11

Takeovers

11.1 Introduction

This chapter focuses on the transfer of ownership of firms, and in particular on the market for corporate control, in which a new company or managerial team takes control of a firm and replaces its existing management or at least manages the firm's assets differently.

Although the main focus will be on hostile takeovers (takeovers that are not welcomed by the incumbent management), we must realize that hostile takeovers represent only a small fraction of actions leading to a managerial turnover (since turnover may simply result from a decision of the board of directors) or to a merger or acquisition (friendly acquisitions negotiated with management and approved by the board of directors).[1]

We refer to Chapter 1 for a broad discussion of the market for corporate control. The current chapter looks at the rationale and the mechanics of takeovers. It analyzes the two common motivations advanced for the existence of takeovers: the benefits accruing from a new management team with fresh ideas, superior efficiency, or, more simply, the willingness to abandon past, mistaken strategies (the "*ex post* rationale"), and the disciplining effect on incumbent management of the hovering threat of a takeover in the case of poor performance (the "*ex ante* rationale"). Firms may facilitate takeovers in order to enjoy these "new blood" and "disciplining" benefits; they, however, want to limit (and appropriate some of) the rents enjoyed by acquirers. Much of the literature on takeovers focuses on this tradeoff between efficiency and rent extraction. Sometimes, though, there is no efficiency component to takeovers. For

example, the raider may want to build an empire; or he may want to suppress a product that cannibalizes or will cannibalize the sales of one of his own products; or else he may want to transfer assets or intermediate goods at a good price to one of his divisions. That is, such a raider reduces shareholder value, but is willing to acquire the firm in order to enjoy control benefits.

The chapter proceeds in two stages. First, Sections 11.2–11.4 abstract from specific institutions and study the general tradeoff between efficiency and rent extraction. This mechanism-design approach to takeovers will be called the "pure theory of takeovers," and will serve as a benchmark for the more positive analysis. It is also used in Section 11.3 to analyze whether private incentives to facilitate or deter takeovers coincide with social ones and whether takeovers should be regulated.

Much of the literature, on the other hand, focuses on the impact of country- and time-specific institutions concerning voting rules, disclosure regulations, and takeover defenses (such as greenmail, poison pills, supermajority or fair-price amendments, and dual-class votes) on the likelihood and efficiency of takeovers. Sections 11.5–11.8 will therefore recast this "positive theory of takeovers" as a study of the implementation (or nonimplementation) of the economic rationale for takeovers.

11.2 The Pure Theory of Takeovers: A Framework

Consider the following situation. A firm knows that, with some probability, a new management team ("the raider") that is able to manage the firm as well as and possibly better than incumbent management will appear in the future. Importantly, this raider is not part of the initial financial arrangement that creates the firm. In particular, we rule out options

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[1]. Of course, some "friendly mergers" occur under the threat of a takeover, and so it is hard to allocate mergers and acquisitions into friendly and hostile groups.
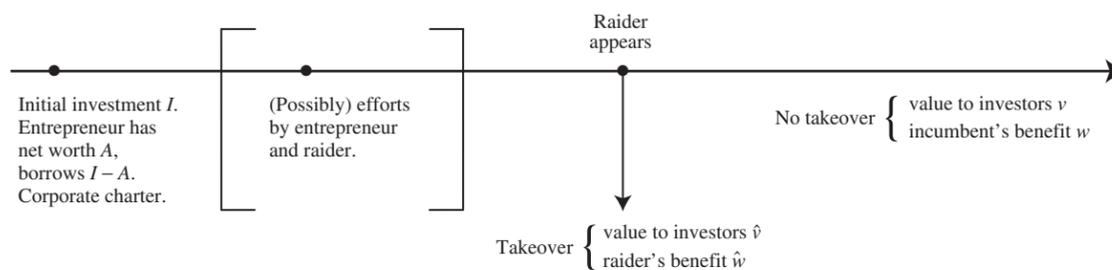
Figure 11.1

that allow a corporate entity (a potential raider) to acquire control of the firm in the future.[2] Put differently, the future raider is not yet identified, or else there are several potential raiders and it is too complex to design option contracts for each of them.

Figure 11.1 describes the timing of events. In the absence of takeover, the firm keeps being run by the incumbent management. Investors receive expected value v and the incumbent entrepreneur receives expected surplus w.

In the event of a takeover, a raider obtains control of the firm.[3] Let $\hat{v}$ and $\hat{w}$ denote the expected value to investors[4] and the raider's expected surplus under raider management.

Fixed-investment example. In the fixed-investment model (see Section 3.2),

$$v = p_{\mathrm{H}}(R - R_{\mathrm{b}}) \quad \text{and} \quad w = p_{\mathrm{H}}R_{\mathrm{b}},$$

where R is the profit in the case of success (there is no profit if the project fails), R_{b} is the entrepreneur's stake, and p_{H} the probability of success.[5] The values

$\hat{v}$ and $\hat{w}$ may differ from those under incumbent management through the probability, $\hat{p}_{\mathrm{H}}$, of success. Or $\hat{w}$ may differ from w because the raider enjoys a private benefit just from heading the firm.

The initial "corporate charter" defines the terms under which the raider can take control.[6] The first question that the charter design must address is that of whether the transfer of control to the would-be raider should be made easy or hard. That is, for what values of $\hat{v}$ and $\hat{w}$ should a transfer occur? A second question is raised when the entrepreneur takes actions prior to the appearance of the raider: what impact does a takeover-friendly or -hostile charter have on the incumbent management's incentives? Similarly, the raider may need to sink a fixed cost to identify the target and define a corporate strategy for this target: what impact does the charter have on the raider's incentive to commit such resources? We now examine these questions in sequence. Indeed, we ignore the effort stage (indicated in brackets in Figure 11.1) in a first step.

11.3 Extracting the Raider's Surplus: Takeover Defenses as Monopoly Pricing

We assume that the corporate charter is unconstrained; in particular, the law does not require it

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2. An illustration of such a forward contract is provided by the 1997 agreement between a consortium formed by Mannesman, AT&T, and Unisource on one side, and Deutsche Bahn on the other to create a new telecommunications company, initially controlled by Deutsche Bahn with an option for the consortium to acquire control in 1999 (see Nöldeke and Schmidt (1998) for more details).

3. Like most of the literature on takeovers, we formalize control as an all-or-nothing phenomenon. As will be discussed in Section 11.5.5, large shareholders do have an influence on the firm's decision making even when they do not have a control majority. The higher their ownership share, the more intense is their monitoring (Burkart et al. 1998, Chapter 9), and the more real authority they enjoy (Chapter 10).

4. We are interested in the impact of the raid on the investors (the increase or decrease from v to $\hat{v}$) and on incumbent management (the removal of the surplus w). It should be kept in mind, though, that takeovers may affect other "stakeholders" (e.g., the workers through the breach of implicit contracts, as in Shleifer and Summers (1988)), the creditors, or the Treasury.

5. Assuming that R_{b}, the entrepreneur's stake in the case of success,

satisfies the incentive constraint. So, if B represents the benefit from shirking, and p_{L} the associated probability of success,

$$R_{\mathrm{b}} \geqslant \frac{B}{p_{\mathrm{H}} - p_{\mathrm{L}}}.$$

6. Needless to say, this view of the corporate charter is exceedingly narrow. But much of the focus in this chapter is on the raider's ability to acquire control and its consequences. Hence, a focus on the transaction price is not unwarranted for our purposes.

to account for the interests of economic agents who are not parties to this initial contract. Under this assumption, the corporate charter stands for the interests of the firm's constituency (entrepreneur and investors) at the date at which it is designed. It has no reason to reflect the interests of parties, such as a raider, that will later become associated with the firm. Rather, it is likely to attempt to capture the latter's surplus. To exploit this monopoly power over future buyers, the charter optimally "taxes" these acquirers.[7]

We will make the following assumptions:

- The raider does not face credit rationing. Thus, he can pay up to the full value $\hat{v} + \hat{w}$ (investor value and private surplus).
- $\hat{v}$, in a first step, is publicly known at the date at which the charter is drawn. By contrast, $\hat{w}$ is private information of the raider at the date of takeover. From the point of view of the target, $\hat{w}$ is distributed according to density $h(\hat{w})$ and cumulative distribution function $H(\hat{w})$ and is private information to the raider.

We will also initially assume that the entrepreneur (incumbent manager) does not face credit rationing (think of this as coming from a high initial net worth) and therefore aims at maximizing the firm's NPV. Later, we will see how the charter is amended if the entrepreneur lacks pledgeable income at the charter design stage.

