq v_I + \chi\Delta v$ into account. The optimization problem of the takeover specialist becomes:

$$\begin{aligned} \text{maximize} \quad & v_R - b - c_2(\phi_R) - c_1(v_R - v_I) \\ \text{s.t.} \quad & b \geq v_R - \phi_R \\ & b \geq v_I + \chi\Delta v \end{aligned}$$

The first constraint stems from the free-rider problem, the second results form the need to preempt counter-bids. We deduce the following FOC[68] and complementary slackness conditions:

$$\begin{aligned} 0 &= 1 - c_1'(\Delta v) - \mu_1 - \mu_2\chi \\ 0 &= -c_2'(\phi_R) + \mu_1 \\ 0 &= -1 + \mu_1 + \mu_2 \\ 0 &= \mu_1(b - v_R + \phi_R) \\ 0 &= \mu_2(b - v_I - \chi\Delta v) \end{aligned}$$

[68]The Lagrangian is $\mathcal{L} = v_R - b - c_2(\phi_R) - c_1(v_R - v_I) - \mu_1(v_R - \phi_R - b) - \mu_2(v_I + \chi(v_R - v_I) - b)$.

Firstly, we prove $\mu_2 \neq 0$. Assume otherwise, i.e. $\mu_2 = 0$. The third FOC implies $\mu_1 = 1$. Thus $c_1'(\Delta v) = -\mu_2\chi$ and $\mu_2 \neq 0$ which is a contradiction. $\mu_2 \neq 0$ implies that $b = v_I + \chi\Delta v$. Of course $\mu_1 \neq 0$ and therefore $v_R - \phi_R = v_I + \chi\Delta v$ or

$$(1-\chi)\Delta v = \phi_R. \tag{7}$$

Hence, the value improvement equals $\Delta v = \frac{\phi_R}{1-\chi} > \phi_R$.

If $0 < \chi$ holds – i.e. the second bidder can partially copy the measures of the first bidder – then the *multiplier*

$$\frac{\Delta v}{\phi_R} = \frac{1}{1-\chi}$$

is larger than 1. The intuition is as follows: Suppose the first bidder can increase the value of the target by 100 and a second bidder can achieve 30% of this value enhancement, i.e $\chi = 0.3$. If the first bidder offers a premium of less than 30% then the second bidder can launch a counter bid. The first bidder offers a premium of 30% (plus a marginal ε) to preempt a bid of the second bidder. In order to profit from the takeover he matches the remaining 70% with dilution, i.e. $(1-0.7)100 = 30$.

Finally, we have[69]

$$(1-\chi)(1-c_2'((1-\chi)\Delta v)) = c_1'(\Delta v). \tag{8}$$

This equation implicitly determines the value improvement Δv. We can rewrite the equation (8):

$$(1-\chi)(1-\mu_1) = c_1'(\Delta v).$$

The equation corresponds to equation (6) of the basic model. It differs as it includes the factor $1-\chi$. In principle, the marginal cost of the value improvement Δv should equal the improvement's marginal benefit which is one. Because of the free-rider the marginal benefits must reduced by the shadow price of the free-rider

[69] Indeed

$$\begin{aligned} & 1 - c_1'(\Delta v) - c_2'((1-\chi)\Delta v) - \mu_2\chi = 0 \\ \Rightarrow\ & 1 - c_1'(\Delta v) - c_2'((1-\chi)\Delta v) - \chi(1-\mu_1) = 0 \\ \Rightarrow\ & (1-\chi)(1-c_2'((1-\chi)\Delta v)) = c_1'(\Delta v). \end{aligned}$$

problem. Because of the leakage of information they are further reduced by the factor $1-\chi < 1$.

As in the basic model the bid price is $v_R - \phi_R$. Hence, the profit is also $\phi_R - c_2(\phi_R) - c_1(v_R - v_I)$. The bidder profits to the extent that he creates private benefits. However, there is a difference to the basic model. Here, any unit of private benefit is accompanied by $\frac{1}{1-\chi}$ units of value improvement (see equation (7)). In the next subsection we analyze the effect of χ on the decision of the takeover specialist.

5.4 Information Requirements and Imitators

In all jurisdictions the bidder must inform the public about his intention after the completion of the takeover. It is usually assumed that more information is better for shareholders. Shareholders are put into the position to make an informed decision. However, one might expect that more information – an increase of χ – is bad for the incentive to produce value improving measures. More information allows imitators to copy more of the takeover specialist's ideas. This dilutes his incentives to search for value-increasing measures in the first place. It is therefore surprising that more information may improve incentives.

If the regulator increases χ then imitation is easier. The takeover specialist faces a more intense bidding competition. The main results of this subsection are: (1) Increasing competition may improve incentive. (2) Too much competition erodes incentives.

To prove this we apply the implicit function theorem to the equation (8):

$$\frac{\partial \Delta v}{\partial \chi} = \frac{c_2'((1-\chi)\Delta v) - 1 + (1-\chi) \cdot c_2''((1-\chi)\Delta v) \cdot \Delta v}{(1-\chi) \cdot (c_2''((1-\chi)\Delta v)) \cdot (1-\chi) + c_1''(\Delta v)}$$

The denominator is always positive. The signature of $\frac{\partial \Delta v}{\partial \chi}$ is determined by the signature of the numerator. It is positive if

$$(1-\chi) \cdot c_2''((1-\chi)\Delta v) \cdot \Delta v > 1 - c_2'((1-\chi)\Delta v) = \mu_1.$$

If $\chi < 1$ then a positive effect $\frac{\partial \Delta v}{\partial \chi} > 0$ of χ on the incentive is possible. The interpretation is as follows. There is a complementariness between ϕ_R and Δv described by equation (7). For every unit of ϕ_R the bidder needs $\frac{1}{1-\chi}$ units of Δv.

If the legislator increases χ the multiplier increases. Hence, the bidder can appropriate a certain value of ϕ_R only with a larger value improvement (we call this effect the *multiplier effect*). This mechanism induces a positive effect of χ on Δv. However, a higher χ makes bidding more expensive: the bidder faces the constraint $b \geq v_I + \chi \Delta v$ (we call this the *cost effect*). The latter effect lowers the incentive to search for value improving measures. We conclude that there are two opposing effects and a hump shaped curve is possible, with a positive effect for small χ and a negative effect for large χ. Indeed, if $\chi = 1$ the left hand side is zero and the right hand side positive. Therefore the derivative is negative at the neighborhood of $\chi = 1$.

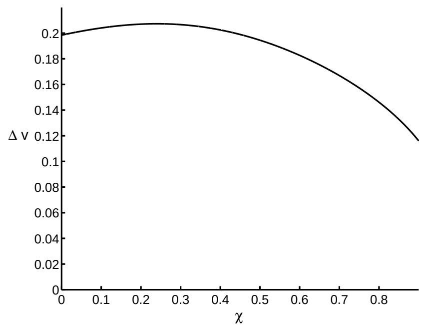

Figure 9: Some “leakage” of information is good for incentives.

To verify that a hump shaped relationship between Δv and χ is possible, we consider the following example: Assume that the cost function is the function $c(x) = x^4$. The condition (8) becomes[70]

$$\begin{aligned} & (1-\chi)(1-4a(1-\chi)^3\Delta v^3) = 4a\Delta v^3 \\ \Leftrightarrow \quad & \Delta v^3 = \frac{1}{4a}\frac{1-\chi}{1+(1-\chi)^4} \end{aligned}$$

The figure 9 shows the Δv as a function χ.[71] Whether the multiplier effect or the cost effect dominate is an empirical question.

[70]It holds

$$(1-\chi)(1-4a(1-\chi)^3\Delta v^3) = 4a\Delta v^3 \Leftrightarrow 1-4a(1-\chi)^3\Delta v^3 = \frac{4a}{1-\chi}\Delta v^3$$

$$\Leftrightarrow \quad 1 = 4a\left(\frac{1}{1-\chi} + (1-\chi)^3\right)\Delta v^3 \Leftrightarrow 1 = 4a\left(\frac{1+(1-\chi)^4}{1-\chi}\right)\Delta v^3 \Leftrightarrow \Delta v^3 = \frac{1}{4a}\frac{1-\chi}{1+(1-\chi)^4}.$$

[71]The matlab command is: fplot('(1/4)*((1-x)/(1+(1-x)^4))^(1/3)',[0,0.9])

5.5 Limiting Private Benefits – Ex-Ante Incentives

Suppose the legislator impedes the extraction of private benefits. What is the effect on the incentive of the takeover specialist? The optimization problem is[72]

$$\begin{aligned} \text{maximize} \quad & v_R - b - c_1(\phi_R, \rho) - c_2(\Delta v) \\ \text{s.t.} \quad & b \geq v_R - \phi_R \\ & b \geq v_I \end{aligned}$$

ρ is an auxiliary index that measures the difficulty to extract private benefits. If the legislator enacts new rules that make the extraction of private benefits more difficult – ρ increases – then the cost of finding a measure that allows to divert an amount ϕ_R increases. Thus we assume $\frac{\partial c_1}{\partial \rho} > 0$. As in the basic model it holds $\Delta v = \phi_R$. It follows

$$1 = c_2'(\Delta v) + c_1'(\Delta v, \rho).$$

With the implicit function theorem we obtain

$$\frac{\partial \Delta v}{\partial \rho} = -\frac{c''_{1\rho}(\Delta v, \rho)}{c''_{2\Delta v}(\Delta v) + c''_{1\Delta v}(\Delta v, \rho)} < 0.$$

Consequently, if the regulator hampers the extraction of private benefits then value improvement are also hampered.

5.6 Asymmetric Information & Incentives

In this subsection we assume that the value improvement and the private benefit are private information of the takeover specialist, i.e. the shareholder don't know what kind of takeover specialist they face. We assume that there are many takeover specialists and many potential targets. Shareholders form their expectations using "market averages" $\overline{v}_{\text{PVC}}$, $\overline{v}_{\text{OVC}}$ and $\overline{\phi}$. They also use an estimate of p. If the expectation are determined by market averages so is the bid price $b^* = pv_{\text{PVC}} + (1-p)(v_{\text{OVC}} - \phi)$ a specific takeover specialist has to pay. Hence, for a typical takeover specialist the bid price is exogenous. In this sense he acts as a price taker.

[72] The first order condition and the complementary slackness conditions are

$$\begin{aligned} 0 &= 1 - c_2'(\Delta v) - \mu_1, 0 = -c_1'(\phi_R, \rho) + \mu_1, \\ 0 &= -1 + \mu_1 + \mu_2, 0 = \mu_1(b - v_R + \phi_R), 0 = \mu_2(b - v_I) \end{aligned}$$

5.6.1 Model 1

As in section 5.2 we want to study the incentives of a takeover specialists to search value increasing measures and/or diversion opportunities. The takeover specialist can try to find value improving measures and diversion techniques. The profit of the takeover specialist is

$$\pi_L = v_R - b^* - c_1(\Delta v) - c_2(\phi_R).$$

We employ the same kind of research technology as in section 5.2; it is possible to search independently for dilution devices and for value increasing measures. In principle any combination of Δv and ϕ is possible. We conclude that with this kind of research technology no firm searches for diversion as the marginal revenue is zero. If information is perfect then the bidder's private benefits lowers his bid price. With private information the bidder's private benefit cannot serve this function as the bid price is exogenous for a typical takeover specialist. Consequently, he has no incentive to develop a dilution technique, i.e. he chooses $\phi = 0$. However, all takeover specialist makes the same calculations and shareholders anticipates this. As a consequence $p = 1$, there no asymmetric information, the bidder has to bid $b = v_R$ and the profit is non-positive. The market for corporate control breaks down.

The cause of the breakdown is a public good problem. Firms that decide to search for diversion exercise a positive external effect. Those firms that "supply" diversion serve as a silent threat that pure value creators indirectly use. However, no takeover specialist has an incentive to act as the "bad" guy. Here, being bad is a public good that is not supplied.

5.6.2 Model 2

In this section we assume that the takeover specialist searches for a value improvement without knowing whether he will be able to extract it as a private benefit. With probability p the value improvement cannot be extracted and with probability $1 - p$ the value improvement satisfies $\Delta v = \phi$. The objective of the takeover specialist is

$$v_R - p\, v_R - (1-p)v_I - c(\Delta v) = (1-p)(v_R - v_I) - c(\Delta v).$$

and the optimal value improvement is determined by

$$1 - p = c'(\Delta v).$$

The value improvement is not efficient. The equation (9) is similar to equation (6) and has a similar interpretation. The shareholders of the target assume that with probability p the bidder is a pure value creator. To a corresponding extend they try to free-ride. Indeed, the minimal price the shareholders accept is $pv_{\mathrm{PVC}} + (1 - p)(v_{\mathrm{OVC}} - \phi)$ and the probability p is the weight given to the free-rider case, i.e. the case where the bidder found a pure value improvement v_{PVC}. The comparison of the equations (6) and (9) suggests to identify the shadow price of the free-rider problem with the probability that the value creator *cannot* divert private benefits.

The regulator affects the probability p. If dilution techniques are relatively easy to find, i.e. if there are many ways to extract private benefits then p is small. We obtain the same result as in section 5.5: If the regulator facilitates the extraction of private benefits then the incentive for the takeover specialist improves, i.e. Δv increases.

5.7 Conclusion

An equilibrium with a high fraction of opportunistic value creators is good for the incentives of the takeover specialist. However, it is unlikely that p is high. Regulators usually try to curb the extraction of private benefits. Hence, the likelihood that a takeover specialist finds a value improvement that can be diverted is relatively small. Furthermore, individually a typical takeover specialist has no incentive to search for dilution techniques. If information is private then the bid price is determined by the market average of dilution, hence by the decisions of the other takeover specialists. The decision of a single firm has no effect on the average. Consequently, we expect a *shortage* of dilution.

The multiplier – the ratio of the value improvement and the private benefit – is one if the value improving measures cannot copied by an outsider. If some of the measures can be copied than the multiplier is larger than one. In all jurisdictions the bidder must inform the public about his intention after the completion of the takeover. It is usually assumed that more information is better for shareholders. However, one might expect that more information – an increase of χ – is bad for the incentive to produce value improving measures. More information allows imitators to copy more of the takeover specialist's ideas. This dilutes his incentives to search for value-increasing measures in the first place. We demonstrate that some informational openness is optimal if the multiplier is larger than one.

If the size of the value improvement and of the dilution is private information then the market of corporate control may break down. The cause of the break down is a public good problem. Firms that decide to search for diversion exercise a positive external effect. Those firms that "supply" diversion serve as a silent threat that pure value creators indirectly use. However, no takeover specialist has an incentive to act as the "bad" guy. Here, being bad is a public good that is not supplied. The market of corporate control does not break down if there is a positive probability that the value improvement cannot be extracted. We show that this probability can be interpreted as the shadow cost of the free-rider problem.

SECTION 6

Dominant Blockholder and Block Trades

6.1 Blocktrade: Motivation

Section 4 and 5 deal with corporations that are widely held. Widely held firms have the disadvantage of shareholder's passivity. Managers have the opportunity to extract private benefits, exert low effect and enjoy prerequisites. A way out could be the presence of a blockholder. Starting with the seminal contribution of Demsetz and Lehn (1985) many papers have studied the link between the ownership structure and variables measuring the firm's performance.[73] Morck, Shleifer and Vishny (1988), for instance, consider the relationship between inside ownership[74] and Tobin's Q (as a measure of the firm's efficiency). They find a saw-tooth shape: For low inside ownership (below 5%) the relationship is positive, for intermediate values it is negative and it is again positive if the inside ownership is larger than 25%. However, there is no consensus about the effects of the ownership structure on the firm's value. Holderness (2003) concludes in his recent survey: "First, it has not been definitely established whether the impact of blockholders on firm value is positive or negative. Second, there is little evidence that the impact of blockholders on firm value – whatever that impact may be – is pronounced".

Two opposing effects are usually discussed. On the one hand, a blockholder might be a *monitoring shareholder*. A blockholder has an incentive to monitor since he internalizes to a larger degree, than a marginal shareholder, the effects of value increasing measures. In addition, he has the power to implement a change in the corporate policy. Consider a firm with a blockholder owning e.g. 20% of the shares and assume that all other shareholders hold only a marginal number of shares. The latter don't have an incentive to infer with the decisions of the management. They won't search for value increasing measures, since they have costs and no – or only a marginal – profit. In contrast, a blockholder reaps 20 % of the improvement. The block generates some incentives to monitor and search for value increasing measures. On the other hand, the blockholder has

[73]Holderness (2003) provides a survey.

[74]Inside ownership is measured by the percentage of common stock held by the management.

the ability to extract private benefits. It is not unreasonable to assume that he operates in collusion with the management or even is part of the management. Hence, he acts as an entrenchment technique of the management. We will call such blockholders *entrenching blockholders*.[75] With this kind of blockholders the conflict of interest is between the minority shareholders and the insiders consisting of the management and the blockholder. Theory does not provide much guidance whether blockholders are entrenching or monitoring. We will discuss empirical evidence of private benefits associated with prevalence of blocks. Hence, there are entrenching blockholders. The empirical study of Barclay et al. (2001) argues that both kinds of blockholders exit.

