Shareholder Rights and the Bargaining Structure in Control Transactions

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Abstract

When there are many shareholders in a firm, they face collective action problems. One problem is that acquirers can pursue divide-and-conquer strategies such as two-tiered front-loaded bids. The solution to this in the theoretical literature and in judicial practice is a centralized bargaining agent, such as the firm's management, or a shareholder vote. We show that these methods are of limited usefulness, however, in addressing the agency problem between shareholders and managers. In the relationship between shareholders and centralized bargaining agent, the shareholders receive take-it-or-leave-it offers, such that the agent captures all the surplus. This in turn hampers efficient ex ante financing: Some firms can raise sufficient funds only if (the threat of) judicial remedies provides them (an expectation of) some surplus. In realistically imperfect judicial systems, this induces trade-offs with court errors and litigation costs.

Dispersed shareholders face considerable dangers in control transactions initiated by managers and controlling shareholders. Their basic rights under current statutory law—appraisal and the shareholder vote—are the ruins of the 19th century unanimity requirement for mergers that collapsed under the pressure of economic necessity (Manning, 1962). Modern jurisprudential developments such as *MFW* and *Corwin* that cut back on other protections seem driven primarily by a concern to limit litigation. Courts and commentators put much faith in corporate fiduciaries negotiating on behalf of shareholders to give them their due. But what is shareholders' due, and

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which mechanisms can secure it, is almost entirely unclear. Corporate fiduciaries acting as centralized bargaining agents can protect shareholders against certain collective action problems such as those created by two-tiered front-loaded tender-offers. But what protects the shareholders against unfaithful fiduciaries?

We attack these questions from first principles. Our starting point is the centralization of the managerial authority of the corporate form in the board of directors and senior officers. This basic institutional feature is ubiquitous for widely-held public companies for well-understood economic reasons: hired professional managers are better informed than dispersed shareholders about how to run the business. But while this delegation of authority to managers has large benefits, it also raises the prospect of agency costs. In the case of control transactions, the basic problem is that management might push through transactions that benefit themselves at the expense of shareholders. To protect shareholders from such opportunistic managerial behavior, and ultimately increase the efficiency of the corporate system, corporate law grants shareholders a mix of voting rights and litigation rights.

The basic perspective we develop in this paper is that the functioning of these shareholder rights must be understood in terms of how they shape the bargaining structure of shareholders vis-a-vis management. The centralization of authority in management gives managers proposal power, which has profound consequences for the bargaining structure induced by alternative bundles of shareholder rights. This bargaining power perspective on shareholder rights in mergers yields a range of insights.

First, we show that the shareholder vote on a transaction can secure shareholders' interest in the standalone firm—i.e., the status quo—but nothing else. The reason is inherent in the shareholders' predicament as a (more or less) dispersed group, which prevents them from making their own proposals. At least in the relationship to their own fiduciary, shareholders typcially face in effect a take-it-or-leave-it-offer and hence must leave all surplus to the offeror (barring bidder competition, see below). Second, we show that this hampers efficient ex ante financing: some firms can raise sufficient funds only if they can promise their shareholders a part of an eventual deal surplus. Our

bottom line is that monetary judicial remedies—or, when available, certain alternatives discussed below—are necessary to ensure efficient ex ante financing. Finally, we consider important details and difficulties in implementing these general ideas, relating our findings to existing law and trade-offs with court errors and litigation costs.

Our first point—the shareholder vote only protects the status quo—has an easy game-theoretical intuition. Essentially, the shareholder is on the receiving end of an ultimatum game. The crux is that there is usually no way out of it: shareholders are usually technologically unable to make the offer because they are dispersed or lack means to do so, or both. Beyond pointing out this under-appreciated fact, our contribution is to show the generality of this insight even if "the game" is not artificially restricted to one round of offer and acceptance / rejection. One might think that the possibility of repeated offers changes the game to a standard bargaining game with very different predictions. But this is not so because, repeated or not, the shareholders never make the offer, in sharp distinction to standard bilateral bargaining models (e.g., Rubinstein, 1982).