11.3.1 Incumbent Manager Is Not Credit Constrained

Suppose that the firm can commit to a sale price P to a potential raider.[8] Such a commitment is

tantamount to selecting a cutoff value $\hat{w}^*$ for the raider's surplus such that

$$\hat{v} + \hat{w}^* = P.$$

The probability of a sale is then

$$1 - H(\hat{w}^*) = 1 - H(P - \hat{v}).$$

The entrepreneur's utility is equal to the NPV:

$$U_b = -I + (v + w)H(\hat{w}^*) + (\hat{v} + \hat{w}^*)[1 - H(\hat{w}^*)].$$

Maximizing this utility with respect to $\hat{w}^*$ (which, as we have seen, is equivalent to maximizing the NPV over the sale price P) yields first-order condition (assuming an interior solution)

$$\frac{P - (v + w)}{P} = \frac{(\hat{v} + \hat{w}^*) - (v + w)}{\hat{v} + \hat{w}^*} = \frac{1}{\eta}, \quad (11.1)$$

where

$$\eta \equiv \frac{h(\hat{w}^*)(\hat{v} + \hat{w}^*)}{(1 - H(\hat{w}^*))}$$

is the raider's elasticity of demand.

We thus obtain the standard monopoly pricing formula: the "Lerner index"—that is, the relative markup over marginal cost—is equal to the inverse elasticity of demand. The "cost" of "supplying a takeover" to a raider is just the opportunity cost of the forgone surplus $(v + w)$. To see that η is indeed an elasticity of demand, note that the probability of takeover

$$1 - H(\hat{w}^*) = 1 - H(P - \hat{v})$$

defines a "demand for takeovers" $D(P)$. And so $D'(P) = -h(P - \hat{v}) = -h(\hat{w}^*)$. Thus, η is equal to $-D'P/D$, which is the standard definition of an elasticity.

Let

$$\hat{w}^* = \hat{w}^m$$

(where "m" stands for "monopoly") denote the solution to (11.1).[9]

Needless to say, monopoly pricing induces a social inefficiency. As Bebchuk and Zingales (2000) put it, future buyers do not sit at the table at the charter design stage. Their surplus is therefore not internalized and the resulting purchase price is excessive and leads to a socially suboptimal volume

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7. The following is closely related to the idea pioneered by Diamond and Maskin (1979) and Aghion and Bolton (1987), according to which two parties to a commercial transaction have an incentive to write long-term contracts with penalties for breach in order to force new partners to a transaction with one of the two parties to offer better terms of trade.

8. We will assume that the raider pays in cash. In practice, though, the raider may pay in equity or debt securities of his own firm. Payments in equity or risky debt raise another issue: the shareholders of the target firm may not know the value of the payment offer made by the raider; that is, they face adverse selection (see Chapter 6) and may be concerned that the bidding firm is overvalued.

But asymmetric information can operate both ways (Fishman 1989): if the target's shareholders have superior information about the value of their firm and the target's size is not negligible with respect to the acquirer's size, then a payment in equities can mitigate the adverse-

selection problem by having the target's shareholders share the post-takeover profits.

9. A sufficient condition for the program to be strictly quasi-concave is that the hazard rate $h/[1 - H]$ be strictly increasing (a property satisfied by almost all usual distributions).

of takeovers.[10] Like any monopolist, the entrepreneur trades off a higher price P against the risk of forgoing profitable trading opportunities. From the point of view of society, though, P is a transfer, and so monopoly pricing results in a suboptimally low volume of takeovers.

Remark (other welfare considerations). We identify only one force giving rise to inefficient levels of takeovers. Other forces are in play. For example, and as we earlier discussed, the raider may be subject to an agency problem. Its management may push for this takeover because it gains from building an empire or because it has private information about the poor health of the bidding firm and is trying to "gamble for resurrection";[11] in such cases, the bidder's management exerts its "real control" (see Chapter 10) to reduce the bidder's value. A proper analysis of real and formal authority in the bidding firm is then needed in order to make assertions about the welfare impact of takeover defenses.

11.3.2 Incentive to Prepare a Raid

The preceding analysis neglected the impact of the corporate charter on the potential raider's incentive to design a business plan for the firm. Suppose, for instance, that the raider needs to invest cost c to be able to formulate a strategy for the firm. That is, by paying c, he creates a value pair $(\hat{v}, \hat{w})$, where $\hat{w}$ is drawn from the distribution H. His *ex post* gain is then $\hat{v} + \hat{w} - P = \hat{w} - \hat{w}^{\mathrm{m}}$ if $\hat{v} + \hat{w} \geqslant P$ and 0 otherwise. Under monopoly pricing, the raider then prepares a raid if and only if

$$\int_{\hat{w}^{\mathrm{m}}}^{\infty} (\hat{w} - \hat{w}^{\mathrm{m}}) \, dH(\hat{w}) \geqslant c. \qquad (11.2)$$

If inequality (11.2) is not satisfied, then the firm must reduce the sale price P below $\hat{v} + \hat{w}^{\mathrm{m}}$, so as to encourage the raider to participate.

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10. The conclusion would be different if the potential raider could be part of the initial charter design. It would then make sense to build an option for the raider to acquire the firm at a lower price (say, the "marginal cost" $v + w$), in exchange for an up-front payment for this option. The Coase Theorem would then obtain: there would be a socially efficient volume of takeovers.

See Burkart (1996) for an earlier discussion of the regulation of takeovers.

11. Such strategies are sometimes perceived as coming from "managerial overconfidence," but need not be associated with hubris.

11.3.3 Incumbent Manager Is Credit Constrained

Let us return to the situation in which the raider's participation in the process is not an issue; but let us now assume that the entrepreneur (who, as usual, receives the NPV) must adjust her policy so as to let her investors break even. Let us illustrate the main finding in the context of the fixed-investment model developed in Section 3.2 and discussed in Section 11.2 ($v + w = p_{\mathrm{H}}R$): the entrepreneur chooses R_{b} and $\hat{w}^*$ so as to solve

$$\max_{\{R_{\mathrm{b}}, \hat{w}^*\}} \{-I + (v + w)H(\hat{w}^*)$$
$$+ (\hat{v} + \hat{w}^*)[1 - H(\hat{w}^*)]\}$$

s.t.

$$vH(\hat{w}^*) + (\hat{v} + \hat{w}^*)[1 - H(\hat{w}^*)] \geqslant I - A,$$
$$v = p_{\mathrm{H}}(R - R_{\mathrm{b}}),$$
$$w = p_{\mathrm{H}}R_{\mathrm{b}},$$
$$(\Delta p)R_{\mathrm{b}} \geqslant B.$$

If the first constraint, the investors' breakeven constraint, is nonbinding, then $\hat{w}^* = \hat{w}^{\mathrm{m}}$. The interesting case is when the entrepreneur has a weak balance sheet, as, say, measured by a low value of A. The breakeven constraint is then binding and has a strictly positive shadow price. The quest for pledgeable income then mandates that the entrepreneur takes as small a share in profit as is consistent with incentives:

$$R_{\mathrm{b}} = \frac{B}{\Delta p}.$$

Taking the minimal incentive-compatible stake is a costless way (in terms of NPV, which depends only on $v + w = p_{\mathrm{H}}R$, and not on R_{b}) of creating pledgeable income. We now show that the entrepreneur also resorts to a more costly way of creating pledgeable income, namely, a below-monopoly-level acquisition price. Letting $\mu > 0$ denote the shadow price of the investor breakeven constraint, the first-order condition with respect to $\hat{w}^*$ yields

$$\frac{(\hat{v} + \hat{w}^*) - (v + w/(1 + \mu))}{\hat{v} + \hat{w}^*} = \frac{1}{\eta}. \qquad (11.3)$$

This implies that $\hat{w}^* < \hat{w}^{\mathrm{m}}$.

The quest for pledgeable income leads to a higher occurrence of takeovers. Or, anticipating our later discussion of the implementation of P through takeover defenses, a weaker initial balance sheet calls

for more limited takeover defenses. The intuition for this result is that unlike the investor value, v, under incumbent management, and the resale price, $P = \hat{v} + \hat{w}^*$, the entrepreneur's surplus, w, is nonpledgeable. This is why it receives weight only $1/(1 + \mu)$ in the opportunity cost of takeovers in formula (11.3).

To sum up, we obtain here another illustration of the concessions made by firms to investors in their quest for pledgeable income. In this respect, there is little difference between a higher probability of takeover, costly collateral pledging, the enrollment of speculative and active monitors, and the transfer of control rights to investors. All these policies sacrifice NPV to boost pledgeable income.