This treatment concentrates on change-of-control transaction. In this section we analyze such transaction if there is a blockholder. On this topic the seminal theoretical contribution is Bebchuk (1994). Barclay and Holderness (1991, 1992) are the seminal empirical papers. Transfers of blocks would be hardly interesting if there were no private benefits. Indeed, block sales are used to estimate private benefits. The prevalence of private benefits also causes an obstacle to efficient allocation of control. Firstly, the incumbent management wants to be compensated for his private benefits. Secondly, minority shareholders try to free-ride the value-improvement associated with the new controller. There is a consensus in the literature that an efficient allocation of control cannot be assured. We will argue that an efficient allocation of control can be assured if one preconditions is satisfied: the *transaction* costs of financing the transfer and of bidding are negligible. Efficiency is achieved by combining the Mandatory Bid Rule with a Conditional Voting Cap.

If there is a blockholder then three cases must be considered: (1) A rival appears and the incumbent and the rival enter negotiations about a transfer of control. (2) The blockholder may sell his block to the public (the management becomes the controlling agent). (3) The incumbent conducts a buy-out. In the latter case, the controlling party does not change but the control structure changes. We will focus on the second case and sketch the other cases in section 6.3. It turns out that in the framework of this section transactions like in (2) and (3) are unlikely to take place.

In this section we assume that there is blockholder, i.e. we assume that the

[75]This terminology is similar to Barclay, Holderness and Sheehan (2001).

shareholder I owns the fraction $0 < \alpha < 1$ of the shares of the corporation A. The shareholder I could be the initial owner/founder of the firm or the manager. All other shareholders own by assumption an infinitesimally small number of shares. The rival has two opportunities to obtain control of the target: (1) The raider can negotiate a private transfer of control (accompanied by a standstill agreement) and (2) he can launch a tender offer. The latter is possible only if $\alpha < \frac{1}{2}$. *For the regulator the question arises whether the selling blockholder might keep the premium.* There is marked difference of opinion between the US and Europe (now including the UK). For the US: "It is unlikely that any American court today would reject the general proposition that controlling shareholders may obtain a premium for their shares which they need not share with other shareholders. (Hamilton, 1985, cited from Barclay et al., 1992, page 267)". In Europe – including the UK – it is a mainstream to demand a Mandatory Bid Rule in case of a change-of-control transaction. In this section we discuss the pros and cons of the Mandatory Bid Rule.

This section proceeds as follows: Firstly, we discuss the empirical approach. Block sales are very informative transactions. The seminal contribution is Barclay and Holderness (1991). Dyck and Zingales (2004) and Barclay et al. (2001) are resent studies. These studies indicate the size of the private benefits. The seminal theoretical contribution is Bebchuk (1994). We will restudy his approach and extend his analysis. We augment the model of Bebchuk by the rival's threat to launch a tender offer. This threat alters the bargaining position of the incumbent who finds it more difficult to defend his private benefits.

6.2 An Empirical Synopsis of Negotiated Transfers of Control

6.2.1 A Sketch of the Empirical Results

Before we proceed with theory we explain how private benefits are measured. We will sketch results from empirical studies. Next, we discuss shortcomings of the measure.[76]

To measure private benefits one considers the prices of the negotiated transfer-

[76] See also Dyck and Zingales (2004) for the similar but less extensive analysis.

of-control transactions and the market reaction to this transaction. The analysis of these deals allows to infer the private benefit that the purchaser anticipates. The seminal study using this measure is Barclay and Holderness (1991).

Measurement: To measure private benefits one calculates the following premia in privately negotiated block sales:

$$\text{prem} = \frac{P_{\text{transfer}} - P_{\text{market},+1}}{P_{\text{market},+1}}.$$

$P_{\text{market},+1}$ denotes the share price at the stock exchange after the change of control is announced and P_{transfer} denotes the price the purchaser of the block pays (per share). Note, that the share price after the transaction is included in the market price matters. This will be the price after the transaction is announced which is usually before the transaction is actually completed.

If a new controller pays a premium above the post takeover price then he imputes to the ownership of a share more than receiving dividends/capital gains. In the latter case he would pay only the price that marginal shareholders pay. If he pays more than the market price then he anticipates to benefit non-proportionally from his ownership. To provide an impression about the magnitude we refer to a recent study of Dyck and Zingales (2004). They analyzed block premia in a cross country study of 29 countries and 393 transactions. The following table presents these results for 6 countries. The figure presented in the table is $\alpha \cdot \text{prem}$ (in the next section we show that $\alpha \cdot \text{prem}$ is an estimate of the private benefit relative to the public value of the firm $\frac{\phi}{q}$). Obviously, the premia vary greatly. With one exception (Japan) the mean premium is always positive. The highest premium was found in Brazil. The premia are rather low in the US and the UK.

	D	Italy	S. Korea	Brazil	US	UK
prem	10 %	37 %	16 %	65 %	1%	1%

In principle, it is possible that block trades hurt minority shareholders. On the one hand, if the purchaser buys the block to loot the corporation then the minority shareholder loses. On the other hand, the new blockholder may implement a value enhancing strategy. Ultimately, it is an empirical question whether looter or value creator predominate. Barclay and Holderness (1992, 274) offer empirical evidence. They analyze the stock-price increases and find a 16% mean abnormal return in transactions with a positive premium (the average premium is 27%)

One way of acquiring a large block is to buy shares of other shareholder. There is an alternative method, viz. to buy shares in a private placement. In both cases the purchaser ends up with a non-marginal block. Hence, we might expect similar consequences for the corporate's governance and the premia should be about the same. Barclay et al. (2001) find a significant difference between the premia in block trades and in private placements. For block trades the average premium is +11% and for private placements it is -19%. If for two kinds of transactions, that result in an equivalent ownership structure, different premia are observed then the hypothesis that the blockholders differ in type is reasonable. Barclay et al. argue that entrenching blockholders become blockholders through private placements. In block trades monitoring blockholders predominates.

6.2.2 Measurement Problems

Even though the premium as defined above gives a hint on the size of the private benefit the controller anticipates, it is not a very reliable estimate. Suppose the new shareholder can extract a private benefit of ϕ_R and the value of the firm is v_R if he exercises control. The price of a share at the stock exchange after the change of control will be $v_R - \phi_R$. The premium that the bidder pays is

$$\text{prem} = \frac{p - v_R + \phi_R}{v_R - \phi_R} = \frac{p - q_R}{q_R},$$

where p denotes the price the bidder pays per share. We can rearrange the formula to obtain

$$\begin{aligned} &\Leftrightarrow \quad \phi(1 + \text{prem}) = v(1 + \text{prem}) - p \\ &\Leftrightarrow \quad \phi = \frac{v(1 + \text{prem}) - p}{(1 + \text{prem})}. \end{aligned} \tag{9}$$

The problem with this formula is that it contains two unverifiable variables – viz. ϕ and v. We need more information to identify ϕ. Also, we cannot empirically determine the ratio of the private benefits to the value of the firm $\frac{\phi}{v}$. It holds $\frac{\phi}{v} = \frac{1+\text{prem}-p}{v(1+\text{prem})}$ and v is unobservable.

With additional assumptions it is possible to infer the private benefit. Assume that the incumbent receives the complete benefit of the transaction, i.e. he has all the bargaining power and the rival pays his reservation price. We can decompose the value of the firm as follows:

$$v_R = \alpha(v_R - \phi_R) + \phi_R + (1 - \alpha)(v_R - \phi_R)$$

The first term equals the public value of the $\alpha-$block, the second term equals private benefits and the third term equals the public value a share that is widely held. Because of the assumption that all the bargaining power is with the incumbent it holds $\alpha p = \alpha(v_R - \phi_R) + \phi_R$. It follows

$$v_R = \alpha p + (1-\alpha)(v_R - \phi_R).$$

As we can observe α, $v_R - \phi_R$ and p we can calculate v_R. Furthermore,

$$\begin{aligned} & v_R = \alpha p + (1-\alpha)(v_R - \phi_R) = \alpha p + (1-\alpha)q_R \\ \Rightarrow\quad & v_R = \alpha(p - q_R) + q_R \\ \Rightarrow\quad & \phi_R = \alpha(p - q_R) \end{aligned}$$

All variables on the right hand side are observable and the formula allows us to calculate the private benefit. Finally,

$$\frac{\phi_R}{q_R} = \frac{\alpha(p - q_R)}{q_R} = \alpha \text{prem}$$

or

$$\frac{\phi_R}{\alpha q_R} = \text{prem}.$$

This equation is the central equation in the empirical analysis of private benefits. αq_R denotes the public value of the block. Hence, $\frac{\phi}{\alpha q_R}$ is the ratio of the private benefits and public value of the α-block. We have proved the following proposition.

Proposition 1: If the incumbent has all the bargaining power then the premium correctly estimates the private benefits $\frac{\phi_R}{\alpha q_R}$ that the rival anticipates.

If the rival has some bargaining power then the equation for the decomposition of the value of the firm has to be augmented:

$$v_R = (1-\alpha)(v_R - \phi_R) + \alpha p + \eta = (1-\alpha)q_R + \alpha p_R + \eta$$

where $\eta > 0$ implies that the amount αp_R paid for the block is smaller than its intrinsic value $v_R - (1-\alpha)(v_R - \phi_R) = \phi_R + \alpha(v_R - \phi_R)$. It follows

$$\begin{aligned} & \phi_R = v_R - q_R = \alpha(p - q_R) + \eta \\ \Rightarrow\quad & \frac{\phi_R}{\alpha q_R} = \text{prem} + \frac{\eta}{\alpha q_R} \end{aligned}$$

Consequently, if $\eta > 0$ then the premium underestimates the rival's private benefit.

Consider the negotiation between the incumbent and the rival. Assume that the reservation prices of the incumbent and the rival are $\alpha(v_I - \phi_I) + \phi_I$ respectively $\alpha(v_R - \phi_R) + \phi_R$. If β is the bargaining power of the incumbent then

$$\alpha p \quad = \quad (1-\beta)(\alpha(v_I - \phi_I) + \phi_I) + \beta(\alpha(v_R - \phi_R) + \phi_R)$$

and because of $\alpha p + \eta = \alpha(v_R - \phi_R) + \phi_R$ it follows

$$\begin{aligned} \alpha p &= (1-\beta)(\alpha(v_I - \phi_I) + \phi_I) + \beta(\alpha p + \eta) \\ &= (1-\beta)(\alpha(v_I - \phi_I) + \phi_I) + \beta \alpha p + \beta \eta \\ &\Rightarrow (1-\beta)\alpha p + (1-\beta)(\alpha(v_I - \phi_I) + \phi_I) = \beta \eta \end{aligned}$$

Hence

$$(1-\beta)\alpha p + (1-\beta)(\alpha(v_I - \phi_I) + \phi_I) = \beta \eta.$$

Proposition 2: If the rival has some bargaining power then the premium underestimates the rival's private benefit $\frac{\phi_R}{\alpha q_R}$ by

$$\frac{\eta}{\alpha q_R} = \frac{1-\beta}{\beta} \cdot \frac{\alpha(p - q_I) + \phi_I}{\alpha q_R}$$

Note, that the bias increases with the private benefit of the incumbent ϕ_I and the bargaining power β. Neither β nor ϕ_I can be observed.

We can rearrange the equation (10):

$$\frac{p - q_R}{q_R} = (1-\beta)\frac{\phi_I}{\alpha q_R} + \beta \frac{\phi_R}{\alpha q_R} - (1-\beta)\frac{q_R - q_I}{q_R}$$

Hence

$$\frac{p - q_R}{q_R} - \frac{\phi_R}{\alpha q_R} = (1-\beta)\left(\frac{\phi_I - \phi_R}{\alpha q_R}\right) - (1-\beta)\frac{q_R - q_I}{q_R}$$

We observe that the premium deviates from the private benefit of the rival if there is a change in the public value of the firm or/and a change in the private benefit. If the transaction happens unexpectedly then the market price of a share is q_I. Hence, we can calculate $\frac{q_R - q_I}{q_R}$. Suppose we specify β. In this case we are not able to infer $\frac{\phi_R}{\alpha q_R}$ but $(1-\beta)\frac{\phi_I}{\alpha q_I} + \beta \frac{\phi_R}{\alpha q_R}$, i.e. the weighted average of the incumbent's and the rival's private benefit. This measure of the private benefits must be interpreted with care.[77] A certain value of $(1-\beta)\frac{\phi_I}{\alpha q_I}+\beta\frac{\phi_R}{\alpha q_R}$ might occur as the rival is going to be and/or the incumbent was a looter.

We assumed that the outcome of the negotiation is $\alpha p = (1-\beta)(\alpha(v_I - \phi_I) + \phi_I) + \beta(\alpha(v_R - \phi_R) + \phi_R)$, i.e. we assumed that the reservation price of the rival (incumbent) is $\alpha(v_R - \phi_R) + \phi_R$ (resp. $\alpha(v_I - \phi_I) + \phi_I$). However, it is questionable that the reservation price of the incumbent is indeed $\alpha(v_I - \phi_I) + \phi_I$ if α is smaller than 0.5. If the block is not large enough to entrench the incumbent then the rival may launch a tender offer. In general, this threat lowers the reservation price of the incumbent. Suppose the rival bids $v_R - \phi_R$. If there is no overbidding (this will be explained later) then the bid would succeed. Consequently, the reservation price of the incumbent is $\alpha(v_R - \phi_R)$ and the outcome of the negotiations

$$\begin{aligned} \alpha p &= \beta(\alpha(v_R - \phi_R) + \phi_R) + (1-\beta)\alpha(v_R - \phi_R) \\ &= \alpha(v_R - \phi_R) + \beta\phi_R = \alpha q_R + \beta\phi_R \end{aligned}$$

Hence

$$\text{prem} = \frac{p - q_R}{q_R} = \beta\frac{\phi_R}{\alpha q_R}.$$

If there is overbidding then the reservation price of the incumbent becomes αv_R and

$$\begin{aligned} \alpha p &= \beta(\alpha(v_R - \phi_R) + \phi_R) + (1-\beta)\alpha v_R \\ & \beta(\alpha(v_R - \phi_R) + \phi_R) + (1-\beta)\alpha(v_R - \phi_R) + (1-\beta)\alpha\phi_R \\ &= \alpha q_R + \beta\phi_R + (1-\beta)\alpha\phi_R \\ &= \alpha q_R + (\beta + (1-\beta)\alpha)\phi_R. \end{aligned}$$

Hence

$$\text{prem} = \frac{p - q_R}{q_R} = (\beta + (1-\beta)\alpha)\frac{\phi_R}{\alpha q_R}.$$

Proposition 3: If the takeover threat is viable then $\frac{\text{prem}}{\beta}$ (respectively $\frac{\text{prem}}{\beta+(1-\beta)\alpha}$ if the incumbent overbids) is an accurate estimate of the rival's private benefit $\frac{\phi_R}{\alpha q_R}$.

In many block trades the block is smaller than $\frac{N}{2}$. Hence, proposition 3 applies. This is fortunate. As Proposition 2 shows the bias is affected by the incumbent's private benefit if the takeover threat is non-viable. This thwarts to measure the rival's private benefit (even if we specify β).

[77] For that reason and for further reasons discuss below, the results of Dyck and Zingales need a more careful reinterpretation.

6.3 The Fortified Free-rider Problem and the Persistence of Blockholding

In this section we encounter a reenforced version of the free-rider problem of Grossman & Hart (1980). Grossman and Hart consider an outside bidder that has no stake in the firm. We assume that a blockholder exists and considers a buyout. In the framework of Grossman and Hart an outside raider can – if he can extract private benefits – obtain control of the corporation using a tender offer. He makes a strictly positive profit in such a transaction. This is different if the raider has already a stake in the firm.

Suppose the controlling blockholder owns a fraction α of the shares of A. The value of the firm is v and the private benefit is ϕ. Assume that the diversion technology is neutral $\delta = 1$. The incumbent considers to buy out the minority shareholders using a tender offer. Firstly, he cannot bid less than the post-takeover public value of a share as shareholders would not tender. Hence $b \geq v - \phi$.

Secondly, suppose he bids b and the bid is successful. He has to pay $(1-\alpha)b$ and the change of his wealth is $v - \alpha(v-\phi) - \phi$. He marginally profits if

$$\begin{aligned} & v - \alpha(v-\phi) - \phi = (1-\alpha)b \\ \Leftrightarrow \quad & (1-\alpha)(v-\phi) = (1-\alpha)b \\ \Leftrightarrow \quad & v - \phi = b. \end{aligned}$$

We conclude that he bids at most $v - \phi$. Hence

$$b = v - \phi.$$

He can buy out the cooperation but he won't profit. This is similar to the free-rider problem of Grossman and Hart. However, there is a difference. Whereas private benefits facilitate a takeover in the framework of Grossman and Hart, they don't help much if the bidder has already a toehold .

The free-rider problem is even fortified if $\delta < 1$ holds. Consider the lower bound determined by post-takeover public value of a share. If the bid is successful no diversion takes place and the post-takeover public value of a share is v. Therefore the bid price must be at least v. To calculate the maximal bid price we need the intrinsic value of the α-block. The intrinsic value depends on whether $\alpha \geq \delta$ or not. Suppose $\alpha \geq \delta$. The intrinsic value is αv and the zero-profit bid price is $b = v$. The incumbent can buy out the minority shareholders but his profit is zero.