Our second point—ex post surplus sharing is important for ex ante investment—is also intuitive. After all, if ex ante investment did not matter, there would be no efficiency reason to give shareholders anything in a control transaction, or outside of it for that matter. This perspective of ours—shareholder payoffs are irrelevant ex post but critical ex ante—is standard in the general corporate finance literature (e.g., Grossman and Hart, 1980; Tirole, 2006) but curiously not in the law and economics literature on M&A.[1]

Our setup is very general. It nests arms' length transactions, management-buyouts (MBOs), squeezeouts, and sales of control blocks, and captures both private and public firms. This may seem surprising to readers accustomed to seeing certain problems mostly in certain types of transactions. For example, managerial self-interest is a major concern in MBOs but much less so in arms' length

[1]For example, Easterbrook and Fischel (1981) argue for appraisal as the exclusive remedy because giving shareholders (only) their status quo value ensures that all (and only) ex post efficient transactions take place, while providing optimal incentives for managers to search for such transactions. But the optimal ex post incentives point is also true outside a sale. Yet there Easterbrook & Fischel would not hand the entire upside to the manager, creating a dangerous distortion where the manager is much better off investigating sales than stand-alone management. More to the point, all of these ex post problems could be eliminated by handing the manager complete ownership of the firm. The reason not to do so is, obviously, to maintain incentives for ex ante shareholder investment.

transactions. But what we are accustomed to seeing in transactional practice is itself a result of the prevailing legal regime (which throughout the article includes charter provisions), which takes certain options off the table. For example, it would be an actionable violation of a manager's duty of loyalty to pocket a side payment from a buyer in an arm's length transaction (at least without shareholder approval). We do not presume such legal restrictions must be in place; we consider if and why they are desirable. This puts connections and unintended side-effects in stark relief. For example, managerial entrenchment—a key concern in third-party takeover attempts—emerges as the flipside of prohibitions on side-payments. To be sure, we also discuss why some aspects are more critical in some types of transactions than in others.

Readers with a practical bent may also believe, or hope, that some or all of the problems we identify are handled in the real world by mechanisms outside of our model. Chief among these are boards and bidder competition. That faithful and competent boards would eliminate (most) agency problems is almost tautological. Similarly, unfettered competition between bidders appealing directly to shareholders would save shareholders from their ultimatum game predicament. In either case, we and the law would not need to bother with costly additional protections, except insofar as they are required as flanking measures to secure these conditions. There is reason to fear, however, that boards are often not effective, and most deals do not have competing bidders, so that we would be left with the mechanisms of our model. Alternatively, one can view our model as showing the importance of effective boards and bidder competition by showing what goes wrong if they are missing (much like Modigliani-Miller's irrelevance proposition showed the importance of what was outside their model).

The papers closest to ours are those modeling the relationship between manager and shareholders in particular types of M&A transactions: sales of control (Bebchuk, 1994), squeezeouts (Yee, 2005), and arms' length mergers (Choi and Talley, 2018). None of them models or focuses on (minority) shareholders' ex ante investment incentives, none consider the full gamut of shareholder rights, and all are one-shot games.[2] Our model is thus considerably more general. Our

[2]Yee (2005) models what he calls ex ante investment by the *controlling* shareholder, which is ultimately a pure ex post concern because the firm is already up and running in Yee's model when the controller purchases the control

model nests Bebchuk (1994), which develops our ex post analysis in the special context of sales of control, but not the ex ante implications. Yee (2005) additionally models the controlling shareholder's decisions to acquire a control block and to investigate a squeezeout. Choi and Talley (2018) additionally models (outside) shareholder heterogeneity and competition between outside bidders.

The main focus in most of the literature is on the effects of shareholder rights on the bargaining between the buyer and the target in an M&A transactions (e.g., Stulz, 1988). For example, Choi and Talley (2018) models appraisal primarily as a commitment to a reserve price in an auction of the firm. This is peculiar both given the usual focus of corporate law on the manager-shareholder agency conflict and the obvious thrust of these remedies. If appraisal's or the shareholder vote's main purpose were to meaningfully enhance the target's bargainng position in negotiations with the buyer, we would expect single-owner firms to commit to equivalent mechanisms, say by empaneling a body of phantom-stockholders to vote on a sale, or by vesting most of the stock in an irrevocable trust (that as outside shareholder has appraisal rights). Accordingly, our focus is on the role of shareholder rights in mitigating the manager-shareholder conflict.

The paper proceeds as follows. Section 1 sets up the model. Section 2 solves the one-shot version of the ex post interaction between manager and shareholder, i.e., the decision whether to sell and how to split the price. The one-shot version is trivial but contains all of the intuition of shareholders' ultimatum game predicament. The Appendix does the hard work of showing that the intuition largely continues to be correct even if multiple, potentially infinite rounds of offers are allowed. Section 3 considers the efficiency implications for ex post allocation (i.e., which mergers get consummated) and ex ante investment (i.e., which firms get financed in the first place). Finallly, Section 4 discusses complications and relates the model to regimes and situations we see in the real world.

block, and the controller's only role is to investigate effcient squeezeouts.

1 Setup

We model the agency conflict between a manager—who may or may not be a controlling shareholder—and shareholders in a sale of the company to a buyer, who could be a third party (arm's length transaction) or the manager (MBO, squeezeout). Specifically, we consider the effect of three types of legal protections that may be available to the shareholder in isolation or in some combination as described below: (1) a requirement of shareholder approval, (2) injunctions, and (3) suits to obtain a higher payout (like appraisal or fiduciary duty damages claims). We first set out our assumptions (1.1) before commenting on their realism and generality (1.2).