11.3.4 Unknown Value Enhancement

We have heretofore assumed that the payoff to investors under raider management was known; only the raider's surplus was subject to uncertainty. Let us now assume that $\hat{v}$ is also unknown.

An important difference between $\hat{v}$ and $\hat{w}$ is that a measure of $\hat{v}$ (the realization of the random variable whose mean is $\hat{v}$) is available *ex post*. We now show that this observation implies that *partial* sales are in general optimal.

To illustrate this in a simple way, suppose as before that $\hat{w}$ is unknown and is distributed according to a uniform distribution on $[0, 1]$:

$$\hat{w} \sim U[0, 1].$$

Assume further that $\hat{v}$ is independent of $\hat{w}$.

For simplicity, we treat the case in which the entrepreneur is not credit constrained.

Let us consider the following *thought experiment*: suppose that, contrary to our assumption, $\hat{v}$ were actually known (as has been the case until now). The entrepreneur would then maximize the NPV. Using the fact that the distribution of $\hat{w}$ is uniform, $H(\hat{w}) = \hat{w}$, the optimal $\hat{w}^*$ solves

$$\max\{-I + (v + w)\hat{w}^* + (\hat{v} + \hat{w}^*)(1 - \hat{w}^*)\}$$

or

$$\hat{w}^{\mathrm{m}} = \tfrac{1}{2}(1 + v + w - \hat{v}) \iff P = \tfrac{1}{2}(1 + v + w + \hat{v}).$$

Let us now return to the situation in which only the raider knows $\hat{v}$ (and of course $\hat{w}$). Then the entre-

preneur cannot increase the NPV relative to the situation of the thought experiment. But it turns out that, despite the imperfect knowledge about $\hat{v}$, the same NPV as in the thought experiment can be obtained: suppose that only half of the shares are put up for sale to the raider,[12] and that the price for this block of shares is set at the following level:

$$P = \tfrac{1}{2}(1 + v + w).$$

The raider then purchases the block if and only if the investor value for half of the shares plus the raider's (entire) surplus exceeds the sale price:

$$\tfrac{1}{2}\hat{v} + \hat{w} \geqslant P$$

or

$$\hat{w} \geqslant \tfrac{1}{2}(1 + v + w - \hat{v}).$$

In a sense, a partial sale can be used as a *metering* device that allows the firm to benefit from part of the investor value increases brought about by the raider.

11.4 Takeovers and Managerial Incentives

Let us now turn to the impact of a takeover prospect on managerial incentives to raise profitability. The popular debate assigns both a positive and a negative incentive impact to takeovers. On the one hand, the market for corporate control is meant to keep incumbent managers on their toes by threatening them with the prospect of takeover in case of poor managerial performance (Manne 1965). Thus, takeovers are good for governance. Jensen (1988) has been a strong advocate of this perspective. On the other hand, takeovers are asserted to induce managers to adopt a short-term, "myopic" perspective. Because similar ideas have been developed in previous chapters, I will present a very informal account of the main arguments.

11.4.1 Takeover-Induced Myopia

Let us start with a simple version of the "myopia" argument.[13] Return to the fixed-investment model.

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12. I here finesse the issue of control. If the raider requires control to implement his policy, assume that the block sold to the raider has a majority of voting rights. In general, this may require different classes of shares with different voting rights (see Section 11.6 for a discussion of dual-class shares).

13. More sophisticated versions can, for example, be found in Bebchuk and Stole (1992), Laffont and Tirole (1988), Schnitzer (1992), and Stein (1988, 1989).

Suppose that the probability that the project is successful under incumbent management is $p + \tau$, where p is equal to p_H or p_L depending on whether the incumbent management later works or shirks, and τ is some pre-takeover-stage investment by the entrepreneur. Let $y(\tau)$ denote the (convex) private cost to the entrepreneur of choosing τ. Assume that the choice of τ is unobservable by other parties. In particular, the incumbent manager's (actual, as opposed to anticipated) choice of τ affects neither the raider's willingness to pay for the firm (at the date of the raid) nor the acquisition price. Letting R_b denote the entrepreneur's stake in success and H the probability of no takeover taking place, the entrepreneur chooses τ so as to maximize

$$\tau R_b H - y(\tau).$$

In general, this choice involves two distortions relative to the socially optimal level. First, when retained, the entrepreneur receives less than the full pie ($R_b < R$) and therefore has a suboptimal incentive to raise the probability of success. This is another version of the standard effect identified in Section 3.2: the quest for pledgeable income forces the entrepreneur to give some of the return to investors, which dulls entrepreneurial incentives.

More interestingly, incentives are also dulled by the prospect of a takeover ($H < 1$); the entrepreneur invests less if the probability that she will reap the fruits of the investment decreases. Whether this induces a social cost depends on the transferability of the investment τ. If τ is not transferred to a new team (e.g., it corresponds to some noncodified knowledge accumulated by the entrepreneur), then this second reduction in incentives is not distortive, since the investment pays off privately and socially with probability H only. In contrast, if the investment is transferable (so τ corresponds to the choice of a better project, to a better maintenance of the equipment, etc.), a new factor of underinvestment is the positive externality of investment on the raider.[14]

Here managerial myopia—the tendency to excessively privilege the present over the future—takes the form of an underinvestment in future profitability, as the benefits will partly go to the new managerial team. Alternatively, and closely related, managerial myopia might consist in "sabotaging" the profit of the raider so as to decrease the likelihood of a takeover;[15] or, along the lines of the analysis of Chapter 7, in sacrificing long-run payoff in order to "posture," that is, to obtain good short-term results and appear efficient to investors.

11.4.2 Takeovers and Managerial Discipline

Conversely, the takeover threat may induce the entrepreneur to work harder. The analysis is similar to that of Section 10.4.2. There, we argued that contingent interference may be an instrument of managerial discipline. The basic point is that performance-related rewards and punishments cannot consist in solely monetary rewards. In particular, to the extent that managers derive rents from their position, a sanction for poor performance may require taking that position away. This strategy was analyzed in Section 10.4.2 in the context of a liquidation or downsizing of assets in the case of poor intermediate performance—but the key feature of this policy is not the form of interference per se, but the fact that the manager enjoys lower rents from office or loses them altogether. The same can be accomplished, perhaps at a lower cost, through the replacement of the incumbent team by a new team.

Bertrand and Mullainathan (2003) analyze the impact on corporate behavior of the passage of laws restricting takeovers of firms incorporated in a given state in the United States. Among other things, they compare plants located in the same state but belonging to firms incorporated in different states. For example, they can look at changes in two plants located in New York but belonging to firms incorporated in Delaware and California when an antitakeover law is passed in Delaware, which enables them to filter out state-specific shocks. They find that wages, and in particular white-collar ones, increase significantly when an antitakeover law is passed. By contrast, the passage of an antitakeover law does not affect firm size overall (it leads to fewer

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14. In the case of transferable investments, the value of H depends not only on the price P demanded for the acquisition but also on the equilibrium value τ^*. The entrepreneur's investment is then given in a rational expectations equilibrium by $R_b H(P, \tau^*) = y'(\tau^*)$.

15. An example of such behavior is entrenchment, in which the incumbent team invests in assets that it knows how to run, but the future managerial team will have little expertise in managing.

plant destructions and fewer plant creations). They conclude that the evidence is consistent with the idea that takeover protection enables managers to enjoy a "quiet life," but does not support empire-building theories.

A final note: facilitating takeovers per se may not improve managerial incentives. A takeover-friendly charter in general makes a takeover more likely both when performance is good and when it is poor. The net effect on managerial incentives for good performance is *a priori* unclear, unless takeover incentives put us in a range in which takeovers are only a threat when performance is poor. Ideally, for incentive purposes, one would want takeovers to be facilitated when performance is poor and discouraged when performance is good.

11.5 Positive Theory of Takeovers: Single-Bidder Case

The pure theory of takeovers focuses on the price the firm would want to charge the raider in an acquisition and on the associated likelihood of a takeover. It does not elicit the mechanism through which this price will actually come about.

In contrast, the positive theory of takeovers takes as given some common institutions and looks at how they impact the likelihood of a takeover and the price paid by the raider. Much of the literature analyzes tender offers. Assuming that there exists a single bidder, in a (stylized) tender offer, the raider makes a price offer and shareholders then individually decide whether to tender their shares. This is in sharp contrast with the analysis in Section 11.3, in which the acquisition price was set by the firm rather than by the raider; we will see, however, that the firm's charter can influence the tender offer price, and so the firm can indirectly select the price.