The more interesting and presumably more realistic case is $\alpha < \delta$. The intrinsic value is $\alpha(v-y)+\delta y = \alpha(v-y)+\phi$. The change in wealth $v-\alpha(v-y)+\phi = v-\alpha(v-y)+\delta y$. The zero-profit bid price is

$$\begin{aligned} (1-\alpha)b &= v-\alpha(v-y)+\delta y \\ \Rightarrow \quad b &= v+\frac{\alpha-\delta}{1-\alpha}y \end{aligned}$$

As $\alpha < \delta$ no buyout takes place. Note, that the free-rider problem is more severe than in the model of Grossman and Hart, where a bidder has a non-negative profit if he bids the reservation price of the minority shareholders. The problem is that the minority shareholders try to free-ride the non-verifiable benefit ϕ and not just the value-improvement. The model explains why blockholders find it difficult to concentrate ownership completely via a buyout.

If a buy-out fails maybe a sell-out works? If owing a block allows to extract private benefits and if extraction generates an efficiency loss, i.e. $\delta < 1$, then the blockholder has an incentive to sell the block. If the firm is widely held its value is higher (we assume that no private benefits are extracted if the blockholder ceases to control the corporation). In principle, the blockholder could make a profit by selling the block. This argument has two weaknesses. Suppose the current blockholder sells his shares and the firm becomes widely held. Without a controlling shareholder no private benefits are extracted. The firm's piblic value is v. The value of the $\alpha-$block is $\alpha(v-y)+\delta y$. Suppose the incumbent can sell his shares for v (this is the anticipated public value of a share). He receives αv and sacrifices $\alpha(v-y)+\delta y$. His gain is $y(\alpha-\delta)$. Hence, selling the block is profitable if $\alpha > \delta$. However – so it is argued by Bebchuk (1999) – a raider might grab for the "sleeping" private benefit. The capital market can anticipate this and the revenue from selling the block will be discounted. Selling the block in order to commit to no-extraction is infeasible if later on a new blockholder may appear. The second weakness is the assumption that without a blockholder there will be no extraction of private benefits. It is more likely that the management extracts private benefits if the blockholder disappears.

6.4 The Model with an Entrenching Blockholder

In section 4 we assume that the controller of the corporation is the management and that the management owns no shares. We studied the problem of a change of

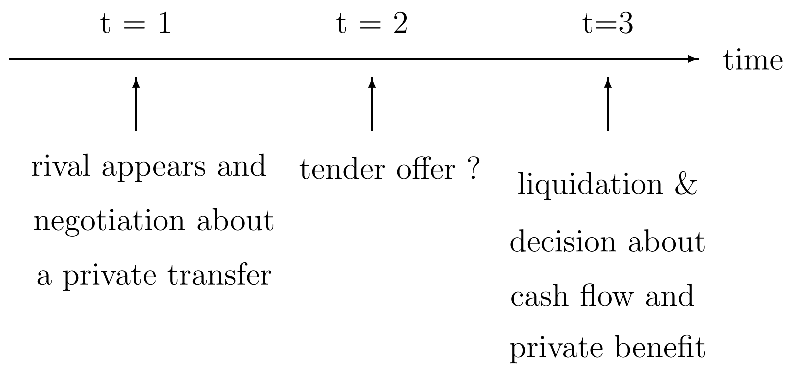

Figure 10: **The Timing of the Game**

control through a tender offer, i.e. an outside rival appears and launches a tender offer. In this section we assume that the initial controller of the corporation is a "large" shareholder whom we call incumbent or I. The incumbent owns a fraction $\alpha > 0$ of the shares of the corporation. We assume that the incumbent blockholder controls the decisions of the firm independent of the size of the block. All other shareholders own only an infinitesimal small number of shares and are rationally ignorant. The corporate governance problem stems from the conflict of interest between the blockholder and the minority shareholders. The management is controlled by the blockholder or acts in collusion with I.

The value of the firm under the incumbent's control is v_I p.s. and the private benefits are ϕ_I. The *intrinsic* value of his block is $\alpha N(v_I - \phi_I) + N\phi_I$ in aggregate and $\alpha(v_I - \phi_I) + \phi_I$ per share. With the attribute "intrinsic" we emphasize that $\alpha N(v_I - \phi_I) + N\phi_I$ is the value of the stake if the incumbent exercises control of the corporation at $t = 3$. We will say *I-intrinsic value of the block* instead of the intrinsic value of the stake if the incumbent exercises control; likewise we use R-intrinsic value. The value that the block has for the incumbent, i.e. the actual incumbent's payoff, might differ from the I-intrinsic value of the block. If control is transferred to R then the income of the incumbent equals the proceeds from this transaction. The price paid by the purchaser is affected by v_I and ϕ_I but also by v_R and ϕ_R. For the moment we ignore the efficiency loss generated by diversion, i.e. we assume $\delta = 1$.

The rival R appears at $t = 1$ and the question is whether the rival will assume the role of the incumbent by buying the block of the incumbent. Beside this positive question, we also ask the normative question whether control should be transferred from I to R. The regulators design the framework of the change-of-control transactions. They affect the frequency and the kind of transactions that take place. In this context the most controversial question is whether the Market Rule or the Mandatory Bid Rule should be used. The market rule prevails in most states of the US[78] and especially in the most important state Delaware. The Mandatory Bid Rule is adopted in almost all members of the EU (Berglöf and Burkart, 2003, 186). The UK – usually more similar to the US than to Continental Europe – has the Mandatory Bid Rule in its City Code.

The raider differs from the incumbent in terms of the value of the firm v_R (instead of v_I) and the private benefit ϕ_R (instead of ϕ_I) he can divert. We call a change-of-control **efficient** iff $v_R \geq v_I$. A regulation (a rule) is called **ex-post first-best** if it blocks all inefficient transactions and frustrates no efficient ones. If a regulation is ex-post first-best then the allocation of control is efficient.

Note, that even with a first best rule the minority shareholders don't welcome all change-of-control transactions. Consider a private transfer, i.e. the block is transferred from the incumbent to the rival. The minority shareholders keep their shares (in a tender offer or a mandatory offer the minority shareholders might sell their shares). The value of the firm may rise because of a change-of-control transaction, but it is possible that the minority shareholder loses. The value of a minority share is $v_X - \phi_X$ where $X = I$ or $X = R$. The change of the value of a share of minority shareholder is

$$q_R - q_I = \underbrace{(v_R - v_I)}_{>0} \underbrace{- (\phi_R - \phi_I)}_{>0}.$$

A transaction may be efficient ($v_R > v_I$) and nevertheless hurt minority shareholder if $v_R - v_I < \phi_R - \phi_I$. We call such a transaction a **minority-shareholder-exploiting** transaction. In general, a transaction is called minority-shareholder-exploiting if the minority shareholders are worse off with than without the transaction. Note, that a minority-shareholder-exploiting transaction may affect the *majority* of the shareholders. We say that a regulation *protects minority shareholders* if all minority-shareholder-exploiting transactions are blocked.

The fact that a change-of-control transaction is minority-shareholder-exploiting and nevertheless called efficient seem at odds with the Pareto-criterium. How-

[78]The only exceptions are Pennsylvania and Maine (Berglöf and Burkart, 2003, 188).

ever, when we refer to an efficient transaction we mean aggregate welfare. In principle, the losing party could be compensated.

The following analysis is based on the seminal contribution of Bebchuk (1994) and Zingales (1995). Recently Berglöf and Burkart (2003) discussed the European takeover regulation. It differs from Bebchuk when modelling the negotiation between R and I. We add – following Zingales – the possibility that the rival threatens with a tender offer. This additional device improves the bargaining position of the rival by lowering the reservation price of the incumbent. With a takeover threat the incumbent's reservation price is the revenue in a tender offer. The threat of tender offer thwarts the incumbent's defence of his private benefit. We assume that a takeover threat is a viable iff $\alpha < \frac{1}{2}$.

6.4.1 Market Rule

If the Market Rule applies the incumbent can sell his block to the rival and there is no obligation for the rival to enter into any transaction with the minority shareholders. We have to distinguish two cases. If $\alpha \geq \frac{1}{2}$ then the incumbent is entrenched and a transfer of control is not possible without his consent. Indeed, control is transferred if and only if the rival purchases the block. If $\alpha < \frac{1}{2}$ then the rival may threaten to launch a tender offer. Even if this threat is never executed it alters the bargaining position of the rival and the incumbent.

The case where $\alpha \geq 1/2$

We consider the case $\alpha \geq \frac{1}{2}$ first. Since the incumbent is entrenched a change of control occurs only with his consent, i.e. the incumbent must sell his stake to the rival. If the incumbent retains control the value of his stake is $\alpha(v_I - \phi_I) + \phi_I$. Thus, the minimum price he is willing to accept is $\alpha(v_I - \phi_I) + \phi_I$. Under the **market rule** a transfer of control takes place if

$$\alpha(v_R - \phi_R) + \phi_R > \alpha(v_I - \phi_I) + \phi_I. \tag{10}$$

The right hand side of this inequality is the value of the block if R assumes the role of I. This is the maximum amount R is willing to pay. We rearrange (10):

$$(10) \quad \Leftrightarrow \quad v_R - v_I \geq -\frac{1-\alpha}{\alpha}(\phi_R - \phi_I).$$

From this inequality we draw the following conclusions:

- If a transfer is efficient and the private benefits of the rival R and the incumbent I are about the same then a transfer will take place. If the incumbent has a large private benefit compared with the rival's then an efficient transfer may be frustrated.

- An inefficient transfers may occur if the rival can extract a large private benefit. In this case minority shareholders are exploited "twice". The value of the firm declines since $v_R - v_I$ is negative. In addition, $\phi_R - \phi_I > 0$ is positive. Thus diversion is larger. The change of the value of a share of a minority shareholder is the sum of these two effects $(v_R - v_I) - (\phi_R - \phi_I) < 0$.

Here "exploitation" is a consequence of the fact that the incumbent and rival when negotiating a transfer of control, do not take the external effect (third party effect) into account that they exercise on the minority shareholders.

The case where $\alpha < 1/2$

If $\alpha < 1/2$ holds control may change through a private transfer but also by a tender offer. The rival R may launch a tender offer and – if the bid is successful – obtain control of the corporation. The rival may also use the opportunity of a tender offer as a threat when negotiating with the incumbent. The game unfolds as follows:

- **Stage 1:** The incumbent and the rival enter negotiations about a private transfer of control. If they agree on a price the block is transferred from incumbent to the rival. If the negotiations break down the game moves to Stage 2. If the negotiation are successful the game moves to stage 4.
- **Stage 2:** The rival can launch a tender offer and the incumbent can make a counter-bid. The game moves to stage 3.
- **Stage 3:** The minority shareholders decide about accepting or rejecting the bid(s).
- **Stage 4:** Depending on the outcome of stage 2 respectively of stage 3 either the incumbent or the rival controls.

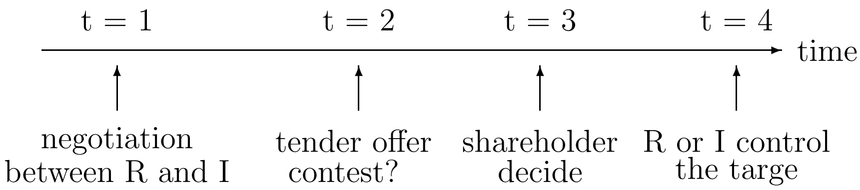

Figure 11: **Timing of the Game**

Firstly, we consider stage 3. We assume that the rival launches an unrestricted conditional bid (we discuss the (ir)relevance of partial bids later). Consider the following table that summarizes the strategic situation of a typical minority shareholder. A typical minority shareholder has three alternatives: "tender to R", "tender to I" and "don't tender". The three columns of the table correspond to these alternatives. Three outcomes are possible. The outcomes correspond to the rows of the table.

	tender to R	tender to I	don't tender
R wins	b_R	$v_R - \phi_R$	$v_R - \phi_R$
I wins	$v_I - \phi_I$	b_I	$v_I - \phi_I$
no bid is successful	$v_I - \phi_I$	$v_I - \phi_I$	$v_I - \phi_I$

The first observation is that the rival won't submit a bid with $b_R < v_R - \phi_R$. The minority shareholder won't accept such a bid as "don't tender" weakly dominates "tender to R". We have the usual result that a bidder must bid at least the post-takeover public value. The maximum the rival is willing to bid is v_R. Hence, the bid price satisfies

$$v_R \geq b_R \geq v_R - \phi_R.$$

The bidding behavior of the incumbent may differ.[79] The incumbent is not only a bidder but also a seller and by overbidding the incumbent pushes up the rival's bid price. Since he has a toehold he has an incentive to overbid (see Burkart, 1995). We will consider two cases. For the moment, we assume that the bidder never overbids, i.e. he bids at most v_I. Later, we consider the case where the incumbent overbids.

[79]All papers mentioned at the beginning of the section overlook overbidding.

In order to win the takeover contest R has to bid at least v_I since otherwise the incumbent can launch a counter-bid. We assume that in case of two equilibria, one being pareto-better, the pareto-better equilibrium results. Together these restrictions imply

$$b_R = \begin{cases} \max\{v_I, v_R - \phi_R\} & : v_I \leq v_R, \\ \text{no bid} & \text{otherwise.} \end{cases}$$

We make two observation: If the rival bids – i.e. we have $v_R \geq v_I$ – he makes a strictly positive profit $\min\{\phi_R, v_R - v_I\}$ and this determines his reservation price: The rival will not accept an agreement with a profit less than $\min\{\phi_R, v_R - v_I\}$.

We also conclude that only for *efficient* transfers the analysis differs from the case where $\alpha \geq \frac{1}{2}$ holds. If the transactions were inefficient the incumbent would win the takeover contest. The rival's threat is empty in this case. Thus in case of an **inefficient transfer** the condition for a change of control is $\alpha(v_R - \phi_R) + \phi_R \geq \alpha(v_I - \phi_I) + \phi_I$ as in the case where $\alpha \geq \frac{1}{2}$. Note that minority-exploiting-transfers are possible.

For **efficient transfers** the takeover threat is **viable**. To determine whether a transfer of control occurs we have to calculate the reservation price of the incumbent. There are two cases: $b_R = v_I$ and $b_R = v_R - \phi_R$ corresponding to the two possible bid prises.

Suppose $b_R = v_I$, i.e. $v_I \geq v_R - \phi$. With this bid price the incumbent's revenue in a takeover is αv_I and the rival's profit is $v_R - v_I$. Because of $\alpha v_I < \alpha v_I + (1 - \alpha)\phi_I = \alpha(v_I - \phi_I) + \phi_I$ the reservation price is lower with a viable threat of a takeover (the incumbent's revenue in a takeover is smaller than the I-intrinsic value). If the bidder pays v_I in a private transaction the bidder's payoff satisfies

$$\begin{aligned} & \alpha(v_R - \phi_R) + \phi_R - \alpha v_I \\ = \;& \alpha(v_R - \phi_R) + \phi_R - \alpha v_I + (1 - \alpha)(v_R - \phi_R) - (1 - \alpha)(v_R - \phi_R) \\ = \;& v_R - \alpha v_I - (1 - \alpha)(v_R - \phi_R) \\ > \;& v_R - \alpha v_I - (1 - \alpha)v_I = v_R - v_I \end{aligned}$$

Hence, if the bidder pays the reservation price of the incumbent then the rival makes a strictly positive profit and his profit is larger than in case of a takeover. There are gains of exchange and the change-of-control occurs through a private transaction. Note, that with the assumed parameters minority exploiting transfer are possible. Also, note that the minority shareholders would like to participate in the transaction as $v_I \geq v_R - \phi_R$ but the rival will not launch a voluntary tender offer.

Next, we consider the case where $b_R = v_R - \phi_R$, i.e. $v_R - \phi_R \geq v_I$. With this bid price the incumbent's revenue in a takeover is $\alpha(v_R - \phi_R)$ and the rival's profit is ϕ_R. Also note, that the minority shareholders gain if a transfer occur: $v_R - \phi_R \geq v_I > v_I - \phi_I$. Suppose that $\alpha(v_I - \phi_I) + \phi_I > \alpha(v_R - \phi_R)$, i.e. the reservation price of the incumbent is not the intrinsic value but the revenue $\alpha(v_R - \phi_R)$ in a takeover. If the bidder pays the reservation price of the incumbent then the rival's profit is

$$\alpha(v_R - \phi_R) + \phi_R - \alpha(v_R - \phi_R) = \phi_R.$$

The rival is indifferent between a tender offer or a private transaction and so is the incumbent. The rival will not pay more than $v_R - \phi_R$ p.s and the incumbent will not accept less. Hence the reservation prices of both are the same and the transfer occurs at this price. Presumably, the transaction costs (not modelled) are smaller for a private transaction. The change-of-control is likely to take place through this form.

If $\alpha(v_I - \phi_I) + \phi_I < \alpha(v_R - \phi_R)$ the transfer will also occur. It can be argued that the reservation price of the incumbent is $\alpha(v_R - \phi_R)$ as this is the revenue in a takeover. Indeed, if the negotiations break down the rival has an incentive to launch a tender offer. If the tender offer decision is part of the negotiations however then the reservation price is $\alpha(v_I - \phi_I) + \phi_I$. But independent of this the reservation price will be smaller than αv_R and control will change.

We conclude that all efficient transfers of control take place. Thus, whereas there are efficient transaction that are frustrated in the framework of Bebchuk (1994) – i.e. without a takeover threat – with a viable market of corporate control all efficient transfer take place.

For an interpretation of this result note that in all cases where the takeover threat matters the incumbent's private benefit is irrelevant for incumbent's reservation price (the latter is either αv_I or $\alpha(v_R - \phi_R)$). If the private benefit of the incumbent is high and takeover threat non-viable, then an efficient transfer might fail. A viable takeover threat eliminates this obstacle.