1.1 Assumptions

Actors and information. We model three strategic actors: one manager, one shareholder, and—in a small supporting role—a plaintiff's attorney. All three are rational, risk-neutral, and perfectly informed. We will also have a buyer and a judge but they behave mechanically (i.e., not strategically). The manager may or may not represent a controlling shareholder.

For simplicity, we assume that if the manager or shareholder are indifferent between utilizing a shareholder protective device or not, they will choose not to utilize it. Similarly, if no deal can be reached in equilibrium, the manager prefers not to propose one. Both of these assumptions only rule out uninteresting, payoff-equivalent variations of the equilibria we derive. We also assume that if the manager is indifferent between a deal and no deal, the manager prefers a deal: this makes a difference for situations where the shareholder would get a positive deal surplus (protected by the litigation regime) but it is a knife-edge case.

Firm, ownership stakes, and status quo payoffs. Initially, the manager and shareholder own shares $s \in (0,1)$ and $1-s$, respectively, of the common stock of some firm. We normalize to one the net present value of the cash flows that are shared between the manager and the shareholder in the status quo according to the "official" s vs. $1-s$ split. In addition, the manager receives private benefits $b \geq -s$ from running the firm. The total social value of the firm in the status quo is thus

$1+b$.

Merger: surplus, price, and manager's cut. A potential buyer values the firm net of deal cost at v. If there is a sale, the seller captures all of this value. The manager can initiate a deal and decide on the split of this value between the manager (fraction $a \in [0,1]$) and the shareholder ($1-a$ subject to the shareholder protective remedies discussed below. Note that $v-1-b$ is the potential social welfare gain (or loss, if $v < 1+b$).

Shareholder protective devices. If and only if the manager initiates the sale, the shareholder may, in this order:

1. sue to enjoin the sale if the shareholder's proposed consideration $(1-a)\,v$ is less than some injunction threshold I;

2. (if available in the chosen deal structure:) vote on the proposed deal; and

3. sue to change her consideration to some judicially determined award J,

where I and J are positive non-stochastic positive numbers that may be a function of all the fixed model parameters and v but not of a.[3]

Whether a vote is available (2.) and the way I and J are determined depend on the law, including the terms of the corporate charter. Corporate law may offer the manager a choice of less stringent I,J in return for submitting the deal to a shareholder vote (a so-called "cleansing act" under current doctrine), or the other way around (i.e., the possibility to avoid a vote in return for more searching judicial review). If so, the manager makes that choice together with the initiation of the deal. In this case we differentiate pairs $\left\{I^D, J^D\right\}$ by the "deal structure" superscript $D \in \{V, NV\}$ for whether shareholders have a vote (V) or not (NV). We assume $\left\{I^V, J^V\right\} \leq \left\{I^{NV}, J^{NV}\right\}$, which holds with equality only if the manager actually gets no additional leeway from offering a vote.

[3] If I or J is a function of v, we assume that its partial derivative with respect to v is positive but less than one, i.e., the judge does not increase them more than one-for-one with the price v.

We consider both the possibilities that the shareholder herself or a plaintiff's attorney decides to bring any available lawsuit. The difference is that the plaintiff's attorney only cares whether the suit will be successful. By contrast, the shareholder also cares about what happens afterwards. Thus, in a situation where the shareholder is offered less than I but more than $1-s$, the shareholder might not sue but the plaintiff's attorney would.

Timeline. For clarity, we explicitly set out the full timeline of the game. When the game begins, the rules have been set, be it by a legislator, a court, or private contracting, and the manager and shareholder both learn the potential buyer's valuation. The sequence of moves is:

1. **Manager's choice of deal and deal structure**. The manager decides whether to pursue a transaction and, if so, (a) what split of the deal value a to propose and (b) if given a choice by the law, which deal structure to implement, $D \in \{V, NV\}$, and hence which package of rights will be available to the shareholder. Recall that we have stipulated that the price of any sale transaction will be set at the buyer's reservation value. If the manager does not pursue the transaction, the game ends, and the manager and shareholder receive their status quo payoffs.

2. **Injunction.** The shareholder or plaintiff's attorney decides whether to sue. If so, then the judge enjoins the deal if the shareholder's consideration is less than I. Consequences of injunction granted or not are the same as shareholder disapproval or approval, respectively.

3. **Shareholder vote?** If a shareholder vote is required, the shareholder decides whether to approve the merger. If approved, we move on to the next step. If disapproved, the outcome depends on the rules: if they allow the manager to pursue a different transaction, we go back to step 1.; if not, the game ends with the status quo.