Offers may be *restricted* (to a certain percentage of outstanding shares) or *unrestricted* (the raider purchases all tendered shares, regardless of their number). Similarly, offers may be *conditional* on the raider's acquiring a certain percentage of the shares (e.g., a simple majority stake of 51%) or *unconditional.*

In a first step we will assume that all shares carry equal voting rights and that the raider needs a simple majority or, more generally, a fraction $\kappa \in (0, 1)$

of the shares in order to gain control, replace the incumbent management, and implement the new policy. That is, a raider who purchases only a minority of shares or, more generally, a fraction less than κ of the shares is on the same footing as any other investor, and neither delivers investor value $\hat{v}$ nor enjoys rent $\hat{w}$ from control.[16] Later on, we introduce dual-class shares, some with a voting right, some without.

We say that the raider *enhances value* (to investors) if

$$\hat{v} > v.$$

The case $\hat{v} < v$ corresponds to a "*value-decreasing raider.*" We focus on the case in which the value enhancement or decrease is symmetric information.[17]

11.5.1 Value-Enhancing Raider: The Grossman–Hart Analysis

Grossman and Hart (1980) identified a simple free-rider incentive in the shareholders' response to a tender: if the investor value of the firm under raider management exceeds that under incumbent management, tendering becomes a "public good" to which no one wishes to contribute, but everyone hopes others will. To illustrate this point, while minimizing notation, let us normalize to 1 the value added by the raider's taking over:

$$\hat{v} - v \equiv 1.$$

And let us redefine P as the *premium* over v offered by the raider. That is, the raider offers price $v + P$. The relevant range for P is $[0, 1]$. A negative-premium offer is always rejected, while premia above 1 are accepted but wasteful for the raider.

We will assume that there is a continuum, of mass 1, of shareholders. The assumption of a continuum finesses the issue of a shareholder's potentially

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16. Like the entire literature, we do not allow the raider to enjoy real authority when he purchases a fraction of shares that is lower than κ. This assumption is a strong one, especially when the raider is value enhancing. Indeed, with $v < \hat{v}$, shareholders might be inclined to listen to his suggestions!

To study this, one would need to combine the study of the emergence of share concentration (Section 9.3), that of real authority (Section 10.3), and this section. I am not aware of any research along these lines.

17. A number of papers have extended the theory to allow for the raider's having private information about what he plans to do with the target. This work is reviewed in Hirshleifer's (1992, 1995) surveys on mergers and acquisitions.

being "pivotal," i.e., affecting the outcome through his tendering choice. A shareholder will therefore compare the takeover premium that is offered by the raider to the expected value enhancement, taking the probability of takeover as exogenous to his tendering choice and equal to its equilibrium value. Later, we will consider a (potentially large, but) finite number of shares, and will study the robustness of this first-cut analysis.

Consider an unrestricted, unconditional offer, and assume that the raider needs to acquire a fraction $\kappa \in (0, 1)$ of the shares to gain control. We claim that the probability of takeover success must be equal to the premium:

$$\beta \equiv \Pr(\text{takeover success}) = P.$$

If this probability exceeded P, then each shareholder would be better off holding on to his share, since

$$\beta \hat{v} + (1 - \beta)v > v + P;$$

and so the takeover would fail with probability 1, a contradiction. Similarly, for a probability of success smaller than P, all would be better off tendering and thus the takeover would succeed. So the equilibrium probability of takeover success must equal the premium. The fraction of shares tendered must be exactly equal to κ. The mechanics of how the probability of a successful takeover comes out as $\beta = P$ remains mysterious at this stage of the analysis, which only derives necessary conditions for equilibrium. Section 11.5.3 will show how this probability emerges in the presence of a large, but finite, number of shareholders. Leaving aside any private surplus $\hat{w}$, the profit made by the raider on the takeover attempt is

$$\pi = \kappa[\beta \cdot 1 - P] = 0.$$

That is, the raider is unable to derive any benefit from the value enhancement.[18] Free riding by shareholders fully captures the raider's value enhancement.[19] It may thereby discourage a potential raider from setting up a raid.

Remark (free riding and the incentive to go public). Zingales (1995) argues that the free-rider benefits

associated with dispersed shareholdings are a reason why firms may want to go public rather than keeping a concentrated ownership, which may not allow them to appropriate as much of the surplus of future acquirers.

11.5.2 Positive Raider Surplus despite Free Riding

11.5.2.1 Private Benefit from Control

When the raider derives a private surplus $\hat{w}$ from control, then he gets to keep this surplus and optimally bids $P = 1$. To see this, note that the raider's profit when offering premium P is

$$\pi = \kappa[\beta - P] + \beta\hat{w} = P\hat{w}.$$

The raider strictly prefers to bid the maximum premium: $P = 1$. Thus, a tender offer mechanism fully extracts the raider's investor value enhancement under shareholder free riding, and captures none of the raider's private surplus. Dispersed shareholders are good at extracting increases, $\hat{v} - v$, in share value. They, however, can capture none of the raider's private benefit $\hat{w}$. By contrast, a large shareholder of the target company can extract some of the raider's private benefit provided that (a) he has sufficient bargaining power in the negotiation with the raider, and (b) the raider has cash on hand to finance the acquisition and therefore can pay more than the value of shares to gain access to his private benefit (if the acquisition is externally financed, the raider's private benefit cannot be captured since financiers are not willing to pay more than the value of shares) (see Burkart 1995; Zingales 1995).

Let us turn to three further mechanisms that enable the raider to capture some of the value enhancement.

11.5.2.2 Toehold

Raiders often have substantial toeholds when making a tender offer.[20] Suppose that the raider already owns a fraction $\theta < \kappa$ of the shares when making

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18. If $\hat{w} > 0$, the raider enjoys $\hat{w}$ with probability $\beta = P$ (see below).

19. Burkart et al. (2005) analyzes takeovers of companies owned by a set of atomistic shareholders and one minority blockholder. The blockholder has more incentives to tender his shares than atomistic bidders.

20. They can secretly purchase shares prior to a tender offer. U.S. regulations require the purchaser of shares combining to a block of at least 5% of shares to file an "SEC 13d" report within 10 days of the acquisition. So the raider can purchase more shares in those 10 days. Raiders therefore own on average 14% of target firms. More than half of the bidders have toeholds (see, for example, Betton and Eckbo (2000) for more detail).

a tender offer. Assuming, again, that $\hat{w} = 0$, the raider's profit for premium P is

$$\pi(P) = (\kappa - \theta)(\beta - P) + \theta\beta,$$

where β is, as earlier, the probability of takeover success and must in equilibrium be equal to P. Hence,

$$\pi(P) = \theta P.$$

The optimal bid is then $P = 1$, yielding profit

$$\pi = \theta.$$

Thus, the raider fully appropriates the value added to the toehold shares.[21]

11.5.2.3   Dilution

Grossman and Hart (1980) discuss another mechanism through which raiders may be given incentives to prepare a raid. Suppose that, having gained control, the raider is able to capture a fraction ϕ between 0 and 1 of the gains made by the shareholders who have not tendered their shares. This, in a sense, amounts to a partial expropriation of minority shareholders, and therefore may conflict with laws protecting the latter. For example, one may have in mind that the raider forces the firm to purchase some supplies at an inflated price from one of the raider's affiliates. This amounts to increasing $\hat{w}$ while decreasing $\hat{v}$. Namely, starting from the absence of private benefit, dilution creates one equal to $\hat{w} = \phi(\hat{v} - v) = \phi$, while $\hat{v} - v = 1$ becomes $(1 - \phi)(\hat{v} - v) = 1 - \phi$.

Again a fraction κ of the shares is tendered (assuming no toehold). The new probability of takeover success β when the premium is P is given by the shareholders' indifference between tendering and not tendering:

$$P = (1 - \phi)\beta(P).$$

The raider's profit is then (for $P \leqslant 1 - \phi$)

$$\pi(P) = \beta(P)[\kappa \cdot 1 + (1 - \kappa)\phi] - \kappa P$$
$$= \beta(P)\phi.$$

As in the case of a toehold, the optimal tender offer for the raider induces a sure success. That is,

$$P = 1 - \phi$$

and

$$\pi = \phi.$$

Thus, the raider appropriates the value of the dilution on untendered shares as well as from tendered shares (through the threat of dilution if the shareholder does not tender).

Dilution, however, may not be feasible to the extent that a controlling shareholder often has a fiduciary duty to minority shareholders; for example, the tunneling of assets by the raider to affiliated entities would be unlawful in the United States. Müller and Panunzi (2004) point out that in the 1980s merger wave, raiders often practiced dilution in a more subtle way by setting up acquisition subsidiaries.