We check the relevance of partial bids. Suppose the bidder makes a partial bid for 50% of the shares. If a bid occurs the bid price is $b_R = \max\{v_R - \phi_R, v_I\}$. Suppose that $b_R = v_I$, i.e. $v_I \geq v_R - \phi_R$. It follows $\frac{\alpha}{2}v_I + \frac{\alpha}{2}(v_R - \phi_R) \leq \alpha v_I$, i.e. the revenue in case of a takeover is not larger than αv_I. Analogously, if the rival bids $b_R = v_R - \phi_R$, i.e. $v_I \geq v_R - \phi_R$, it follows $\frac{\alpha}{2}v_I + \frac{\alpha}{2}(v_R - \phi_R) \leq \alpha(v_R - \phi_R)$. Hence the incumbent's revenue in a takeover is not larger with partial than with unrestricted bids and so is the reservation price. The main conclusion is the same as above: no efficient transfer is blocked.

If the incumbent overbids the bidder has to bid $v_R - \varepsilon$.[80] The rival's profit in a takeover is ε and the incumbent's revenue $\alpha(v_R - \varepsilon)$. Remember, the major result we want to check is whether there are blocked efficient transfers. Suppose $\alpha v_R < \alpha v_I + (1 - \alpha)\phi_I$. The reservation price of the incumbent is $\alpha(v_R - \varepsilon)$ and the transfer occur as $\alpha(v_R - \phi_R) + \phi_R > \alpha v_R$. If $\alpha v_R > \alpha v_I + (1 - \alpha)\phi_I$ the incumbent's reservation price is either αv_R or $\alpha v_I + (1 - \alpha)\phi_I$ depending on the form of the negotiations. In both cases the transfer occurs. We conclude: Overbidding betters the bargaining position of the incumbent as it increases the revenue in a takeover. Nevertheless, no efficient transfer is frustrated. Note, that overbidding of the incumbent does not lead to a better protection of the minority shareholders. The takeover will never be executed and minority do not participate in the private transaction. Independent of the price paid for the block a share of minority shareholder is worth $v_R - \phi_R$. The latter can be smaller than $v_I - \phi_I$.

Finally, we consider the case where $\delta < 1$.[81] If $\alpha \geq \delta$ neither the incumbent nor the rival will divert. The intrinsic values are αv_I and αv_R respectively for the incumbent and the rival. A transfer occurs if it is efficient, i.e. $v_R > v_I$. The more interesting and presumably more realistic case is $\alpha < \delta$. Note, that all formulaes that refer to intrinsic values of the block remain unchanged. However, the properties of the takeover threat change. The crucial difference between $\delta < 1$ and $\delta = 1$ is that after a successful takeover a controlling party that owns more than δ shares has no incentive to divert. This steps up the free-rider problem. Indeed, the bidder has to bid v_R to convince the minority shareholders to tender. Consider the strategic table of the typical minority shareholder:

	tender	don't tender
takeover is successful	b	v_R or $v_R - \phi$
takeover is not successful	$v_I - \phi$	$v_I - \phi$

[80]See the appendix for remarks on overbidding. For sake of transparency, we suppress ε in some formulae.

[81]See the appendix for the "short cut" we use in the case of $\delta < 1$.

The post-takeover public value of a share depends on the decision of the incumbent. If he keeps his share then the post-takeover value is either v_R or $v_R - \phi$. If $1 - \alpha < \delta$ *and* the incumbent keeps his shares then the post-takeover public value is $v_R - \phi_R$. Hence, a bid with bid price $v_R - \phi_R$ is successful. However, the incumbent's profit is $\alpha(v_R - \phi_R)$ if he tenders and if he keeps his shares. If he communicates that he tenders then a bid with bid price $v_R - \phi_R$ will fail as the minority shareholders will not tender. Hence, he has an incentive and no costs to do so. Accordingly minority shareholders expect that the incumbent tenders. As a consequence, the bid price must be v_R.

The takeover threat is the same as in the case of overbidding. Hence, all efficient transfers take place.

We summarize: The market rule does not achieve ex-post efficiency. Neither for $\alpha < \frac{1}{2}$ nor for $\alpha \geq \frac{1}{2}$. If $\alpha \geq \frac{1}{2}$ both kind of inefficiencies can occur: some inefficient transfers are not blocked, some efficient transfers are blocked. If $\alpha < \frac{1}{2}$ all efficient transfers take place but also some inefficient. Furthermore, minority shareholders are not protected, i.e. not all minority exploiting transfers are blocked.

6.4.2 Mandatory Bid Rule

With the mandatory bid rule the rival has to make a mandatory tender offer to all shareholders in case of change of control. The bid price of the mandatory offer has to be the same as the price the rival pays for block. As in the preceding subsection there are two cases: The incumbent is entrenched $\alpha \geq 1/2$ and not entrenched $\alpha < 1/2$.

The case where $\alpha \geq 1/2$

If $\alpha \geq \frac{1}{2}$ holds the threat of a tender offer is non-viable. A transfer will take place if

$$\alpha v_R \geq \alpha v_I + (1 - \alpha)\phi_I. \tag{11}$$

The right hand side is the I-intrinsic value. In the entrenched case this is also the reservation of the incumbent.[82] The rival's reservation price is αv_R. If he pays more than αv_R for the block then the minority shareholders will tender in the subsequent mandatory offer – the bid price is larger than $v_R > v_R - \phi_R$. The rival eventually owns all shares and makes a loss as he pays more than v_R. If he pays exactly αv_R his profit is zero.

We make two observations: With the Mandatory Bid Rule all inefficient transactions are blocked and minority shareholders are protected: If $v_R < v_I$ holds then $\alpha v_R < \alpha v_I \leq \alpha v_I + (1-\alpha)\phi_I$ and condition (11) is not satisfied. Hence, the inefficient transaction is blocked. The lowest price for the block is $\alpha N y_I + N\phi_I$. Hence, the bid price in mandatory offer is $y_I + \frac{\phi_I}{\alpha}$. The minority shareholders gain: Their shares are worth $v_I - \phi_I$ without a transfer and at least $v_I + \frac{\phi_I}{\alpha}$ with a transfer. The Mandatory Bid Rule allows the minority shareholders to participate in the transaction. As the incumbent controller gains (his consent is necessary as he is entrenched) the minority shareholders also gain. Indeed, their shares are worth less than $y_I + \frac{\phi_I}{\alpha}$ viz. $v_I - \phi_I$.

The equal opportunity rule frustrates all inefficient transfers but it also blocks some efficient ones. If

$$\frac{1-\alpha}{\alpha}\phi_I \geq v_R - v_I \geq 0 \tag{12}$$

holds then a transfer of control is efficient but won't occur. Efficient transfers are frustrated if the improvement in efficiency $v_R - v_I$ is small relative to the *incumbent's* private benefits ϕ_I. Note, that only the *incumbent's* private benefits matter in (12). It matters as the incumbent is entrenched and he "defends" his private benefit.

The case where $\alpha < 1/2$

Suppose that $\alpha < \frac{1}{2}$. The incumbent is not entrenched and the rival can launch a tender offer or at least threaten with a hostile bid.

It is easy to see that inefficient change-of-control transactions are blocked. Indeed, if a transfer is inefficient then the takeover threat is non-viable. With

[82] There is a nuance if $\alpha v_I + (1-\alpha)\phi_I < \alpha(v_R - \phi_R)$. We discuss this at the end of this subsection.

the same argument as in the preceding subsection we can rule out inefficient transfers. Note, that a priori we cannot rule out minority exploiting takeovers. The argument of the last subsection does not apply as the intrinsic values are not the reservation prices.

In the framework of Bebchuk (1994) an efficient transfer $v_R - v_I > 0$ is frustrated iff

$$\alpha v_R < \alpha(v_I - \phi_I) + \phi_I \tag{13}$$

holds. The left hand side is the maximal amount, R is willing to pay. The right hand side is the I-intrinsic value of the block. If we ignore the takeover threat this is also the reservation price of I in the negotiations with R. Note, that the problem can be attributed to the private benefit ϕ_I. If ϕ_I were sufficiently small then the transfers would take place.

A viable threat of a tender offer thwarts the defence of the private benefit. There are two cases: $b_R = v_I$ and $b_R = v_R - \phi_R$. We know from the last subsection that the bid price will be $\max\{v_R - \phi_R, v_I\}$ and the bid price equals $v_R - \varepsilon$ if there is overbidding or $\delta < 1$.

Suppose $b_R = v_I$, i.e. $v_I \geq v_R - \phi_R$. With this bid price the incumbent's reservation price is αv_I. If the transfer occurs at this price the minority shareholders will tender in the subsequent mandatory bid. The minority shareholders gain through this transaction as $v_I > v_I - \phi_I$. Note, that the bidder will not bid more and the incumbent will not accept less. Hence, the price paid for the block is v_I p.s.

Suppose $b_R = v_R - \phi_R$, i.e. $v_R - \phi_R \geq v_I$. The reservation price of the incumbent is $\alpha(v_R - \phi_R)$ or $\alpha(v_I - \phi_I) + \phi_I$ depending on the form of the negotiations. Assume, that the incumbent reservation price is $\alpha(v_I - \phi_I) + \phi_I$. If the transfer takes place for incumbent's reservation price then the bid price is $v_I - \phi_I + \frac{\phi}{\alpha}$. The minority shareholders will not tender in the subsequent mandatory bid as $v_I - \phi_I + \frac{\phi}{\alpha} < \frac{\alpha(v_R - \phi_R)}{\alpha} = v_R - \phi_R$. The profit of the rival if the transaction is executed for the incumbent's reservation price is $\alpha(v_R - \phi_R) + \phi_R - \alpha(v_I - \phi_I) - \phi_I > \phi_R$. Hence, there are gains from trade and the change of control takes place.

Suppose the reservation price of the incumbent is $\alpha(v_R - \phi)$. The incumbent will not accept less and the rival will not pay more. Hence, the transaction will take place for $\alpha(v_R - \phi_R)$. In the subsequent mandatory bid the minority shareholders are indifferent whether to tender or not. The public value of a share is

$v_R - \phi_R > v_I > v_I - \phi_I$ hence minority shareholders are protected.

We conclude: If $\alpha < 1/2$ the Mandatory Bid Rule blocks all inefficient and does not block any efficient transfers. It achieves an optimal allocation of control. Furthermore, the minority shareholders are protected.

Our result differs Bebchuk's since in his framework – without a takeover threat – a relatively large private benefit of the incumbent will lead to a high reservation price of the incumbent which implies that R and I can't agree. With a takeover threat the incumbent's reservation price is lowered and more transaction are possible.

Overbidding does not change the result that all efficient transfer will take place. With overbidding the rival bids $v_R - \varepsilon$. If $\alpha v_R < \alpha v_I + (1-\alpha)\phi_I$ then the reservation price of the incumbent is $\alpha(v_R - \varepsilon)$ and the transfer occurs as $\alpha v_R > \alpha(v_R - \varepsilon)$. Mutatis mutandis if $\alpha v_R > \alpha v_I + (1-\alpha)\phi_I$. We conclude: Overbidding betters the bargaining position of the incumbent as it increases his reservation price. Independent of this, all efficient transfers occur.

Epilogue on $\alpha \geq \frac{1}{2}$

Suppose $\alpha \geq \frac{1}{2}$. It is possible that $\alpha(v_I - \phi_I) + \phi_I < \alpha(v_R - \phi_R)$ (hence necessarily $v_R - \phi_R > v_I$). Superficially, the incumbent enters the negotiations with the reservation price $\alpha(v_I - \phi_I) + \phi_I$. This is smaller than the value of a share of minority shareholder $v_R - \phi_R$. But this is implausible. If the incumbent sells $(\alpha - \frac{1}{2})N + 1$ shares to the public he eventually owns less than 50% of the shares. After this change of the ownership structure the incumbent is not entrenched and the takeover threat is viable: the incumbent owns less then 50 % of the shares and the transfer is efficient $v_R > v_I + \phi_R$. The change of control takes place and the public value is $v_R - \phi_R$. Therefore the incumbent receives at least $v_R - \phi_R$ when selling his shares to the public. He also receives at least $v_R - \phi_R$ for the shares he sells to rival. This proves that the incumbent reservation price cannot be smaller than $\alpha(v_R - \phi_R)$.

This observation has important consequences: If we assume that the takeover threat is not part of the negotiation then the bid price paid in the private transfer will never be less than $v_R - \phi_R$. As a consequence: If $v_R > v_I$ then the value of a share of minority shareholder is given by the price paid in the transfer.

Mutatis Mutandis the argument can be made if the incumbent overbids. If the incumbent overbids his reservation price cannot be lower than $\alpha(v_R - \varepsilon)$

6.4.3 Market Rule vs. Equal Opportunity Rule

For $\alpha < \frac{1}{2}$ the Mandatory Bid Rule achieves an efficient allocation of control and protects minority shareholders whereas the Market Rule does neither. In our framework with a viable takeover threat the Market Rule fails as is doesn't block inefficient transfer of control. Other source of inefficiency relevant in Bebchuk's framework are not effective. Neither if the MR nor if the MBR applies.

If $\delta < 1$ there is another advantage of the MBR. In many cases the change-of-control ends with a complete acquisition of the firm. As a consequence, there will be no diversion and no efficiency loss caused by the cost of camouflage. If the MR applies the change of control does not change the ownership structure. Hence, the controller – the incumbent or the rival – diverts and the efficiency loss remains. The rival merely assumes the role of the incumbent. This might lead to a value improvement but still there is diversion and waste. If the MBR applies the ownership structure changes – the rival becomes the single shareholder – and there is no diversion after only one transaction. This is achieved even if the value improvement is tiny. Consequently, it is very likely that the inefficiency is quickly removed. The probability that a rival finds a small value-improvements is relatively large.

If $\alpha > \frac{1}{2}$ holds the Mandatory Bid Rule frustrates more efficient transfers than the Market Rule. In the framework of Behchuk this aspect is crucial for his proposition 5. If the changes in value $v_R - v_I$ and private benefits $\phi_R - \phi_I$ are symmetrically and independently distributed then the Market Rule leads to a lower expected efficiency loss.

6.4.4 Mandatory Bid Rule and Conditional Voting Cap

Suppose the regulator imposes the Mandatory Bid Rule and a *Conditional* Voting Cap. The Conditional Voting Cap applies if $\alpha \geq \frac{1}{2}$. It rules that after a tender offer where the majority of the minority shareholders tender to the rival only $(1-\alpha)N-1$ of the shares of the incumbent carry voting rights. If the tender offer is successful and all small shareholders tender, then the rival has the majority of the votes and presumably controls the firm.[83]

Suppose $v_R > v_I$. The rival bids $b = \max\{v_I, v_R - \phi_R\}$. The revenue of the incumbent in a takeover is independent of his voting rights. In this sense the property rights are protected even though the voting cap breaks through his control rights. Furthermore, as the incumbent's revenue in a takeover determines his reservation price the conditional voting cap thwarts the incumbent's defence of his private benefits: We can apply the same reasoning as in the last subsection where the incumbent was not entrenched to prove that the change-of-control takes place.

Conclusion: The combination of the mandatory bid rule and the conditional voting cap achieves an efficient allocation of control.

6.4.5 The Size of the Stake and the Incidence of Takeovers

There is a prejudice that the larger the block the less likely is a change of control.[84] In our framework the opposite is true. Firstly, we consider the case where the takeover threat is non-viable $\alpha \geq \frac{1}{2}$ and the Market Rule applies. The condition that a transfer of control takes place is $\alpha(v_R - \phi_R) + \phi_R > \alpha(v_I - \phi_I) + \phi_I$. This condition is equivalent to

$$\frac{v_R - v_I}{\phi_I - \phi_R} > \frac{1-\alpha}{\alpha} = \frac{1}{\alpha} - 1. \tag{14}$$

If α increases $\frac{1}{\alpha} - 1$ decreases. Hence, the incidence of takeover increases with α (the region where (14) holds increases).

Suppose $\alpha < \frac{1}{2}$. With a viable takeover threat all efficient but also some inefficient transfers take place. If $v_R - v_I < 0$ and

$$\frac{v_I - v_R}{\phi_R - \phi_I} \geq \frac{1-\alpha}{\alpha}.$$

hold the change of control take place. Again, the incidence increases if α increases.

[83] Note, that in reality the voting cap of $(1-\alpha)N-1$ should not be applied literally. If there is only one defecting small shareholder then the argument fails. For the theoretically analysis the sharp threshold causes no problems.

[84] The empirical evidence is mixed. See Holderness (2003).