Under such "bootstrap acquisitions," before making a public tender offer, the raider organizes a highly leveraged shell company (the acquisition subsidiary) that is assetless, obtains a loan commitment from lenders by pledging the future cash flows of the target firm as a security for its debt, and will be merged with the target firm if the majority of shareholders tender their shares. Importantly, the cash from the loan is used to pay the tendered shares and to compensate the raider, but does not go to the new merged entity. The minority shareholders thus bear (some of) the debt once the acquisition subsidiary is merged with the target, but do not receive the proceeds of debt issuance. In a sense, the raider sells claims on the value enhancement, $\hat{v} - v$, by buying rights on v.

Suppose, as earlier, that the raider makes an unrestricted and unconditional tender offer.[22] Let D denote the shell company's debt[23] and assume that $0 \leqslant D \leqslant 1$. As earlier, let P denote the takeover premium offered by the raider and $\beta(P)$ the probability of takeover success. In equilibrium, a fraction κ of the shares is tendered. The shareholders' indifference equation is $P = \beta(1 - D)$. Because the proceeds of the debt D serve to pay the acquired shares and compensate the raider, the latter's utility is $\pi = [D - \kappa P] + \beta[\kappa(1 - D)] = D$.

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21. The role of toeholds in encouraging takeover attempts in a free-rider environment was stressed by, among others, Shleifer and Vishny (1986a,b) and Hirshleifer and Titman (1990).

22. Müller and Panunzi assume that the offer is conditional on a fraction at least equal to κ being tendered. We look at unconditional offers only for consistency with the rest of the section.

23. This debt, for expositional simplicity, is assumed to be safe. Otherwise the tendering indifference equation derived below is slightly different.

The reader can check that the raider cannot prevent free riding if the acquisition subsidiary is financed through equity rather than debt. Also, (s)he should note the strong similarity with the study of commitment through the use of third parties in Chapter 7.

11.5.2.4 Takeover Defenses

Takeover defenses come in many guises,[24] and, except for the common feature that they make it harder for a raider to acquire a firm, are hard to summarize concisely. Let us illustrate their role in the case of poison pills, more specifically in the most common form of a "flip-over plan" under which the holders of shares are entitled to purchase new shares at a substantial discount after a hostile takeover.[25] For computational simplicity, let us assume a simple majority rule ($\kappa = \frac{1}{2}$) and that the new shares carry no voting rights.[26] In the case of takeover success, the 50% of shares kept by the initial shareholders are worth $\hat{v} + \Delta$ (with $\Delta > 0$), while the 50% acquired by the raider are worth $\hat{v} - \Delta$ to him due to the dilution.[27] Letting, as before, β denote the probability of success and P the premium over v, shareholders are indifferent between tendering and keeping their shares if and only if

$$\beta(\hat{v} + \Delta) + (1 - \beta)v = v + P$$

or

$$\beta = \frac{P}{1 + \Delta}.$$

The raider's profit is then

$$\pi = \beta\hat{w} + \tfrac{1}{2}[\beta(\hat{v} - \Delta) + (1 - \beta)v - (v + P)]$$
$$= \beta(\hat{w} - \Delta).$$

Assuming that $\hat{w} > \Delta$ (otherwise the raider makes no offer), it is optimal for the raider to succeed for

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24. See, for example, Malatesta (1992) and Section 1.5. Malatesta and Walking (1988) is among the classic references on poison pills.

25. Here we assume that the poison pill cannot be removed. Bebchuk and Hart (2001) allow the tender offer to be accompanied by a proxy vote contest over the redemption of the poison pill.

Also, the threshold that triggers the exercise of the option to buy new shares may be smaller than 50%.

26. If the new shares carry a voting right, the analysis is basically unchanged.

27. For example, suppose that the holders of untendered shares are entitled to one extra share per share for free. Then the raider has only one-third of the cash rights. Then $\Delta = \frac{1}{3}\hat{v}$.

certain ($\beta = 1$) by choosing

$$P = 1 + \Delta.$$

The poison pill further raises the purchase price. In contrast with the dilution of initial shareholders by the raider considered in Grossman and Hart, poison pills allow a dilution of the raider by initial shareholders.

Poison pills thereby allow the firm to adjust the purchase price paid by the raider. Suppose, for example, that the raider's benefit from control, $\hat{w}$, is known (the distribution H is a spike at $\hat{w}$).[28] In the absence of a poison pill, $P = 1$ and the raider's surplus is $\hat{w}$. The optimal poison pill then yields dilution $\Delta^* = \hat{w}$.

11.5.3 Value-Enhancing Raider: Pivotal Tendering

A series of papers by Bagnoli and Lipman (1988), Holmström and Nalebuff (1992), Gromb (1995), and Segal (1999) have carefully analyzed strategic behavior among shareholders facing a tender offer. Let us assume that there are n shares, $a \leqslant n$ of the shares carrying a voting right, and that the raider must possess $k \leqslant a$ shares in order to exercise control (so $\kappa = k/a$). Each share carries a cash-flow right equal to $1/n$th of the investor payoff (v under incumbent management, $\hat{v}$ under raider management). Lastly, we assume in a first step that each shareholder owns one share.

It can be shown that assuming that the raider does not bid for the nonvoting shares involves no loss of generality. Intuitively, the raider and the shareholders have the same valuation for the nonvoting shares. Hence, no trade of nonvoting shares between them can benefit both, or, put differently, any sale of nonvoting shares to the raider must occur at a price equal to the expectation of their *ex post* value. For the same reason, "nonvoting shares" could also stand for "debt": the raider has no incentive to acquire the firm's outstanding debt.

Note that the raider can appropriate the entire value enhancement (at least on the voting shares) if *conditional* offers are feasible. Indeed, suppose that he makes an unrestricted offer at an arbitrarily small

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28. And $v + w < \hat{v} + \hat{w}$.

premium

$$P = \varepsilon$$

for the a shares, conditional on all voting shares being tendered. It is then an equilibrium for all shareholders to tender;[29] for, each obtains $(v + \varepsilon)$ by tendering, and only v if he does not tender (and thereby defeats the tender offer). Thus, shareholder unanimity strengthens the raider to the point that the free-rider problem completely disappears! Only the value enhancement on the nonvoting shares is not appropriated by the raider.

Second, assume that conditional offers are forbidden or are not credible.[30] Let us look at voting shares and let P, as earlier, denote the premium over v offered by the raider. We will focus on the *symmetric, mixed-strategy equilibrium*, in which each shareholder tenders his share with a probability x to be determined.[31] Let m denote the (random) number of voting shares tendered overall.

Consider shareholder $i \in \{1, \ldots, a\}$. Let m_{-i} denote the number of voting shares tendered by other shareholders. Because these play a mixed strategy, m_{-i} is a random variable. The probability that the takeover succeeds if shareholder i does not tender his share is $\Pr(m_{-i} \geqslant k)$. In order for shareholder i to be indifferent between tendering his voting share and not tendering it, it must be the case that he obtains the same utility from both strategies, or

$$P = \Pr(m_{-i} \geqslant k) \cdot 1. \qquad (11.4)$$

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29. This is not the only equilibrium. There are other equilibria in which the takeover fails (e.g., if all refuse to tender their share, there is no individual impact of not tendering one's share). However, these alternative equilibria rely on weakly dominated strategies (tendering one's share either has no impact or benefits the shareholder if the others also tender their share). The equilibrium we focus on is the only one that is robust to the elimination of weakly dominated strategies.

30. The terms of the offer could later be relaxed if the conditions set in the offer are not satisfied.

31. The equilibrium is far from being unique. For example, there are pure-strategy ones in which k shareholders tender and $a - k$ do not tender for $P \in (0, 1)$. These equilibria resemble the one prevailing under a conditional offer: each of the k shareholders tendering their share is pivotal, and makes the takeover attempt fail if he does not tender his share. And, for the same reason, the raider fully appropriates the value enhancement on the voting shares.

There are also mixed equilibria, in which a set of shareholders tenders for certain, another set does not tender for certain, and a third set randomizes over the tendering decision (as in the mixed-strategy equilibrium).