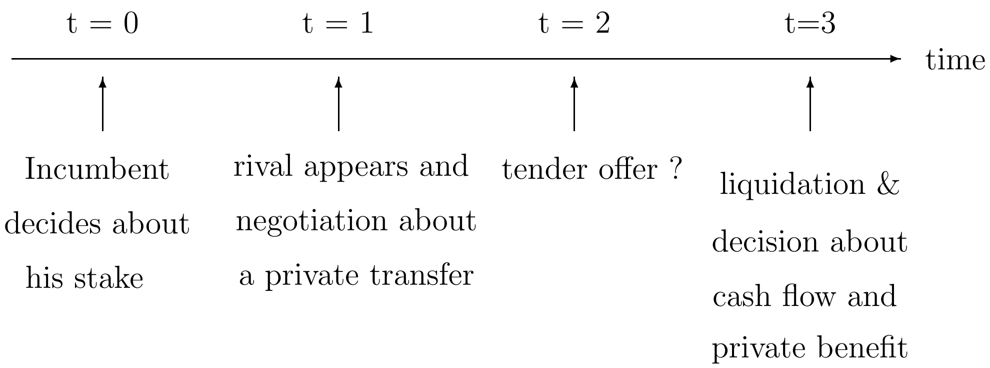

Figure 12: **Timing of the Game**

Suppose that the Mandatory bid rule applies and $\alpha > \frac{1}{2}$. Because of the mandatory bid rule all inefficient transfers are frustrated. If $v_R > v_I$ and

$$\frac{1-\alpha}{\alpha} \geq \frac{v_R - v_I}{\phi_I} \geq 0. \tag{15}$$

hold then an efficient transfer is blocked. If α increases then $\frac{1-\alpha}{\alpha}$ is lower and less transfers are blocked. Finally, if $\alpha < \frac{1}{2}$ then the incidence of takeovers does not depend on α.

To summarize: In our framework the frequency transfers increases with α (or does not depend on α). Note, however that a higher incidence is not necessaryly an indication of higher efficiency: If the Market Rule applies a higher α increases the incidence of *inefficient* transfers. However, if the mandatory bid rule applies then inefficient transfers are blocked and the incidence of efficient transfers increases (for the case $\alpha \geq \frac{1}{2}$).

6.5 Determination of the Size of the Block

Suppose that the incumbent initially owns all shares of the corporation, i.e. the corporation is private and $\alpha = 1$. In this section we want to analyze the decision of the incumbent about a reduction of α. For what reason could he make an initial public offering? For example, it might be necessary to raise funds to finance an investment. However, there might be an "intrinsic/strategic" motivation to go public (Zingales, 1995). The incumbent may anticipate a change-of-control transaction. His choice of α affects the strategic framework in a change-of-control transaction. Below we will analyze the choice of α by the incumbent if the strategic motivation predominates. We will assume that $v_R > v_I$. The rival can generate a higher value but otherwise we make no assumption about v_I, v_R or ϕ_I, ϕ_I.

Before we study the incentive to go private we show that the *only possible strategic reason* to go public is a subsequent change-of-control. Indeed, suppose that the incumbent sells a block of size $1 - \alpha$ to the market and there is *no* change of control. With rational expectations the investors will pay the public value $v_I - \phi_I$ per share. The payoff of the incumbent is

$$\underbrace{(1-\alpha)(v_I - \phi_I)}_{\text{rev. of the IPO}} + \underbrace{\alpha(v_I - \phi_I) + \phi_I}_{\text{payoff of the stake}} = v_I$$

With or without the IPO the incumbent's wealth is v_I. To sell shares makes no sense if the incumbent remains the controller.

Consider the case where a change of control takes place. Suppose the incumbent issues $N(1-\alpha)$ shares. The revenue $R(\alpha)$ in the IPO depends on α and on the payoff of a share of a minority-shareholder. The latter equals the public value of the firm or the price paid in a tender offer/mandatory offer. We assume rational expectations and competitive markets. The investors anticipate the ultimate controller and the payoff of a share. Their investment is zero net-present-value investment. The payoff of the incumbent (including the proceeds of the IPO and the revenue of the change-of-control transaction) is

$$R(\alpha) + T(\alpha),$$

where $T(\alpha)$ is the amount the rival pays for the block. $T(\alpha)$ depends on the size α of the block but also on v_R, v_I, ϕ_R, ϕ_I and the bargaining power of the incumbent respectively the rival.

We are not so much interested in the size of the block as such but in the effect that regulation has on the incumbent's choice of α. We analyzed in the preceding sections how regulation affects the outcome on the market of corporate control. The incumbent's choice of α is affected by the outcome of the change-of-control transaction and the revenue in the initial public offering. Hence, the regulation has repercussion of the choice of α.

6.5.1 Market Rule

If the market rule applies the outside investors will not participate in a change-of-control transactions. Their payoff is $v_X - \phi_X$ where $X = I$ or $X = R$.

If the takeover threat is non-viable $\alpha \geq \frac{1}{2}$ then the reservation prices are the respective intrinsic values. Suppose $\alpha < \frac{1}{2}$. As the change-of-control is efficient and the takeover threat is viable the rival eventually controls the firm. The incumbent's reservation price is[85]

$$\begin{cases} \alpha v_I & \text{:if } v_I > v_R - \phi \\ \alpha(v_R - \phi_R) & \text{:otherwise} \end{cases}$$

and the maximum price the rival will pay is[86]

$$\begin{cases} v_I - (1-\alpha)q_R & \text{:if } v_I > v_R - \phi \\ \alpha(v_R - \phi_R) & \text{:otherwise} \end{cases}$$

The payoff of the incumbent is given by[87]

$$\Pi = \begin{cases} v_I & : I_I \geq I_R, \alpha \geq \frac{1}{2} \\ (1-\alpha)(v_R - \phi_R) + (1-\beta)I_I + \beta I_R & : I_I < I_R, \alpha \geq \frac{1}{2} \\ (1-\alpha)(v_R - \phi_R) + \alpha v_I + \beta(1-\alpha)(v_I - (v_R - \phi_R)) & : v_R - \phi_R < v_I, \alpha < \frac{1}{2} \\ v_R - \phi_R & : v_R - \phi_R \geq v_I, \alpha < \frac{1}{2} \end{cases}$$

where I_I (I_R) denotes the I-intrinsic (R-intrinsic) value of the block. As it is obvious from the formula for the payoff Π the choice of α has several effects. It determines the payoff of the initial public offering. If the rival generates a high public value then the incumbent has an incentive to sell many shares.[88] However, α also affects the incumbent's entrenchment and his ability to "defend" his private benefits. Finally, α affects the respective intrinsic values and consequently the threat points in the negotiations. Zingales (1995, 434, proposition 2) describes the optimal choice of α of the incumbent:

[85] We assume that the incumbent's reservation price cannot be lower than the revenue in a takeover. The takeover threat is not part of the negotiations.

[86] If $v_I > v_R - \phi_R$ then the rival's profit in case of a takeover is $v_R - v_I$. If he pays $\alpha t N$ for the block – i.e. t per share – then his profit is $\alpha(v_R - \phi_R) + \phi_R - \alpha t$. The reservation price of the rival is given by

$$\begin{aligned} & \alpha v_R + (1-\alpha)\phi_R - \alpha t = v_R - v_I \\ \Rightarrow \quad & v_I - (1-\alpha)q_R = \alpha t \end{aligned}$$

If $v_I \leq v_R - \phi_R$ then the incumbent's equals the rival's reservation price: $v_R - \phi_R$.

[87] Note that there is a misprint in Zingales (1995, 434).

[88] Selling to outside investor is advantageous as they have no bargaining power.

- If $q_R \leq q_I$, then $\alpha = 1$.
- If $q_R > v_I$, $\phi_R > \phi_I$ and $\frac{1}{2}q_R \leq \phi_I + \frac{1}{2}q_I + \beta(\phi_R - \phi_I + \frac{1}{2}(q_R - q_I))$ then $\alpha = \frac{1}{2}$.
- If $q_R > v_I$, $\phi_R \leq \phi_I$ and either $q_R < \phi_I + q_I$ or $\frac{1}{2}q_R \leq \phi_I + \frac{1}{2}q_I + \beta(\phi_R - \phi_I + \frac{1}{2}(q_R - q_I))$ then $\alpha = \max\{\frac{1}{2}, \frac{\phi_I - \phi_R}{q_R - q_I}\}$.
- If $q_R \geq \phi_I + q_I$ and $\frac{1}{2}q_R > \phi_I + \frac{1}{2}q_I + \beta(\phi_R - \phi_I + \frac{1}{2}(q_R - q_I))$ then any value below $\frac{1}{2}$ is optimal.

We do not repeat the proof of Zingales but discuss the derivation of the optimal α if there is overbidding (or $\delta < 1$). If the takeover threat is non-viable, i.e. $\alpha > \frac{1}{2}$, then the reservation prices are as above, viz. the respective intrinsic values. If the takeover threat is viable, then the reservation price of the incumbent and the rival are both αv_R. The incumbent's payoff is

$$\Pi = \begin{cases} v_I & : I_I \geq I_R, \alpha \geq \frac{1}{2} \\ (1-\alpha)(v_R - \phi_R) + (1-\beta)I_I + \beta I_R & : I_I < I_R, \alpha \geq \frac{1}{2} \\ (1-\alpha)(v_R - \phi_R) + \alpha v_R & \alpha < \frac{1}{2} \end{cases}$$

As in the model of Zingales the choice α has several effects. If the incumbent chooses an $\alpha \geq \frac{1}{2}$ then he is entrenched and able to defend his private benefits (I_I depends in ϕ_I). If $\alpha < \frac{1}{2}$ then the incumbent cannot defend his private benefits. The payoff does not depend on ϕ_I. The optimal choice of α is as follows

- If $q_R \leq q_I$, then $\alpha = 1$.
- If $q_R \geq q_I$, $\frac{\phi_R - \phi_I}{q_I - q_R} \leq \frac{1}{2}$ and $(1-\beta)(\frac{1}{2}(v_I - \phi_I) + \phi_I) + \beta(\frac{1}{2}(v_R - \phi_R) + \phi_R) \geq \left(\frac{1}{2} - \frac{1}{N}\right) v_R$ then $\alpha = \frac{1}{2}$.
- If $q_R \geq q_I$, $\frac{\phi_R - \phi_I}{q_I - q_R} \leq \frac{1}{2}$ and $(1-\beta)(\frac{1}{2}(v_I - \phi_I) + \phi_I) + \beta(\frac{1}{2}(v_R - \phi_R) + \phi_R) < \left(\frac{1}{2} - \frac{1}{N}\right) v_R$ then $\alpha = \frac{1}{2} - \frac{1}{N}$
- If $q_R \geq q_I$, $\frac{\phi_R - \phi_I}{q_I - q_R} \geq \frac{1}{2}$ then $\alpha = \frac{\phi_R - \phi_I}{q_I - q_R}$

Firstly, we rule out $\alpha < \frac{1}{2} - \frac{1}{N}$ (there is an open interval problem). Indeed, as $(1-\alpha)(v_R - \phi_R) + \alpha v_R = q_R + \alpha\phi_R$ the incumbent will never choose an $\alpha < \frac{1}{2} - \frac{1}{N}$. Secondly, we can rule out that the incumbent retains control. If the incumbent chooses $\alpha = 1$ then $(1-\beta)v_I + \beta v_R > v_I$. Hence, the incumbent will choose a structure such that the change of control takes place.

Let

$$\alpha' = \frac{\phi_R - \phi_I}{q_I - q_R}.$$

It follows $\alpha'(v_R - \phi_R) + \phi_R = \alpha'(v_I - \phi_I) + \phi_I$, i.e. the intrinsic are the same if $\alpha = \alpha'$. Let

$$L = (1-\alpha)(v_R - \phi_R) + (1-\beta)I_I + \beta I_R.$$

It follows $\frac{dL}{d\alpha} = (1-\beta)(q_I - q_R)$. Consider the payoff function Π. It increases monotonically if $\alpha < \frac{1}{2}$. For $\alpha \geq \frac{1}{2}$ the shape depends on $q_I - q_R$ and α'.

Suppose that $q_I > q_R$. It follows that $\phi_R - \phi_I > 0$ (remember we consider only efficient transfers) and consequently $\alpha' > 0$. For all $\alpha > \alpha'$ the inequality $I_I > I_R$ holds. But for $\alpha = 1$ we know $v_R = I_R > I_I = v_I$. Therefore $\alpha' > 1$. This implies that for all $\alpha \geq \frac{1}{2}$ the transfer takes place and the payoff depends positively on α: $\frac{dL}{d\alpha} = (1-\beta)(q_I - q_R) > 0$. In this case $\alpha = 1$.

Suppose that $q_I < q_R$. For $\alpha = 1$ it holds $v_R = I_R > I_I = v_I$. Therefore $\alpha' < 1$. If $\alpha' \leq \frac{1}{2}$ then the payoff declines $\frac{dL}{d\alpha} = (1-\beta)(q_I - q_R) < 0$ until $\alpha = \frac{1}{2}$. The optimal $\alpha = \frac{1}{2}$ if $(1-\beta)(\frac{1}{2}(v_I - \phi_I) + \phi_I) + \beta(\frac{1}{2}(v_R - \phi_R) + \phi_R) \geq \left(\frac{1}{2} - \frac{1}{N}\right) v_R$ and $\alpha = \frac{1}{2} - \frac{1}{N}$ otherwise (here the open interval problem emerges). If $\alpha' > \frac{1}{2}$ then $\alpha^* = \alpha'$.

The result is similar to the result of Zingales (1995). The only difference is that with overbidding an optimal α smaller than $\frac{1}{2} - \frac{1}{N}$ cannot occur. This is due to the fact the incumbent can push up the rival's bid price.

6.5.2 Mandatory Bid Rule

If a transfer occurs then the minority shareholders receive the same payoff as the incumbent. Suppose that there are N shares and the incumbent sells $(1-\alpha)N$ to the open market. If t is the price that the rival and incumbent agree on then the revenue in the IPO is $(1-\alpha)Nt$. Indeed, we have seen that the transfer takes place and price is $\max\{v_I, v_R - \phi_R\}$. The minority shareholders also receive this amount either in the subsequent mandatory offer (if $v_I > v_R - \phi_R$) or as the public value of their shares. Consequently, the incumbent's payoff is

$$(1-\alpha)Nt + \alpha Nt = tN.$$

We obtain the following conclusion: If the Mandatory Bid Rule applies then the incumbent's objective is t, i.e. his payoff is maximal if t is maximal.

If $\alpha < \frac{1}{2}$ then the price t paid per share for the block is $\max\{v_I, v_R - \phi_R\}$. If $\alpha \geq \frac{1}{2}$ then the price t is the outcome of a bargaining process. The reservation price of the rival is v_R. The incumbent's reservation price (per share) is $v_R - \phi_R$ if the I-intrinsic value is smaller than the public value that the rival can generate. It is $\frac{1}{\alpha}(\alpha(v_I - \phi_I) + \phi_I) = v_I - \phi_I + \frac{\phi_I}{\alpha}$ otherwise. Hence,

$$t = \begin{cases} v_I & \text{:if } v_I > v_R - \phi_R, \alpha < \frac{1}{2} \\ (v_R - \phi_R) & \text{:if } v_I \leq v_R - \phi_R, \alpha < \frac{1}{2} \\ \beta(v_I - \phi_I + \frac{\phi_I}{\alpha}) + (1-\beta)v_R & \text{:if } \alpha(v_I - \phi_I) + \phi_I > \alpha(v_R - \phi_R), \alpha \geq \frac{1}{2} \\ \beta(v_R - \phi_R) + (1-\beta)v_R & \text{:if } \alpha(v_I - \phi_I) + \phi_I \leq \alpha(v_R - \phi_R), \alpha \geq \frac{1}{2} \end{cases}$$

Let α'' be defined by

$$\alpha'' q_I + \phi_I = \alpha'' q_R.$$

Hence $\alpha'' = \frac{-\phi_I}{q_I - q_R}$.

Suppose $q_I > q_R$ then the optimal $\alpha = \frac{1}{2}$. In this case $\alpha(v_I - \phi_I) + \phi_I > \alpha(v_R - \phi_R)$ for all α. Suppose $q_I < q_R$. Two cases are possible. If $\alpha'' > \frac{1}{2}$ then $\alpha = \frac{1}{2}$ is the unique optimal solution. If $\alpha'' < \frac{1}{2}$ then any $\alpha \geq \frac{1}{2}$ is optimal. Note the differences to the results of Zingales (1995). If the Mandatory Bid Rule applies then the incumbent never chooses an $\alpha < \frac{1}{2}$. Furthermore, the incumbent never has a "strict" incentive to choose an $\alpha > \frac{1}{2}$. We summarize:

- If $q_I > q_R$ then $\alpha = \frac{1}{2}$
- If $q_I \leq q_R$ then any $\alpha \geq \frac{1}{2}$ is optimal

The analysis is simple if the incumbent overbids. In this case the rival bids $v_R - \varepsilon$ independent of α. Therefore the incumbent is indifferent to α.

6.5.3 Mandatory Bid Rule and a Conditional Voting Cap

We obtain the following neutrality result: If the regulator imposes the Mandatory Bid Rule and a Conditional Voting Cap then α is irrelevant for the payoff of the incumbent. The incumbent payoff is tN and the price paid by the rival is

$$t = \begin{cases} v_I & \text{:if } v_I > v_R - \phi_R \\ (v_R - \phi_R) & \text{:if } v_I \leq v_R - \phi_R \end{cases}$$

The later is independent of the size of the block.

6.6 Conclusions

It is well known that the Mandatory Bid Rule leads to frustration of all inefficient transfers of control (Bebchuk, 1994). An argument against the Mandatory Bid Rule is that it also frustrates efficient transfers of control. We proved that the Mandatory Bid Rule achieves an efficient allocation of control if one condition is met: $\alpha < \frac{1}{2}$. The key to this result is the threat of a takeover: If the incumbent owns less than 50% of the shares then a rival can threaten to launch a tender offer. This takeover threat thwarts the defence of the private benefit: The private benefit ceases to be factor of the reservation price of the incumbent.

If $\alpha \geq \frac{1}{2}$ then incumbent is entrenched. An entrenchment of the incumbent causes the frustration of some efficient transfers. Hence, the MBR does not achieve an efficient allocation of control. In addition, the Mandatory Bid Rule generates the incentive to set $\alpha \geq \frac{1}{2}$. If the incumbent can freely choose α then the incumbent will entrench himself.[89] Consequently, the Mandatory Bid Rule has two disadvantages: (1) If $\alpha \geq \frac{1}{2}$ some efficient transfers are blocked. (2) It is likely that the incumbent chooses $\alpha \geq \frac{1}{2}$. Both problems stem from the entrenchment effect of $\alpha \geq \frac{1}{2}$. The key to solve this problem is to thwart entrenchment.

If the Mandatory Bid Rule is augmented with the Conditional Voting Cap then an efficient allocation of control results. Furthermore, the incumbent is indifferent between all possible α's. The Conditional Voting Cap breaks through his control rights but protects – in a specific sense – his property rights.

There is a consensus in the literature that an efficient allocation of control cannot be assured. We will argued that an efficient allocation of control can be assured if one preconditions is satisfied: the *transaction* costs of financing the transfer and of bidding are negligible. Efficiency is achieved by combining the Mandatory Bid Rule with a Conditional Voting Cap.

We also discussed overbidding. The incumbent is not only a bidder but also a seller and by overbidding the incumbent pushes up the rival's bid price. Since he has a toehold he has an incentive to overbid. The literature on blocktrades ignores (an oversight) overbidding even though (1) the incumbent has a strong incentive to overbid and (2) overbidding has the potential to increases the price the rival has to bid (which affects his incentive to bid in the first place). We show that the main result – the "MBR & $\alpha < \frac{1}{2}$" or "MBR & conditional voting cap" $\Rightarrow$ efficient allocation of control – still holds even though the bid price the rival

[89] The necessity to finance an investment presumably limits the choice of α.

has to pay is higher.

A Conditional Voting Cap has not been suggested so far; neither as a mandatory article of a takeover law *nor as a charter amendment*. As a mandatory rule, it is a severe interference with contractual freedom. However, the break through rule of the European Directive also redefines ownership. Break Through Rule of the European Directive together with the Mandatory Bid Rule does not achieve efficiency. The incumbent can still entrench by choosing $\alpha \geq \frac{1}{2}$.

Appendix: Overbidding and $\delta < 1$

If the incumbent owns shares of the target then he has an incentive to overbid. Assume, that the value of the firm is v_I (v_R) if the incumbent (rival) controls the firm. Superficially, we might expect that the incumbent won't bid more than v_I. But, if the incumbent bids $v_R - \varepsilon_1$, $0 < \varepsilon_1 < v_R$ then a bid of $v_R - \varepsilon_1 + \varepsilon_2$ succeeds. The rival's profit is $\varepsilon_1 - \varepsilon_2$. The latter value is positive if ε_2 is sufficiently small. The incumbent has an incentive to choose ε_1 as small as possible. However, if the incumbent choose $\varepsilon_1 = 0$ then the rival won't bid. The problem is an open set problem. We will take a shot cut and assume that there is a very small minimal ε_1 such that the bidder still bids. In the main text however, we suppress the variable ε_1. We write "the bidder bids v_R if the incumbent overbids" tacitly assuming that he bids $v_R - \varepsilon_1 + \varepsilon_2 < v_R$.

Similarly, we use a short cut if $\delta < 1$. If the rival owns more then δN of the shares of the target then he will not divert. Hence, the post takeover public value of a share is v_R. Consequently, the bidder has to bid at least v_R. If he bidden v_R his profit would be zero. Hence, he has no incentive to bid. To avoid this problem, we assume that the rival can extract a small private benefit ε. Moveover, there are no camouflage costs associated with the diversion of ε. The public value of of a share after the takeover is $v_R - \varepsilon$. Consequently, a bid with bid price $v_R - \varepsilon$ succeeds and the rival's profit is $\varepsilon > 0$. In the main text however, we suppress the variable ε.

SECTION 7

Pyramids and Takeover

7.1 Motivation

Wolfenzon (1999) noticed that there is a marked asymmetry in the analysis of the ownership structures of companies. There is a considerable literature concentrating on the ownership of *one* firm in isolation. However, "considerable less attention has been placed on the different structures that a single individual uses to control multiple firms" (Wolfenzon (1999, 1)). This is even more so, if one considers *theoretical* research on the multiple control. Whereas there are very elaborate empirical studies (e.g. Barca & Becht (2001), Claessons et al. (1999), Faccio et al. (2001), Franks & Mayer (2000), La Porta et al. (1999, 2000))[90] there is relatively few analytical research on this topic (Bebchuk et al. (2000a), Schenk (1997), Wolfenzon (1999)). A major step balancing this asymmetry was done by Wolfenzon.

Wolfenzon (1999) studies whether a firm B is set up as an independent corporation ("horizontally") or a subsidiary of an existing corporation A that is already under control of the entrepreneur ("pyramidal"). This is a "how-question". The question of who controls the firm is deliberately ignored. All attention is focused on how control is executed. In the preceding sections we have discussed the "who-question": which management team will ultimately control the firm. This section will combine these two questions. In section 6.5 a similar problem was analyzed, viz. how does the takeover threat shapes the ownership structure of a single firm. More specifically, we asked how does the market of corporate control affect the incumbent's decision to go public (his choice of α). This section is similar in spirit: how does the market of corporate control affect the choice between a pyramidal or a horizontal structure.

The simultaneous analysis of the how and who–question is important since it is a common argument that the so-called Deutschland AG (Adams (1994, 1999), Schmidt (2001)) hinders takeovers. Therefore, there is an obvious link from the

[90]For a more complete list see the references in Faccio et al. (2001).

how-question – e.g. cross-shareholding – to the who-question. The incumbent managers use cross-shareholding to entrench themselves (Bebchuk et al. (2000a)). This section addresses an effect in the opposite direction "who-question $\rightarrow$ how-questions" by simultaneously studying the who- and how-questions. Indeed, the way an economy handles the who-question, i.e. whether there is an active market for corporate control, has important consequences for the how-questions, i.e. how control is exercised.

7.2 The Model

The timing of the model is given in figure 13. Initially at $t = 0$ there exists a corporation A. The following players are considered. There is a controlling shareholder of the corporation A, whom we call E for "entrepreneur". Beside E the corporation has atomistic shareholders, who are called O for "old". There are other investors (called N for "new") who are (not yet) shareholders of A. Finally there is a player called R for "raider".

At $t = 0$ the entrepreneur controls all operations of A independently of the fraction of shares (denoted α) he owns. All other atomistic shareholders act according to "rational ignorance". At $t = 4$ the corporation A generates a verifiable income of q_A.

At $t = 0$ the entrepreneur E has an "idea". At $t = 4$ this idea will – if it is realized and E is still the controller of the idea – generate a verifiable income q_{EB}. There are verifiable start up costs I at $t = 0$. Furthermore, the idea generates a non-verifiable amount y_E. There is no discounting and no uncertainty.

It is assumed that it is optimal to realize the idea by setting up a new corporation.[91] The entrepreneur E has the choice of either setting up a corporation B as a subsidiary of A, i.e. in a "pyramidal structure". Alternatively he may found B as an independent corporation, i.e. in a "horizontal structure". The difference is that in a pyramidal structure A initially owns all rights (dividend rights and voting rights) of B whereas in the horizontal structure E is the only claimant.

Since neither A nor E have free financial resources to found B, in both cases

[91] See Wolfenzon (1999).

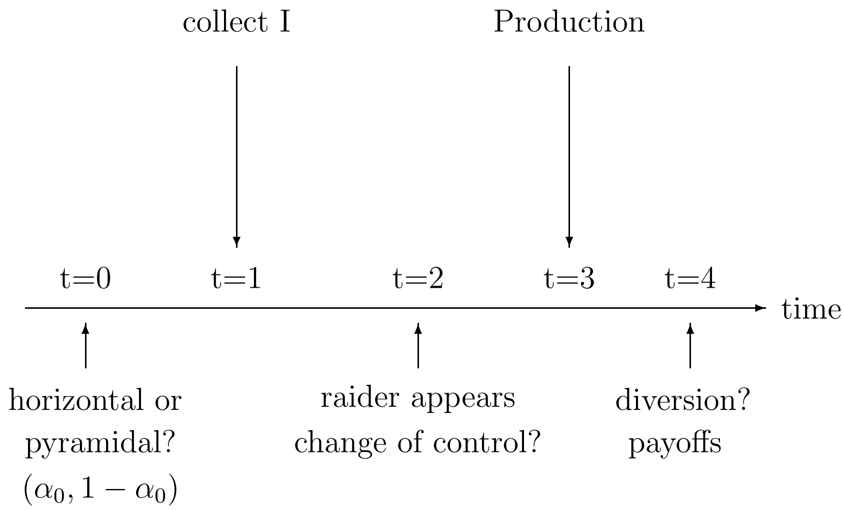

Figure 13: **Timing of the Game**

(pyramidal or horizontal) the initial owner must turn to the capital market to obtain funds for the initial investment. This will happen at $t = 1$. We assume that outside investors N *perfectly anticipate* all future decisions. We will describe the two financing procedures in turn. Both procedure use public offerings to collect money. Note: The future payoffs of A and B are sold to investors. These investors pay a fair price; thus their net-gain is zero. However, the transaction may be negative for O. Their shares are diluted if additional shares of A are issued. In return, they receive dividends but it is not clear whether this is a zero net-present-value transaction. Indeed, in case of $q_B - I < 0$ they lose compared with the situation where B is not founded.

Financing the Horizontal Structure

We consider the horizontal structure at first. To finance the investment the entrepreneur makes two public offerings. He makes an initial public offering (IPO) of shares of B. After this IPO outside investors will hold the fraction $1 - \beta_H$ of the shares of B. In addition E executes a seasoned public offering (SPO) of new shares of A, such that afterwards new shareholders own the fraction $1 - \omega_H$ of the shares of A. The revenue of the SPO is distributed as an "artificial" dividend to all shareholders. E uses his share of this dividend in addition to revenue of the IPO to finance the foundation of B. The ownership structure of A and B after the IPO respectively the SPO is (see also the lower panel of figure 14)

$$A: \quad (\underbrace{\alpha\omega_H}_{E}, \underbrace{\omega_H(1-\alpha)}_{O}, \underbrace{1-\omega_H}_{N}) \qquad B: \quad (\underbrace{\beta_H}_{E}, \underbrace{1-\beta_H}_{N}).$$

The revenue available for the foundation of B is

$$\alpha(1-\omega_H)q_A + (1-\beta_H)x,$$

where x is the cash flow from B (determined later).

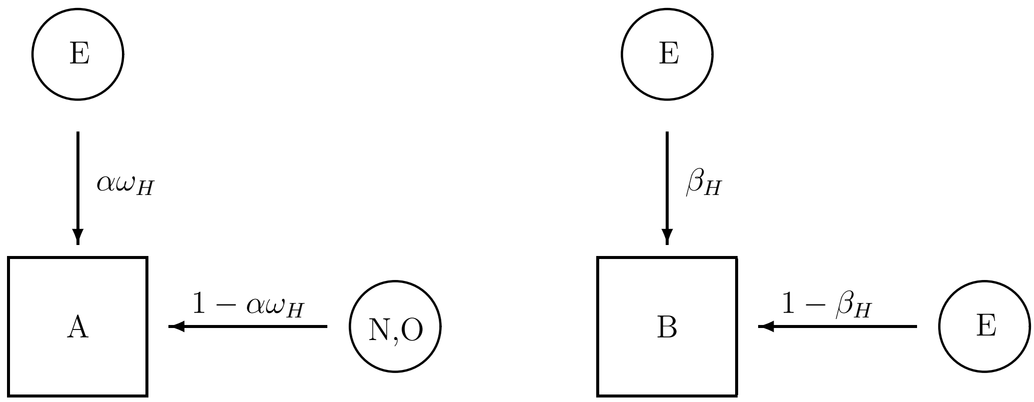

Figure 14: **The ownership structure in the horizontal case.**

Financing a Pyramid

As in the horizontal case, the entrepreneur makes an initial public offering of shares of B and a seasoned public offering of share of A. After the offerings the ownership structures are

$$A: \quad (\underbrace{\alpha\omega_P}_{E}, \underbrace{\omega_P(1-\alpha)}_{O}, \underbrace{1-\omega_P}_{N}) \qquad B: \quad (\underbrace{\beta_P}_{A}, \underbrace{1-\beta_P}_{N}),$$

and the revenues available for the foundation of B are

$$\begin{aligned}(1-\beta_P)x + (1-\omega_P)\beta_P x + (1-\omega_P)q_A \\ = (1-\beta_P\omega_P)x + (1-\omega_P)q_A. \end{aligned} \tag{16}$$

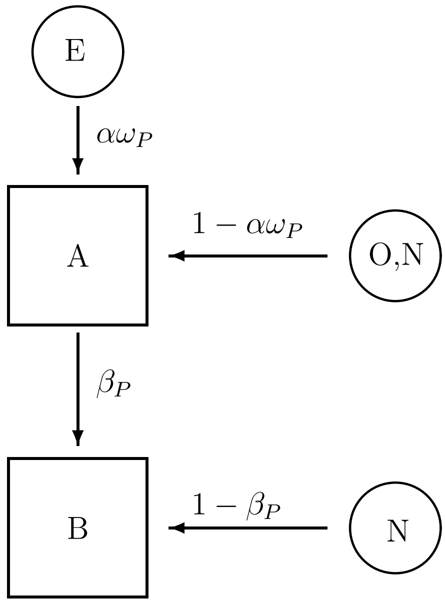

Figure 15: **The ownership structure in the pyramidal case.**

The raider

At $t = 2$ the rival R appears. The verifiable and the non-verifiable income from B under control of R differ from the corresponding incomes if E has control. If R controls the operations of B then the verifiable income is q_{RB} (instead of q_{EB}) and y_R (instead of y_E). At $t = 2$ a change of control may take place. There are two possibilities: R assumes the position of E by buying the block from E. Alternatively, he may launch a tender offer. We do not impose the Mandatory Bid Rule.

Dilution

At $t = 4$ the controller of B – the entrepreneur or the rival depending on the outcome at $t = 2$ – decides whether to pay out the amount y_X ($X = E$ or R) as a dividend or to divert this amount as a private benefit. However, diversion is costly. If the controller diverts the amount y_X he merely receives δy_X, $0 < \delta < 1$. If y_X is paid out as a dividend then the controller receives a fraction of y_X proportional to his shareholding (direct or indirect) in B.

7.3 The Model of Wolfenzon

In this section it is assumed that no raider appears and that this is common knowledge. This is the case considered by Wolfenzon (1999). The analysis in this subsection serves as a reference point for the case with takeovers. Firstly, we determine the revenues of the offerings conducted at $t = 1$. In the horizontal case the revenue of the offerings available for the foundation of B is $\alpha(1 - \omega_H)q_A + (1 - \beta_H)x$, where x is B's dividend at $t = 4$. In the pyramidal case the revenues are $(1 - \beta_P)x + (1 - \omega_P)\beta_P x + (1 - \omega_P)q_A = (1 - \beta_P\omega_P)x + (1 - \omega_P)q_A$.

In both cases the value of x depends on the diversion decision of E. If E divert, then x equals q_B; otherwise x equals $q_B + y_B$.

The Diversion Decision

At $t = 4$ the entrepreneur E decides about diversion. Whether he diverts or not depends on his direct or indirect claim on dividends. We call this the *incentive effect* of a large block. In the horizontal case he diverts iff $\beta_H < \delta$. In the pyramidal case he diverts iff $\alpha\omega_P\beta_P < \delta$.

Financial Constraints

The maximum amount the entrepreneur can raise depends on the control structure and on the dividends paid at $t = 4$. The dividend depends on his claim on dividends of B (incentive effect). Consider the horizontal case at first. If E wants to avoid diversion, he must keep at least the fraction δ of the shares of B. The maximum revenue is $\alpha q_A + (1 - \delta)(q_B + y)$ for the horizontal structure with no diversion (H-ND). The maximum revenue is $\alpha q_A + q_B$ for the horizontal structure with diversion (H-D).

Now consider the pyramidal structure. In order to avoid diversion E must have an indirect claim of at least δ on the dividends of B, i.e. $\alpha\omega_P\beta_P = \delta$. The maximum revenue is $(1 - \delta/\alpha)(q_A + q_B + y)$ in case of no diversion (P-ND). With diversion (P-D) the maximum revenue is $q_A + q_B$.

Table 1, column 2 summarizes the maximum revenues for the corresponding structures.

Structure	max. revenue	E's payoff
H-ND	$\alpha q_A + (1-\delta)(q_B + y)$	$q_B + y - I$
H-D	$\alpha q_A + q_B$	$q_B + \delta y - I$
P-ND	$(1-\delta/\alpha)(q_A + q_B + y)$	$\alpha(q_B + y - I)$
P-D	$q_A + q_B$	$\alpha(q_B - I) + \delta y$

Table 1: Maximum Revenues and E's payoffs (αq_A is not included)

Remarks

For a given value of x the maximum revenue is higher in the pyramidal structure than in the horizontal one. Consider

$$\underbrace{(1-\omega_P)q_A + (1-\beta_P\omega_P)x}_{pyramidal} \quad \text{vs.} \quad \underbrace{\alpha(1-\omega_H)q_A + (1-\beta_H)x}_{horizontal}.$$

For a maximum revenue E must maximally dilute his ownership in A. The maximum revenues are q_A and respectively αq_A in the pyramidal and the horizontal case. However, it is rashly to conclude that this gives the pyramidal structure an advantage. The choice of the ownership structure affects the fraction of dividends that E receives directly or indirectly from B. This affects his incentive to divert and the latter determines x. Even if for a given x the pyramidal structure has an advantage, the assumption of a given x is not unproblematic. Indeed, we are going to encounter a case, where the horizontal structure has a higher revenue potential.