The raider's profit π is most easily computed by noticing that the expected value enhancement (on voting shares) is equal to $a[\Pr(m \geqslant k) \cdot 1]/n$ and that this value enhancement is necessarily shared between raider and shareholders. The latter obtain P/n each since one of their optimal strategies is to tender. Hence,

$$\frac{a}{n} \Pr(m \geqslant k) = \frac{a}{n} P + \pi$$

or

$$\pi = [\Pr(m \geqslant k) - \Pr(m_{-i} \geqslant k)] \frac{a}{n}$$

$$= \binom{a-1}{k-1} x^k (1-x)^{a-k} \frac{a}{n}.$$

From equation (11.4), we know that there is a one-to-one increasing mapping between $P \in [0, 1]$ and x spanning the full support $[0, 1]$: increasing the premium raises the probability of tendering. Thus, maximizing π with respect to P is equivalent to maximizing π with respect to x (and then using equation (11.4) to compute the optimal premium). A simple computation (take the derivative of the logarithm of π) yields the optimal probability of tendering (i.e., the raider's optimal tradeoff between a high probability of takeover success and a low premium paid to shareholders):

$$x^* = \frac{k}{a}.$$

We can now return to Grossman and Hart's analysis of the free-rider problem. The raider's profit, replacing x by its optimal value, is

$$\pi = \binom{a-1}{k-1} \left(\frac{k}{a}\right)^k \left(1 - \frac{k}{a}\right)^{a-k} \frac{a}{n}.$$

Bagnoli and Lipman (1988) and Holmström and Nalebuff (1992) show that when the number of shares a becomes large,[32] the raider's profit converges to 0 (at speed $1/\sqrt{a}$). Intuitively, the probability that any shareholder is pivotal, that is, of *exactly* $k - 1$ other shareholders tendering their shares, becomes very small. Hence, for shareholders to be indifferent between tendering their share or not, it must be the case that the probability of takeover success be very close to the premium.

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32. Keeping a/n constant (e.g., equal to 1, if all shares carry a voting right).

Whatever the number of shares, the nonvoting shares trade at a premium with respect to voting shares equal to[33]

$$\Pr(m \geqslant k \mid x = x^*) - \Pr(m_{-i} \geqslant k \mid x = x^*) > 0.$$

The holders of nonvoting shares are the ultimate free riders. Holders of voting and nonvoting shares have conflicting interests. Nonvoting shareholders, whose interest lies solely in the success of the takeover, are hurt by the free-riding behavior of voting shareholders, and therefore prefer supermajority rules and a low number of voting shares. In contrast, voting shareholders prefer a large number of voting shares and the simple majority rule, because these reduce the probability that they are pivotal and allow them to be less pressured by the raider.

As Gromb (1995) points out, the optimal charter in this environment has *one-share–all-votes*. That is, the firm optimally issues many shares, only one of which has a voting right. The raider purchases this share at an arbitrarily small premium,[34] but the important point is that the takeover occurs with probability 1 (as under the unanimity rule) and so all nonvoting shares (which represent almost the entire value of the firm) free ride on the surefire value enhancement.

Remark (other free-riding securityholders). Nonvoting shareholders are not the only free riders. Along similar lines, holders of risky debt benefit when a value-enhancing raid succeeds. Their claim is similar to that of nonvoting shares to the extent that it carries no voting right and benefits from value-enhancing takeovers (Israel 1992).[35]

Remark (sequential offers). This analysis, like the rest of the chapter, has assumed that the raider makes a single, once-and-for-all tender offer. One may wonder whether the possibility of making new tender offers after an unsuccessful one alleviates or aggravates the free-riding problem. Harrington and Prokop (1993) generalize the analysis with a finite number of shareholders, each holding one share, to a discrete-time, infinite-horizon environment. As long as he has not yet acquired k shares, the raider makes a new unconditional offer each period; and so he acquires new shares until he finally obtains control of the firm.[36] Two key results emerge:

• The raider's payoff is strictly lower than that predicted by static (one-shot-offer) equilibria. The anticipation of a higher tender offer in the future makes shareholders more inclined to hold onto their share. The free-rider problem is exacerbated by the lack of price commitment and the raider must offer a higher premium than in the static context.

• As readers familiar with the Coase (1972) conjecture[37] will intuit, the raider's expected profit converges to 0 as the time period between offers goes to 0. Thus, even with a small number of shareholders (so free riding is limited in a static context), the raider must leave almost all the surplus to shareholders.

11.5.4 Multiple Shares per Shareholder

As Holmström and Nalebuff (1992) point out, the previous analysis hinges crucially on each shareholder holding a single share. Dividing a share into N shares, each with value $1/N$ of the value of the original share, affects the holders of voting shares' incentive to tender. The basic idea is that shareholder's act of tendering a share makes takeover success more likely and thereby raises the profitability of all shares that the same shareholder does not tender. This weakens the shareholders' incentive to free ride and enables the raider to capture a substantial fraction of the pie.

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33. Furthermore, when the number a of voting shares increases, fixing k, the value of these shares increases, while that of nonvoting shares decreases. And when the threshold k increases, keeping a constant, the value of voting shares decreases while that of nonvoting shares increases.

34. This is clear under the maintained assumption of a tender offer. Of course, the owner of the voting share might try to bargain over the price of the share; but due to the others' free riding the two have little surplus to share anyway. So the assumption we make about the credibility of a tender offer (that is, of a lack of bargaining power of the owner of the voting share) is without consequence for the final outcome.

35. Of course, for this to hold, it must be the case that the value enhancement is not accompanied by an increase in risk.

36. The equilibrium concept is the generalization of the static one in this section: the paper focuses on symmetric equilibria, or more precisely on symmetric Markov perfect equilibria. If m_t denotes the number of shares held by the raider at the beginning of period t and P_t the takeover price (or premium), each of the remaining $(a - m_t)$ shareholders tenders his share with probability $x_t = x(m_t, P_t)$.

37. See, for example, Fudenberg and Tirole (1991, Chapter 10) for an exposition.

Start from the situation in which there are a voting shares, k of which must be acquired by the raider to gain control. Each shareholder holds exactly one share. Now subdivide shares N times: each shareholder now holds N shares, and there is a total of aN voting shares. Let kN denote the new number of shares that the raider must acquire; so the percentage of shares to be acquired is kept constant.

Again, we look for the symmetric equilibrium. Each shareholder withholds $M < N$ shares, tenders $N - M - 1$ shares, and randomizes over the tendering decision of the Mth share.[38] The number of shares tendered must be approximately kN in order for this randomization to be rational.

For N large, whenever the raider offers a premium P, $0 < P < 1$, the percentage of shares tendered is almost deterministic, by the law of large numbers. Furthermore, by now familiar reasoning, it must be close to k/a; otherwise all shares would be tendered, inducing each shareholder to keep his shares, or vice versa.[39] Furthermore, the support of the distribution of the number of shares tendered (that is, the range of uncertainty faced by an outside observer as to the number of tendered shares) has size exactly equal to a, since each of the a shareholders randomizes on only one share. So the support is smaller than a shareholder's number of untendered shares for N large.

Next, let us deduce from this that the probability that the takeover is successful converges to 1 as N goes to ∞. If this probability of success were bounded away from 1, then any shareholder could make it exactly 1 by tendering a more shares, which is a small number relative to the M shares not tendered, where, recall, M/N is close to $(a - k)/a$. Hence, each shareholder would have the ability to raise the probability of success substantially by tendering a negligible (for N large) incremental fraction of his shares. This raises the profitability of the "inframarginal shares" (the $M \simeq [1 - (k/a)]N$ shares withheld for certain). Hence, if m is the (random) number of shares tendered,

$$\Pr(m \geqslant kN) \to 1 \quad \text{as } N \to \infty.$$

The raider's profit is then approximately

$$\pi \simeq \frac{kN}{aN}[\Pr(m \geqslant kN) - P]$$
$$\simeq \frac{k}{a}[1 - P].$$

The raider's optimal strategy is to choose P arbitrarily small, yielding raider profit

$$\pi \simeq \frac{k}{a}.$$

Thus, Holmström and Nalebuff (1992), focusing on the symmetric, mixed-strategy equilibrium, show that it makes a substantial difference whether shares are divisible or not.[40] With one share per shareholder, the probability of being pivotal is infinitesimal for a large number of shareholders/shares, and so everyone behaves as a perfect free rider, as in Grossman and Hart (1980). When shareholders have a lot of shares, then each can be pivotal and has an incentive to boost the probability of a takeover in order to raise the profitability of his inframarginal untendered shares. This reduces free riding and lets the raider make a (nonnegligible) profit. For example, the raider appropriates half of the value added in case of a simple majority rule,

$$\frac{k}{a} = \frac{1}{2}$$

and makes even more for supermajority rules.

One may wonder how the Holmström–Nalebuff analysis is modified in the presence of some exogenous noise (for instance, about the number of shareholders who will be informed about and/or care to participate in the tender offer, or about those (here none) who enter separate sale agreements with the raider); one could conjecture with Hirshleifer (1995) that such extra noise would make it unlikely that

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38. In fact, he can be indifferent with regards only to a single share: the benefit from the increase in the probability of takeover success brought about by tendering a share declines with the number of shares tendered (the number of "inframarginal" shares not tendered is then smaller).

39. More formally, letting m denote the (random) number of shares tendered, for any $\varepsilon > 0$, and $\eta > 0$, there exists N_0 such that, for all $N > N_0$, $\Pr(x(N) - \varepsilon < m/aN < x(N) + \varepsilon) > 1 - \eta$, where $x(N)$ is the expected fraction of shares tendered. So, if, for example, $k/a > x(N) + \varepsilon$, then tendering all of one's shares is optimal as long as $P > \eta$ (since the probability of a successful takeover is bounded above by η), a contradiction; and similarly for $k/a < x(N) - \varepsilon$. Choosing $\eta < \min(P, 1 - P)$, we see that $x(N)$ must converge to k/a.

40. Holmström and Nalebuff also look at similar equilibria for asymmetric initial shareholdings, in which shareholders with more shares tender more.

shareholders would perceive themselves as pivotal. That is, noise should reinstate free riding by lowering the individual shareholder's prospect of being pivotal and should substantially reduce the raider's profit. The validity of this conjecture is confirmed in the discussion below.

11.5.5 Discussion

Grossman and Hart's (1980) intuition for free riding builds on the idea that with a large number of shareholders, each feels that (s)he is nonpivotal, i.e., will not influence the outcome of the takeover attempt. Each shareholder therefore refuses to sell as long as the premium does not match the subsequent value enhancement; and so the raider is unable to benefit from the value enhancement he brings along. A number of papers in various fields of economics (in particular, Fudenberg et al. 1998) have studied environments with many small players and exogenous uncertainty (as opposed to the endogenous uncertainty arising in the mixed-strategy equilibria studied above) and derived conditions under which it is indeed optimal for economic agents to behave in the large-number limit as if they individually had no impact on aggregate outcomes. Segal (1999, Section 7) derives an interesting general result along this line; in an application to takeovers he assumes that there is probability ε that a shareholder does not receive the raider's offer or is unable to respond, and that the product of ε times the number of shareholders goes to ∞ as the latter number goes to ∞ (a condition that is trivially satisfied if, for example, ε is independent of the number of shareholders). This creates a fair amount of uncertainty as to the (absolute) number of shares that are being tendered; and so each shareholder rationally anticipates that (s)he is not going to affect the outcome of the tender offer. This reasoning is actually quite general, and, as Segal shows, applies to any arbitrary voluntary mechanism (conditional bids, etc.) and not only to the unconditional, unrestricted mechanism considered here. Segal thereby provides a useful argument in support of Grossman and Hart's free-riding prediction.

Segal (1999) brings another argument against the idea that individual shareholders should feel very concerned that their tendering decision will have a strong impact on their payoff. Even if the shareholder actually turns out to be pivotal (provide the raider with a majority of votes when tendering), the change in payoff may be largely overpredicted by the discontinuous payoff function presumed in the takeover literature, as the reader may have suspected from previous material covered in the book. Provided that the raider's offer is not conditional and so he acquires the shares that are tendered, his intensity of active monitoring in general increases continuously with the raider's shareholding (see Chapter 9); so the expected benefits of curbing managerial moral hazard will move rather continuously. A similar point can be made more generally for shareholders' payoffs under raider's real authority (Chapter 10). Overall, the literature on takeovers takes too narrow a view of "control." Finally, a toehold will encourage the raider to buy more shares in the future, resulting in the eventual transfer of formal authority to the raider.

11.6 Value-Decreasing Raider and the One-Share–One-Vote Result

Let us return to the simplifying case of a continuum of shares and now assume that the raider lowers investor value:

$$\hat{v} < v.$$

Such a raider is necessarily interested in control benefits $\hat{w}$. (Our treatment here follows that of Grossman and Hart (1988). Harris and Raviv (1988) obtain related results.)

For a positive premium ($P \geqslant 0$), it is a (weakly) dominant strategy to tender; similarly, when $P \leqslant \hat{v} - v$, then not tendering is a (weakly) dominant strategy for all shareholders. Hence, let us consider the relevant range in which

$$\hat{v} - v < P < 0.$$

The first observation is that shareholders face a *coordination problem* in their tendering decision. Collectively, they are better off if the takeover fails for certain than if it succeeds for certain (since $P < 0$); furthermore, each has more incentive to tender if the others also do.[41] Contrast this with the

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41. Technically, the tendering game exhibits a "strategic complementarity." We will encounter a similar situation when discussing bank runs in Section 12.3.

case of value-increasing raiders, for which we saw that each has *less* incentive to tender his share when the probability of takeover success increases, and therefore when others are more likely to tender their share.

In the *trust equilibrium*, each shareholder trusts other shareholders not to tender, and so does not tender himself. This equilibrium yields the highest possible payoff to shareholders. In the *suspicion equilibrium* (or "panic equilibrium"), all tender believing that others will tender as well. They all cut their losses by obtaining $v + P$ rather than $\hat{v}$. This is the worse possible outcome for the shareholders.

While these two equilibria coexist, it can be argued that the trust equilibrium Pareto-dominates any other equilibrium (from the point of view of shareholders), and so should be a kind of "focal point." Furthermore, as Grossman and Hart (1988) note, the suspicion equilibrium would disappear if a friendly arbitrageur (who would leave the incumbent team in control) were to come and overbid (that is, bid $v + P'$, with $P' > P$). The shareholders would then be individually and collectively better off tendering their shares to the friendly arbitrageur than selling them to the raider.

Charter design can also rule out shareholder panics of the suspicion equilibrium kind by requiring unanimity ($k = a$). Then, a raider cannot succeed unless $P \geqslant 0$. Of course, we have seen that the unanimity rule is detrimental to shareholders when confronted with a value-enhancing raider, since it then allows the raider to capture the entire value enhancement. The unanimity rule is shareholder friendly for value-decreasing raids for the same reason it is shareholder hostile for value-enhancing raids: it makes every shareholder pivotal, i.e., responsible for the success or failure of the raid.

Next, ruling out the unanimity rule and assuming away panics, the raider is constrained to offer

$$P \geqslant 0$$

if he wants to take control of the firm. The raider can then obtain control by offering $P = 0$. What is the optimal charter? As we have noted earlier, a tender mechanism cannot capture the raider's surplus. The latter is equal to $\hat{w}$ minus the number of shares acquired times the value loss ($v - \hat{v}$). The share-

holders' loss is equal to ($v - \hat{v}$) times the number of shares not acquired by the raider. Thus the firm wants the value-decreasing raider to acquire as many shares as possible.

Suppose, for example, that there are two classes of shares: class A (with one vote each) and class B (without voting rights).[42] The raider will not be interested in class-B shares (which do not help him obtain control and for which he loses $v - \hat{v}$ per share) and will attempt to acquire only class-A shares. So he will acquire all class-A shares if he is forced to make an unrestricted offer within a given class, or will bid for the minimum number of class-A shares needed for control (e.g., 51% under the simple majority rule) if he can make restricted offers. Either way, class-B shares lose $v - \hat{v}$ each, unlike the class-A shares that are purchased at price v and lose nothing. The optimal corporate charter is therefore to have no class-B shares at all (for any given majority rule on class-A shares).

More generally, assuming that all shares are associated with equal cash-flow rights (rights to the revenue stream) and fixing the number of voting rights (a say) and a majority rule ($k \leqslant a$ rights are needed to have control), it is optimal for the firm to endow each voting share with the same number of voting rights, provided that the raider can make offers for each class of shares.[43] Thus, as Grossman and Hart (1988) show, the one-share–one-vote charter is optimal when facing a value-decreasing raider, as it

42. We keep assuming that there is no large owner of voting shares. In practice, dual-class shares are often issued so as to allow owners or founders to retain control. For example, as of 2004, the Ford family had 40% of voting rights in the Ford corporation with only 4% of total equity (cash flow) rights. The class B shares in Berkshire Hathaway (Warren Buffet's firm) have 3/20 of the voting rights of class A shares. Another well-known case in point is Google, in which founders and top executives maintained control at the IPO by retaining shares that carry 10 votes. Needless to say, such dual-class structures tend to make their owners entrenched and may be taken on by investor activists such as CalPERS, the large Californian pension fund.

43. Let m_i denote the number of shares with $i = 0, 1, \ldots$ voting rights, with $\sum_i m_i = a$. Then the raider solves

$$\min \left\{ \sum_i n_i \right\} \quad \text{s.t.} \quad \sum_i n_i i \geqslant k \text{ and } n_i \leqslant m_i.$$

So there exists i_0 such that $n_i = m_i$ for $i > i_0$ and $n_i = 0$ for $i < i_0$.