The assumption of perfect foresight on behalf of new shareholders implies that all offerings are pure financial transactions. Therefore new shareholders have a net advantage of zero. As a consequence **E and/or O** obtain the complete net advantage generated by B. The size of the advantage and its distribution is as follows:

- In the horizontal case the advantage goes to the entrepreneur E and is either equal to $\underbrace{q_B - I + y}_{\text{no}-\text{diversion}}$ or equal to $\underbrace{q_B - I + \delta y}_{\text{diversion}}$.
- In the pyramidal case the size of the advantage is again $q_B - I + y$ in the case of no diversion or equal to $q_B - I + \delta y$ if E decides to divert y. For E

the respective gains are

$$\underbrace{\alpha(q_B - I) + \alpha y}_{\text{no-diversion}} \quad \text{respectively} \quad \underbrace{\alpha(q_B - I) + \delta y}_{\text{diversion}}.$$

In the horizontal case E enjoys the complete net profit. Hence, he has an incentive to commit to non-diversion. However,he will divert iff $\beta_H < \delta$. Whether or not he is able to commit to non-diversion depends on whether he is able to keep β_H (resp. y_P and β_P) greater or equal to δ. If financial requirements make it necessary to have a high fraction of new shareholders then diversion is unavoidable.

Solving the Game

To find the solution of the game, it is solved backwards. At $t = 4$ the decision about pyramidal vs. horizontal is given and the only question is whether or not E diverts. At $t = 1$ E must raise the amount I in order to found B. Finally, at $t = 0$ he must decide about the structure.

Rule: A structure is optimal iff three conditions are met:

- the payoff is positive (see table 1, column 3),
- it can be financed (see table 1, column 2),
- it is better than any other structure that can be financed.

These three conditions give linear inequalities that describe the regions of the parameters' space where certain structures are optimal. Wolfenzon proved the following propositions.

Proposition 1: P-ND never occurs.

Proof: Suppose the payoff of P-ND is non-negative: $\alpha(q_B - I + y) \geq 0$. Suppose that P-ND can be financed: $(1 - \frac{\delta}{\alpha})(q_A + q_B + y) \geq I$. It follows:

$$\begin{aligned}
& \frac{\alpha - \delta}{\alpha}(q_A + q_B + y) \geq I \\
\Rightarrow \quad & (\alpha - \delta)(q_A + q_B + y) \geq \alpha Y \\
\Rightarrow \quad & \alpha q_A + \alpha(q_B + y) - \delta(q_B + y) \geq \alpha I + \delta q_A \\
\Rightarrow \quad & \alpha q_A + (1 + \alpha)(q_B + y) - \delta(q_B + y) \geq q_B + y + \alpha I + \delta q_A \\
\Rightarrow \quad & \alpha q_A + (1 - \alpha)(q_B + y) + \alpha(q_B + y) - \delta(q_B + y) \geq (1 - \alpha)(q_B + y) + \alpha I + \delta q_A \\
\Rightarrow \quad & \alpha q_A + (1 - \delta)(q_B + y) \geq I
\end{aligned}$$

The last inequality implies that (H-ND) can be financed. If (P-ND) can be financed and has a non-negative profit then (H-ND) can also be financed. E prefers (H-ND) as the profit is higher.

Proposition 2: If $q_B \geq I$, P-D never occurs.

Proof: $q_B - I \geq 0$ implies that the entrepreneur prefers (H-D) over (P-D). Furthermore, $q_B - I \geq 0$ implies $\alpha q_A + q_B \geq I$. Hence, (H-D) can be financed if P-D can be financed.

Propositions 1 and 2 imply that $q_B < I$ is a necessary condition for a pyramidal structure. In the case of $q_B \geq I$ diversion may occur since the financial requirements trigger a small stake of E in B. The more interesting situation is $q_B < I$ on which we concentrate in what follows.

Proposition 3: If $q_B < I$, H-D never occurs.

Thus, there are only three possibilities. B will not be founded, it will be founded horizontally and no diversion takes place (H-ND) or a pyramidal structure is used and diversion takes place (P-D). Wolfenzon proves the following theorem

Theorem 1: Suppose $q_B < I$. E's choice of the ownership structure is as follows:

(1) Iff (a) $q_B + y - I \geq 0$, (b) $I \leq q_B + \frac{1-\delta}{1-\alpha} y$ and (c) $I \leq (1-\delta)(q_B + y) + \alpha q_A$, then (H-ND).
(2) Iff (a) $I > (1-\delta)(q_B + y) + \alpha q_A$ or $I > q_B + \frac{1-\delta}{1-\alpha} y$ and (b) $I \geq q_A + q_B$ and (c) $I \leq q_B + \frac{\delta}{\alpha}$ then (P-D).

The inequalities of the theorem have straight forward interpretations. (1a) means that (H-ND) is profitable. (1b) is the conditon that (H-ND) is better than (P-D) and finally (1c) states that (H-ND) can be financed. (2a) states that (H-ND) cannot be financed or is worse than (P-D). (2b) states that (P-D) can be financed and (2c) that it is profitable to do so.

Interim Conclusion

In Wolfenzon's framework a pyramidal structure is always connected with diversion. Furthermore, projects that are worthwhile even if one ignores the non-verifiable income are always set up horizontally. In this case there is no expropriation of minority shareholders and the only problem is the welfare loss of $(1-\delta)y$ due to the diversion technology. In case of a pyramidal structure we have diversion which generates a welfare loss and in addition an expropriation of the minority shareholders of A. In the P-D case shareholders of A pay I and receive only $q_B < I$ in return. The public offering generates a redistribution. The old shareholders suffer a welfare loss of $(1-\alpha)(I-q_B)$. Consider the total gain of B and its distribution

$$\underbrace{q_B - I}_{<0} + \delta y = \underbrace{\alpha(q_B - I)}_{\hookrightarrow E} + \underbrace{(1-\alpha)(q_B - I)}_{\hookrightarrow O} + \underbrace{\delta y}_{\hookrightarrow E} .$$

From the perspective of E, the pyramidal structure has the advantage of a shift of costs. He carries the net-costs of B only partially and enjoys the private benefits completely. In this sense his incentives are distorted.

7.4 Adding Takeovers

In preceding subsection we assumed that E controls A and B independent of the fraction of the shares he owns. The latter may become very small due to the dilution caused by the offerings. This is a relatively unproblematic assumption with respect to the minority shareholders who are presumably ignorant. However, it is not an unproblematic assumption if tender offers are possible. In this case a small controlling shareholder may be vulnerable to the attack of a raider. In this section we demonstrate by a numerical example that the addition of the market for corporate control affects the decision about the control structure. Particularly, we will develop an example such that in the framework of the preceding subsection the P-D emerges. By adding the possibility of a hostile takeover P-D becomes a regretted/disequilibrium outcome.

7.4.1 An Unanticipated Raider – An Example

Consider the following scenario. At time $t = 0$ all players believe that they are playing the game without a raider, i.e. the game as described in section 3. Surprisingly, a raider appears at $t = 2$. The raider differs from E in terms of the private benefits and the verifiable income. In the scenario we consider E will chose a pyramidical structure at $t = 0$. However, he regrets this decision later.

We consider the following parameter constellation: $\alpha = 1/2, q_{EB} = 100, I = 147, y_E = 100, q_A = 200, \delta = 0.8$. Using the theorem of the preceding section we deduce that E chooses P-D.

E has some degree of freedom to finance I. We assume that he keeps all shares of B, i.e. $\beta_P = 1$. To generate a revenue of 147, he accordingly sets $\omega_P = 51\%$, it follows $(1 - 0.51) \cdot 200 + (1 - 0.51) \cdot 100 = 0.49 \cdot 300 = 147$. The net profit for E is given by $0.51 \cdot 0.5 \cdot 300 + 80 = 156.5$. At the margin we note that the expropriation of O is 24.5. If B is not founded O would receive 100. In case that it is founded, they receive $0.255 \cdot 300 = 76.5$. Their wealth is diluted by the public offering.

Now, assume that a raider appears who has not been anticipated. For the rival we assume $q_A = 200, q_{RB} = 120, y_R = 90$. What happens if R owns the shares of E? In this case he would have a net profit of $0.255 \cdot 320 + 0.8 \cdot 90 = 153.6$. These numbers *suggest* that no deal can occur since E would demand at least 156.5 and R would pay at most 153.6. However, 156.5 is not the correct reservation price of E in the negotiations with R as the rival may threaten to launch a tender offer.

Consider what happens if R is the owner of all shares of A. In this case he generates an income of 200 + 120 + 90 =410. Consider an unrestricted conditional tender offer with a bid price of 4.1. Will N and O accept the offer? The following table describes the decisions/payoffs of N and O, where we assume that there are 100 shares.

	tender	don't tender
takeover is successful	4.1	4.1 or 3.2
takeover is not successful	3.0	3.0

The payoff of a shareholder if he plays "tender" and the bid is successful depends on the tendering decision of E. If E does not tender N and O prefer "tender" otherwise they are indifferent. In the equilibrium – see below – E will tender. N and O are indifferent between both actions (tender, don't tender). However the tendering equilibrium pareto-dominates the no-tendering equilibrium. We assume that "to tender" is the outcome.

E can anticipate the actions of N and O. He assumes that N and O tender and the takeover succeeds. If he does not tender, R will divert since $0.745 < 0.8$. In

$t = 4$ dividends will be $120 + 200$ and E will receive 81.6. Will he himself tender? If he tenders he will receive 104.55 for his stake. Therefore he will tender.

Remark: Due to the free-rider problem, the bidder must at least bid the post takeover public value. Thus R must either bid 4.1 or 3.2. Can he bid 3.2? The bid is iff N and O tender. Suppose they tender. Is E going to tender? If he tenders he receives 81.6. His block has the same value if he does not tender. If he tenders R owns all shares and the post takeover is 4.1. The assumption that N and O tender leads to a contraction. R can anticipates this and credibly commit to tender. This implies that N and O will not tender. E has an incentive to commit to tender in case of a low bid (an he is indifferent if the bidder actually bids 3.2).

From the analysis of the takeover battle we can conclude that the reservation price of E is *not* 156.5. Instead of 156.5 he will enter the negotiations with a reservation price of 104.55. This value corresponds to the threat point determined by the takeover threat of R.

With a reservation price of 104.55 of E and an reservation price of 153.6 of R a deal is possible. We assume that they split-the-difference and E receives 129.075 for his stake.

Regret

We have assumed that E uses a pyramidal structure to found B. Consider the outcome if he would have founded B horizontally. Suppose that he issues 50% of the shares of B and chooses $1 - \omega_p = 0.97$. The revenue is 147 in this case. Without a transfer of control his payoff is 133. Notice that R can obtain control of B only if he acquires the shares of E. The reservations prices are 133 and 153.6 for E resp. for R. Assuming "split-the-difference" E would obtain 143.3 for his block. Hence, E regrets his decision to use a pyramidal structure.

In this subsection the raider surprised the players. However, it is equally reasonable to assume that agents expect a raider to appear with a certain probability. The next subsections assume perfect foresight.

7.4.2 The Takeover Contest

At $t = 2$ the raider and the incumbent negotiate about a transfer of control. Whether the transfer of control takes place depends on the reservation prices of the incumbent and the raider. The reservation price of the incumbent may be affected by outcome of the takeover threat. The raider may threaten to submit a tender offer. In this section we study this takeover contest/threat. We determine the outcome of the takeover and especially the payoff for the incumbent. If this payoff is smaller than the intrinsic value of the stake then the latter ceases to be a lower bound in the negotiation with the raider.

Horizontal Case:

We consider the takeover for the horizontal case first. Note, that a takeover threat is viable only if $\beta_H \leq 50$. The bidder has to bid at least the post-takeover public value of the firm since otherwise small shareholders won't tender. The post-takeover value is $v_{RB} = q_{RB} + y_R$ if the raider own more than the fraction δ of the shares. If $1 - \beta_H \geq \delta$ holds then $q_{RB} + y_R$ is the post takeover value. In the case $1 - \beta_H < \delta$ the post takeover value depends on whether E also tenders. If he also tenders then the post takeover value is $q_{RB} + y_R$ and otherwise q_{RB}. We must check whether a takeover with bid price q_{RB} can be successful. The atomistic shareholders won't tender if they believe that E will tender. If E does not tender and the atomistic shareholders believe this then a bid with bid price q_{RB} could be successful. Note, however that E is indifferent between tender and don't tender. Thus, it would be costless for him to commit to tender if a bid with bid price q_{RB} were made. But with this commitment, the bid will fail. For this reason, we assume that the raider must bid $v_{RB} = q_{RB} + y_R$ in both cases $1-\beta_H \leq \delta$ and $1-\beta_H > \delta$. In the negotiations with the incumbent the raider may threaten with a takeover. Such a threat is viable only if the incumbent cannot submit a better counter-bid, i.e. $q_I + y_{IB} < q_{RB} + y_R$. In the case of a takeover the incumbent receives $\beta_H(q_{RB} + y_R)$. Consequently, the value of the blocks is

$$S_0 = \beta_H(q_{RB} + y_R) + \alpha y_H q_A.$$

Note, that overbidding is not a problem, as the bidder bids the maximal value anyway.

To sum up: A takeover threat is viable if $\beta_H < 0.5$ and $v_{RB} > v_{IB}$.

Pyramidal Case:

The pyramidal case is more complicated. In the pyramidal case the bidder may launch a tender offer for A, for B or for both. Whether a tender offer is relevant depends on whether more than 50% of the shares are owned by outsiders (N or O). Three cases are possible.

Assume that $\alpha\omega_P \geq 0.5$ and $\beta_P < 0.5$. In this case the raider can achieve control over B (a bid for A is pointless). If $v_{RB} > v_{IB}$ then a takeover with a bid price of $q_{RB} + y_R$ succeeds and the value for the blocks is

$$S_1 = \alpha\omega_P\beta_P(q_{RB} + y_R) + \alpha\omega_P q_A.$$

Next, assume that $\alpha\omega_P < 0.5$ and $\beta_P \geq 0.5$. The raider will bid for A. A bid for B is pointless. However, as A has a majority in B, R can obtain control of B through A. We must distinguish two cases. If $\beta_P < \delta$ then a bid with $b = \beta_P q_{RB} + q_A$ and $q_R > q_I$ (otherwise the incumbent could launch a counter-bid) will succeed and the value of the blocks is

$$S_2 = \alpha\omega_P\beta_P q_{RB} + \alpha\omega_P q_A.$$

If $\beta_P \geq \delta$ then $b = \beta_P(q_{RB} + y_R) + q_A$ succeeds and the value of the blocks is

$$S_3 = \alpha\omega_P\beta_P(q_{RB} + y_R) + \alpha\omega_P q_A.$$

Finally, assume that $\alpha\omega_P < 0.5$ and $\beta_P < 0.5$. If the bidder bids for B only, the value of the stake is

$$S_4 = \alpha\omega_P\beta_P(q_{RB} + y_R) + \alpha\omega_P q_A.$$

If the raider bids for A only then E might launch a counter-bid for B to force R to bid for B also. Thus R must bid for A and B (or only for B). The bid price must be at least the post takeover public value. Hence, the value of the blocks is

$$S_5 = \alpha\omega_P\beta_P(q_{RB} + y_R) + \alpha\omega_P q_A.$$

Note, that E prefers $0.5 > \beta_P$ to $0.5 < \beta_P < \delta$. Later, we discuss the advantage of entrenchment, i.e. the objective of E to own a sufficiently large block in order to block a takeover. Here, entrenchment is costly. If $0.5 < \beta_P < \delta$ and $\alpha\omega_P < 0.5$ holds then E has a relatively bad bargaining position. The case with $0.5 < \beta_P < \delta$ is “inconvenient”. But according to the following proposition, the incumbent can avoid this parameter constellation.

Proposition: The incumbent can avoid $0.5 < \beta_P < \delta, \alpha\omega_P < 0.5$, i.e. he can choose a different structure such that the project can still be financed and the value of the block is not lower.