In turn, the firm ought to maximize over $\{m_\bullet\}$ and i_0:

$$\max \left\{ \sum_{i \geqslant i_0} m_i \right\} \quad \text{s.t.} \quad \sum_{i \geqslant i_0} m_i i = k$$

(there is no loss of generality in assuming that $n_{i_0} = m_{i_0}$). The solution to this program is to have $m_i = 0$ for $i \geqslant 2$.

forces the raider to acquire the maximum number of shares.

Remark (a reinterpretation with multiple value-enhancing raiders). The environment with the single value-decreasing raider studied here can be reinterpreted as a multiple-raider environment in which the "value-decreasing raider" actually increases investor value to $\hat{v}_1 > v$, but less so than the other raider who delivers $\hat{v}_2 > \hat{v}_1$: suppose that the former, let us call him the "low-value raider," enjoys private benefit from control, $\hat{w}_1 > 0$, while the latter, the "high-value raider," does not, $\hat{w}_2 = 0$. The low-value raider may then overbid the high-value one in their contest for control of the firm. The one-share–one-vote rule again forces the low-value raider to acquire as many shares as possible at the value $\hat{v}_2$ that would have been created by the high-value raider. This remark leads us to the next topic of this chapter: bidding contests.

11.7 Positive Theory of Takeovers: Multiple Bidders

The analysis thus far has assumed that there was a single relevant bidder. A large literature, surveyed by Hirshleifer (1995), extends the analysis to competitive bidding.[44] For conciseness, I will not attempt to review this literature, and will content myself with a few themes.

Some of the literature focuses on revelations by bidders, through takeover bids, of information about share value under their management. In Fishman (1988), two raiders have independent valuations $\hat{v}_1$ and $\hat{v}_2$.[45] The highest bidder buys all the shares (there is no free riding; equivalently, the winner can perfectly dilute shareholders who held on to their share). Bidder 1 knows $\hat{v}_1$ and selects a premium P.

Bidder 2, observing P, must then decide whether to pay a fixed cost c_2 in order to learn $\hat{v}_2$; if he does so, he learns $\hat{v}_2$ and enters a bidding contest with bidder 1 (and gets $\hat{v}_2 - \hat{v}_1 - c_2$ if $\hat{v}_2 \geqslant \hat{v}_1$ and $-c_2$ otherwise). Fishman derives conditions under which the first bidder finds it advantageous to bid a positive premium $P > 0$, despite the fact that $P > 0$ amounts to wasting money if bidder 2 does not compete (either does not acquire information, or finds out that $\hat{v}_2 \leqslant P$). Conversely, in this signaling equilibrium, a low-premium bid by the first bidder is more likely to attract competition. Empirically, a second bidder does indeed seem less likely to appear and compete after a high-premium bid than after a low-premium one (Jennings and Mazzeo 1993).

Another strand of the literature on bidding contests looks at the impact of toeholds. The theoretical work of Burkart (1995) and Singh (1998) shows that a toehold increases the bidder's chance of winning a takeover contest.[46] Consider a battle between bidder 1 (with privately known value $\hat{v}_1$ to shareholders, say) having accumulated a toehold, and bidder 2 (with privately known value $\hat{v}_2$ to shareholders) with no such toehold; the bidding contest is as an ascending auction, in which the winner buys all outstanding shares at the price at which the loser abandoned.[47] Even if he loses, bidder 1 gains from forcing bidder 2 to raise his bid since that will raise the capital gain on the toehold. Bidder 2 has no such incentive. Hence, ceteris paribus, bidder 1 bids more on average.

Bulow et al. (1999) extend the Burkart–Singh analysis to the case of "common values" in order to obtain stronger effects (with private values, that is, when $\hat{v}_i$ carries no information that can help predict $\hat{v}_j$, a small toehold has only a small effect). Each bidder has private information about the target's profitability (which, say, is the same under either management).[48] Common values, as usual, give rise to a winner's curse. Bulow et al.'s point is that the winner's curse is very severe for bidder 2 when bidder 1 has a toehold. The toehold makes bidder 1 more aggressive, and so bidder 2 winning is particularly

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44. See, for example, Hirshleifer and Png (1989) and Dewatripont (1993). In Burkart et al. (2000) a minority block is initially held by an incumbent shareholder and the rest of shares dispersed among small shareholders. When the raider appears, the incumbent and the raider may negotiate privately either to trade the block or to enter into a standstill agreement (the raider then pledges not to buy new shares); if renegotiation fails, the two wage a public tender contest. Burkart et al. find a tendency toward block trades and low ownership by the raider despite the fact that the higher concentration of ownership created by a public tender generates more monitoring and a higher firm value; the reason for this result is that the two parties do not internalize the small shareholders' welfare in their bilateral negotiation.

45. There is no "common value" element.

46. This prediction is consistent with the available empirical evidence (Betton and Eckbo 2000; Walking 1985).

47. Free-rider problems are ruled out.

48. In the Bulow et al. model, $\hat{w}_1 = \hat{w}_2 = 0$. And $\hat{v}_1 = \hat{v}_2 = v(t_1, t_2)$, where t_1 and t_2 are the private information held by bidders 1 and 2.

bad news about the actual valuation of the target. This makes bidder 2 bid more conservative, which in turn reduces the winner's curse for bidder 1, and so forth.

Bulow et al. also show that, for a takeover contest characterized by a first-price, sealed-bid auction, the bidder with the larger toehold is more likely to win, but the winner's curse is less powerful.[49]

11.8 Managerial Resistance

Managers usually resist hostile takeover attempts in several ways. Not only do they routinely advise shareholders against tendering their shares, but they also lobby both "*ex ante*" (in the absence of takeover threat) and "*ex post*" (after a raider arrives) for takeover defenses. Recall that takeover defenses must be approved by shareholders, as in the case of corporate charter defenses such as supermajority rules or staggered boards,[50] or by the board, as in the case of poison pills.[51] In response to a takeover, the firm may also threaten the raider with litigation to gain time, may sell some of the assets desired by the raider to a third party, increase debt prior to the bid, acquire another firm to create antitrust problems for the bidder, or may agree to "greenmail," that is, repurchase the raider's current block of shares at a hefty price in exchange for a standstill agreement, under which the raider promises not to seek control of the firm in the future.

It is not clear why managers should have a say in such decisions. They face an obvious conflict of interest: a successful takeover is likely to result in the loss of employment and the control of their rents. On the basis of Chapter 10, it would be hard to make a case in favor of any *formal* right held by management in this area!

However, we know from Chapter 10 that managers may enjoy substantial *real* authority from their superior information. For example, management may have information indicating that

- the raider's success would lead to a reduction in the target's value;
- the raid is value enhancing, but the offer made by the raider is too low (the target is underpriced).

In the former case, the takeover should be prevented; in the latter case, takeover defenses should more mildly push the raider's price up.[52]

No general theory of managerial resistance based on this notion of real control is available, and so we can only conjecture what its main ingredients could be. We know from Chapter 10 that management is more likely to influence the board and the general assembly if its interests are better aligned with those of shareholders. Indeed, this alignment is often the stated rationale for golden parachutes. The fact that managers receive large golden parachutes after dismissal not only raises redistributive concerns as these managers often receive indecent amounts of money, but also seems to be at odds with incentive theory because managers that add little value (v is low) are more likely to be replaced in the wake of a takeover. The efficiency rationale for a golden parachute is that it acts as a counterweight for the rents from control and thereby reduces the managers' natural bias in favor of strong takeover defenses. Furthermore, and following the analysis in Chapter 10, one would expect the managers' real authority to increase with managerial stockholdings;[53] indeed, managers with large stockholdings are less likely to oppose takeovers (Walking and Long 1984).

11.9 Exercise

Exercise 11.1 (takeover defenses). Extend the analysis of takeover defenses in Section 11.5.2 to the case in which the new shares created by the flip-over plan carry a voting right.

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49. In the case of symmetric toeholds, the expected sale price is higher in an ascending auction than in a first-price auction (see Singh (1998) for the case of private values and Bulow et al. (1999) for common values).

50. For example, one-third of board members comes up for reelection each year, which implies that even a successful raider cannot take immediate control of the board.

51. We do not, of course, consider here statutory defenses, which are not controlled by the firm.

52. For example, in Bagwell (1991) and Stulz (1988), repurchasing shares in an environment with an upward-sloping supply of shares (say, because shareholders have different capital gains bases) forces the raider to increase his bid.

53. Managerial stockholdings, if they are substantial and carry voting rights, however, also reduce the number of shares that can be tendered by independent shareholders.

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