Proof: Consider a choice of ω_P, β_P $(0.5 < \beta_P < \delta, \alpha\omega_P < 0.5)$ such that the investment is financed, i.e.

$$(1 - \beta_P\omega_P)X + (1 - \omega_P)q_A = I,$$

where X is the dividend paid by B. We assume for the moment that X is fixed. The intrinsic value of the block is

$$\alpha\beta_P\omega_P X + \alpha\omega_P q_A + \delta y.$$

Suppose that the incumbent sets $\beta' = \beta_P - x_1$. The revenue is

$$\begin{aligned} & (1 - \beta'\omega_P)X + (1 - \omega_P)q_A = (1 - (\beta_P - x_1)\omega_P)X + (1 - \omega_P)q_A \\ = \quad & (1 - \beta_P\omega_P)X + (1 - \omega_P)q_A + x_1\omega_P X = I + x_1\omega_P X. \end{aligned}$$

The extra amount is kept at the purse of A and distributed as dividend at $t = 4$. The value of the block is

$$\begin{aligned} & \alpha\beta'\omega_P X + \alpha\omega_P q_A + \delta Y + \alpha\omega_P x_1\omega_P X \\ = \quad & \alpha(\beta_P - x_1)\omega_P X + \alpha\omega_P q_A + \delta Y + \alpha\omega_P x_1\omega_P X \\ = \quad & \alpha\beta_P\omega_P X - \alpha x_1\omega_P X + \alpha\omega_P q_A + \delta Y + \alpha\omega_P x_1\omega_P X \\ = \quad & \alpha\beta_P\omega_P X + \alpha\omega_P q_A + \delta Y, \end{aligned}$$

We conclude: The incumbent can reduce the β_P without decreasing the value of the block. The intrinsic value is un-effected by a ‘void” transaction (a transaction is void if an extra amount is collected and later simply distributed).

Consequently, the incumbent can choose a low β'_P (and perhaps also a low y'_P) in such a way that the intrinsic value remains unchanged but $\beta'_P < 0.5$.

Note, that the takeover is indeed severe. If a takeover occurs, E obtains at most $\alpha\omega_P\beta_P y_{RP}$, i.e. he shares in the non-verifiable income according to his shareholdings, whereas he receives the private benefit δY_{EP} in all if he is the controller. As a controlling shareholder he would enjoy δY_{EP} as a private benefit. It is very likely that $\alpha\omega_P\beta_P$ is much smaller than δ.

To sum up: A takeover threat is viable if in addition to $v_R > v_I$ the inequality $\alpha\omega_P < 0.5$ or $\beta_P < 0.5$ holds. The value of the blocks in a takeover threat is

$$\alpha\omega_P\beta_P(q_{RB} + y_R) + \alpha\omega_P q_A.$$

7.4.3 Negotiations and Transfer of Control

Consider the horizontal case. If R controls B then the value of the block is $\beta_H q_{RH} + \delta y_{RH}$ if $\beta_H < \delta$ and $\beta_H(q_{RH} + Y_{RH})$ otherwise. Whether a transfer takes place depends on the incumbent's reservation price. The revenue if R executes a takeover is $\beta_H(q_{RH} + Y_{RH})$. Without a takeover the value of the block is $\beta_H q_{EH} + \delta Y_{EH}$ if $\beta_H < \delta$ and $\beta_H(q_{EH} + Y_{EH})$. Note, that a takeover threat is viable only if $\beta_H < 0.5$. We can conclude that a transfer of control will take place in the following cases

Case 1: $\beta_H < \delta, v_R > v_I,$ **and** $\beta_H < 0.5:$

$$\beta_H q_{RH} + \delta y_{RH} > \min\{\beta_H(q_{RH} + y_{RH}), \beta_H q_{EH} + \delta y_{EH}\}$$

Case 2: $\beta_H \geq \delta$ **and** $\beta_H < 0.5:$

$$\begin{aligned} & \beta_H(q_{RH} + y_{RH}) > \beta_H(q_{EH} + y_{EH}) \\ \Leftrightarrow \quad & v_R > v_I \end{aligned}$$

Case 3: $\beta_H \geq \delta$ **and** $\beta_H > 0.5:$

$$v_R > v_I$$

Case 4: $\beta_H < \delta$ **and** $\beta_H > 0.5:$

$$\beta_H q_{RH} + \delta y_{RH} > \beta_H q_{EH} + \delta y_{EH}$$

In all other cases the incumbent retain control. Consider the pyramidal case. The R-intrinsic value of the block is

$$\begin{aligned} \alpha\omega_P\beta_P(q_{RB} + Y_{RB}) + \alpha\omega_P q_A \quad & (\alpha\omega_P\beta_P \geq \delta) \\ \alpha\omega_P\beta_P q_{RB} + \delta Y_{RB} + \alpha\omega_P q_A \quad & (\alpha\omega_P\beta_P < \delta) \end{aligned}$$

Without a takeover threat the raider must offer at least the I-intrinsic value. With a takeover threat, the incumbent's is (in general) lower. A transfer of control take place in the following cases:

Case 1: $\alpha\omega_P\beta_P \geq \delta$**,** $\alpha\omega_P < 0.5$ **or** $\beta_P < 0.5$**:**

$$\alpha\omega_P\beta_P(q_{RB} + y_R) \geq \alpha\omega_P\beta_P(q_{EB} + y_E)$$

Case 2: $\alpha\omega_P\beta_P < \delta$**,** $v_R > v_I$**,** $\alpha\omega_P < 0.5$ **or** $\beta_P < 0.5$**:**

$$\alpha\omega_P\beta_P q_{RB} + \delta y_R \geq \min\{\alpha\omega_P\beta_P(q_{RB} + y_R), \alpha\omega_P\beta_P q_{EB} + \delta y_E\}$$

Case 3: $\alpha\omega_P\beta_P \geq \delta$**,** $\alpha\omega_P > 0.5$ **and** $\beta_P > 0.5$**:**

$$\alpha\omega_P\beta_P(q_{RB} + y_{RB}) \geq \alpha\omega_P\beta_P(q_{EB} + y_{EB})$$

Case 4: $\alpha\omega_P\beta_P < \delta$**,** $\alpha\omega_P > 0.5$ **and** $\beta_P > 0.5$**:**

$$\alpha\omega_P\beta_P q_{RB} + \delta y_R \geq \alpha\omega_P\beta_P q_{EB} + \delta y_{EB}$$

Finally, note that a takeover never actually occurs. The takeover option serves as a threat only. Remember, that the case $\delta > \beta_P > 0.5$ never occurs.

7.4.4 Solution

At $t = 1$ the incumbent E decides about the structure. He may choose the pyramidal or the horizontal structure. The incumbent will compare these alternatives and choose the structure with the higher payoff. He calculates the payoffs for specific values of ω and β. Given ω, β, v_R and v_I the incumbent and the market can anticipate who will eventually control the firm and whether the ultimate controller diverts or not. Given this information, it is possible to determine whether the project can be financed, i.e. whether the revenues in the IPO resp. the SPO are at least I. If so it is possible to calculate the incumbent's payoff. The incumbent choose ω and β such that this payoff is maximal.

7.4.5 The Example Continued

We continue with the example assuming that the incumbent anticipates the rival. He know that the rival appears and he also knows the type of the rival.

As $\alpha = 0.5$ it follows that $\alpha\omega_P\beta_P < \delta$. Hence, in the pyramidal case the ultimate controller will divert. Furthermore: If $\beta_P = 0.5$ and $\alpha\beta_P = 0.5$ (thus

$\omega_P = 1$) it follows that the revenue is less then 60. Consequently, the incumbent cannot entrench. Consider the intrinsic values

$$\begin{aligned} & I_R^n = \alpha\omega_P\beta_P 120 + 72, I_E^n = \alpha\omega_P\beta_P 100 + 80 \\ \Rightarrow \quad & I_R^n - I_E^n = 20\alpha\omega_P\beta_P - 8 \end{aligned}$$

It follows $I_R^n - I_R^n \geq 0 \Leftrightarrow \omega_P\beta_P \geq 0.8$. Also, $\omega_P \geq \omega_P\beta_P \geq 0.8$. But

$$(1 - \omega_P\beta_P)120 + (1 - \omega_P)200 \leq 24 + 40 < I.$$

In other words the I-intrinsic value is lower than the R-intrinsic value. The incumbent does not want to sell his block. However, as $v_R > v_I$ the takeover threat is viable. The incumbent chooses a structure such that the payoff in case of a takeover is maximal.

To determine the optimal choice of β_P and ω_P we need some observations. If we rearrange the financing constraint we obtain

$$\beta_P\omega_P = \frac{q_{RB} + q_A - I}{q_{RB} + \frac{1}{\beta_P}q_A} \tag{17}$$

and the value of the block in the case of a takeover is

$$\alpha\omega_P\beta_P(q_{RB} + Y_R) + \alpha\omega_P q_A = \alpha\omega_P\beta_P q_{RB} + \alpha\omega_P q_A + \alpha\omega_P\beta_P Y_R$$

A change of β_P and ω_P such that the financing constraint is still valid leaves $\alpha\omega_P\beta_P q_{RB} + \alpha\omega_P q_A$ unchanged. Hence, the value of the block is maximal if $\omega_P\beta_P$ is maximal. From equation (17) we obtain that $\beta_P = 1$ is optimal. It follows $\omega_P = 0.5406$. The R-intrinsic value is

$$\alpha\beta_P\omega_P 120 + \alpha\omega_P 200 + 0.8 \cdot 90 = 32.43 + 54.06 + 72 = 158.49.$$

The incumbent's revenue in the case of a takeover (the threat point) is

$$\alpha\beta_P\omega_P 210 + \alpha\omega_P 200 = 56.76 + 54.06 = 110.82.$$

With split-the-difference the incumbent's payoff is 134.655.

We already know that with a horizontal structure the incumbent can entrench himself. We have to make similar considerations as above. However, now the incumbent can garantee than $\beta_H \geq 0.5$. Therefore, the takeover threat is non-viable and the intrinsic values determine the outcome of the negotiation.

Suppose $\beta_H = 0.8$. The ultimate controller does not divert and the revenue is $100(1 - y_H) + 0.2\dot{2}10 \leq 100 + 42 < 147$. This implies that a structure with $\beta_H \geq 0.8$ cannot be financed. Hence, the ultimate controller diverts.

Consider the intrinsic values:

$$I_E = \alpha y_H 200 + \beta_H 100 + 80, I_R = \alpha y_H 200 + \beta_H 120 + 72$$
$$I_R - I_E \geq 0 \Leftrightarrow \beta_H \geq 0.4$$

Hence, if $\beta_H \geq 0.5$ a transfer occurs and the reservation prices are the respective intrinsic values. The incumbent will choose $\beta_H = 0.5$. Indeed, any variation of β_H and y_H such that the revenue is 147, leaves the I-intrinsic value $\alpha y_H 200 + \beta_H 120 + 72$ unchanged. Consequently, $\alpha y_H 200 + \beta_H 100 + 80$ is large if β_H is small. The optimal choice of β_H is 0.5. The I-intrinsic (R-intrinsic) value is 143 (145). With split-the-difference the payoff of the incumbent is 144. We observe that the payoff is higher in the horizontal case than in the pyramidal case.

We can conclude that the incumbent will not choose a pyramidal structure. The takeover threat lowers the reservation price in the pyramidal case and the incumbent cannot entrench with this structure. If the incumbent chooses a horizontal structure then he can entrench and the payoff is larger.

7.5 Conclusion & Discussion

The preceding two subsections considered numerical examples. For arbitrary parameters the model becomes very complex since a myriad of cases has to be considered. It is nevertheless possible to draw general conclusions. These conclusions relate the entrenchment against hostile takeovers, the market for corporate control and negative aspects of internal capital markets.

7.5.1 Entrenchment

In the numerical examples of the previous section it turned out that the horizontal structure is preferred, if E anticipates a raider. The key to this result is entrenchment. The capabilities to entrench in the pyramidal case differ from those of the horizontal control structure.

Consider how R can obtain control of B. He has two options:

- Negotiate with E and buy his stake.
- Use a tender offer.

Consider the possible types of tender offers, if B was founded pyramidically. If $1 - \beta_P > 1/2$ then R may obtain control by acquiring the shares of B held by N. If $1 - \beta_P \leq 1/2$ holds, he must obtain control of A in order to obtain control of B. In the horizontal case R can obtain control if $1 - \beta_H > 1/2$. To achieve control of A is of no use in this case.

The reason why – in some circumstances – the horizontal structure has an advantage relative to the pyramidal structure is that it is easier to entrench in the former case. The entrenchment option does not imply that a transfer of control is ultimately hindered. However, entrenchment improves the bargaining position of E.

Entrenchment in the Horizontal Structure

If E wants to "insure" himself against a transfer of control, he must keep at least 50 % of the share, thus $\beta_H \geq 1/2$. This restricts his revenues. If he completely dilutes his block in A and maximally dilutes his block in B, while entrenching against a takeover, his revenues are $\alpha q_A + \frac{1}{2}X$. Entrenching reduces his revenue potential by $\frac{1}{2}X$.

Entrenchment in the Pyramidal Structure

If E wants to "insure" himself against a transfer of control, he must ensure that less than 50 % of the shares of B are issued, i.e. $\beta_P \geq 1/2$. Furthermore, he must entrench against a takeover of A, i.e. $\alpha\omega_P \geq 1/2$. These two conditions restrict his revenues. His maximum revenue conditioned on being entrenched against takeovers is

$$(1 - \frac{1}{4\alpha})X + (1 - \frac{1}{2\alpha})q_A.$$

In the Wolfenzon model the corresponding equation is

$$X + q_A.$$

Depending on the values of α and q_A entrenchment may drastically restrict his ability to fund the initial investment. For example, if $\alpha = \frac{1}{2}$, he cannot dilute his stake in A at all. His maximum revenue is $\frac{1}{2}X$.

Comparing the Ability to Entrench

The horizontal structure has the advantage that E does not have to bother about loosing control of A. Thus he can maximally dilute his stake in A. If he founds B pyramidically he must defend against a takeover of A *and* B. Whether entrenchment is simpler in the horizontal structure depends crucially on the size of q_A and α. Anyway, the pyramidal structure has the disadvantage of two entrances aggravating entrenchment. This creates the incentive to avoid the pyramidal structure.

7.5.2 The market for corporate control

The analysis demonstrates that the market for corporate control affects the choice of the control structure. The control structure affects the proneness for a hostile takeover. In order to entrench against a takeover, the decision maker must take entrenchment constraints into account. Different control structures limit to a varying degree the possibility of entrenchment. Thus a control structure optimal for an economy without a market for corporate control may become suboptimal if takeovers become more likely.

The preceding section suggests that an active market for corporate control hinders (some) pyramidal structures. This implies that we should expect that pyramidal structures are less frequent in an economy with an active market for corporate control. It is well known that the United States and the United Kingdom have active markets for corporate control whereas in continental Europe these markets are much less active. Casual observation of the ownership structures shows that the prediction of the model conforms stylized facts.

7.5.3 Internal Funds

We assumed that no free funds are available to finance the foundation of B. Due to this the controller turns to the capital markets. This leads to a dilution of his stake and makes him more vulnerable to hostile takeovers. Therefore, he is forced to take the entrenchment characteristics of the control structure into account. If there are free cash flows and if the controller can use them to found B then he is not forced to turn to the capital market and the entrenchment aspect vanishes. This constitutes another example of the disciplining force of capital markets and of the negative aspects of internal capital markets. The analysis corroborates regulatory steps to control internal capital markets. *Pyramidal structure could be controlled better if capital markets were given the opportunity to "vote" on this how-question.*

SECTION 8

Conclusion

> While research on the market for corporate control has mushroomed, it is, in our opinion, a growth industry.
>
> *Jensen and Ruback (1983)*

The paradigm: On the market for corporate control the "right to manage" is traded: *M & A transactions are an important device to match assets and management teams efficiently.* The theoretical part of this treatment proceeds in three steps: the target is widely held, controlled by a blockholder, tier of pyramid. At each step different problems are accentuated but they all have two aspects in common: *protecting minority shareholders and allocating control.*

One may argue that the objective to protect minority shareholders is in conflict with the aim to facilitate takeovers: If the interests of the shareholders are enforced then bidding is more expensive with the consequence that less takeovers occur. We have *defined* that minority shareholders are protected if the change in their wealth caused by a change-of-control transaction is non-negative. For the sake of the protection of the minority shareholders it is not necessary that they share in the premium. If we appeal to this definition then the Mandatory Bid Rule protects minority shareholders. Furthermore, the Mandatory Bid Rule achieves – if two conditions are met – an efficient allocation of control: efficient transactions take place, inefficient transactions are blocked. Furthermore, if the Mandatory Bid Rule applies the ownership structure *changes* – the rival becomes the single shareholder – and there is no diversion after only one transaction. The preconditions are: the transaction costs are negligible and the blockholder owns less than 50 % of the shares. Moreover, if we add a Conditional Voting Cap to the Mandatory Bid Rule then an efficient allocation of control results. The key to this result is the threat of a tender offer. If the threat of a tender offer is non-viable then some efficient change-of-control transactions are blocked. This blockage is caused by the incumbent's private benefit. The incumbent demands a compensation for sacrificing his private benefit with the consequence that the takeover is too expensive for the rival. The threat of tender offer breaks through this blockage.

The threat of a tender offer is also the key to the main result of section 7. This section deals with a "how-question": How is control exercised? More specifically, is control exercised pyramidally, where the entrepreneur controls a firm through another firm? Pyramidal structures are associated with the exploitation of minority shareholders. The main result is: If the market for corporate control is active and internal capital markets are curbed then pyramidal structures are less likely. Indeed, a pyramidal structure leaves more flanks. In order to assure a good bargaining position the incumbent needs a controlling interest (the majority of votes) of several firms.

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I have checked all internet-links cited below on 21th November 2004. All documents are also available (in pdf format) upon request:

Email: `jaeger@wiwi.uni-halle.de`
Web: `www.finomica.de`

Legal Documents

Bundesdrucksachen are available at
`http://dip.bundestag.de/parfors/parfors.htm`.

The **Aktiengesetz** and the **Wertpapiererwerbs- und Übernahmegesetz (WÜEG)** are available at
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