4. **Monetary suit.** The shareholder or plaintiff's attorney decides if to sue. If so, the judge awards the shareholder J instead of the deal consideration; otherwise, the deal proceeds as proposed by the manager.

In an extension of the model , we also consider the possibility that the manager can implement a deal without a shareholder vote if the original deal has been derailed at stage 2 or 3, subject, of course, to possible injunction and monetary suit with respective thresholds $\{I^{NV}, J^{NV}\}$.

For robustness, the Appendix will also consider the possibility that the manager can indefinitely keep reproposing deals if the prior proposal was voted down or enjoined. In this case, we assume that there is an exogenous period-to-period probability of deal failure $1-\pi$, i.e., the "new try" is possible only with probability $\pi \in (0,1)$. There is a modelling choice between two options of a technical detail of this setup that maps onto our base model and its variation in the one-shot game, as we will explain when we get there.

1.2 Notes on the setup

Multiple shareholders. Our model could easily be extended to multiple shareholders without changing the results. A collectivity of shareholders will vote identically to the single shareholder in a model with perfect information such as ours, or with dispersed information centered around the truth. While there are well-known collective action problems afflicting dispersed shareholders in some transaction structures such as the notorious two-tiered front-loaded partial tender offer, such collective action problems can be and, in reality, are solved through various means. Similarly, representative litigation largely solves shareholders' collective action problem in litigation. Modelling these aspects explicitly would very considerably complicate the notation for little gain.

Asymmetric information. In reality, the manager has an information advantage over shareholders that further complicates the shareholders' plight. This would be particularly acute in an MBO or squeeze-out. Our symmetric information model thus provides a best case scenario for the shareholder vote, and yet we find that the vote provides seriously deficient protection. Adding asymmetric information would only strengthen this result. For litigation, we implicitly allow for asymmetric information—between judge and manager—by allowing for court error.

Nature of private benefits. The private benefits b cover both pecuniary benefits—often referred to as "tunneling"—and non-pecuniary benefits such as the feeling of power. The pecuniary benefits may or may not be disclosed, and if disclosed, may or may not appear as side payments as opposed to compensation given for value, for example under a competitive executive compensation contract (we count only the supra-competitive rent as a private benefit). Clearly, the precise value of b is not easily observable to outsiders such as a court. Also note that b is not constrained to be positive because the manager might bear a private cost—effort, stress, etc.—from running the firm. We merely assume $b \geq -s$ because otherwise the manager would be better off in the status quo quitting altogether.

Stock price. For a publicly traded firm, it might be tempting to think that $1-s$ would be the value of the public float ($1-s$ shares times an NPV of one) or, equivalently, that 1 would be the firm's market capitalization measured by the value of outside shares. However, that would usually be incorrect because the market price should incorporate expectations of lower or higher payoffs received by the shareholder in a potential transaction, which will rarely if ever be zero.

Deal price and its negotiation. We do not model deal negotiations explicitly so that we can focus on what we think is both the explicit purpose and the main effect of merger rules—shaping the agency conflict between manager and shareholder.[4] Our assumption that the seller captures all of v is natural if the buyer is the manager, i.e., when interpreting our model as one of an MBO or squeeze-out. In that case, v is the *manager's* valuation, and $1-a$ is the fraction paid to the outside shareholder (e.g., the squeezeout consideration). When the buyer is a third party, our assumption that the buyer pays all of v means that the seller has all the bargaining power, which seems close to empirical reality in public-to-public deals. It could be microfounded by assuming—heroically—that the manager can make a take-it-or-leave-it-offer to the seller. In any event, all of our strategic results would go through if we instead assumed that the buyer paid some increasing function of

[4]Note that single-owner firms do not have the mechanisms we discuss, nor do they mimick them (e.g., by giving some outsiders a veto right on sales incentivized by some cut of the deal value).

their valuation, even though any reduction in price would obviously increase the potential for lost efficient deals and reduce the potential for inefficient deals.

Split of the deal price (a). At this point, we do not distinguish *how* the merger consideration is received. In particular, the manager's take could include not only value received explicitly for the manager's shares but also value openly or secretly paid on the side, such as under a "consulting agreement." We return to this point when discussing judges' ability to estimate a.

Transaction costs of shareholder rights. Our assumption that manager and shareholder prefer no suit and an approving vote, all else being equal, is the notationally simpler equivalent of infinitesimal costs of suit and a failed vote, respectively. In a prior iteration of the model, we modelled these and other transaction costs explicitly, but this adds little to the economic intuition. Economically, transaction costs are likely to be small, even negligible, compared to the deal payoffs. To the extent they are not, the interesting part is to understand why; the tradeoffs and thus the impact on the desirability of various rules will be fairly obvious once the basic model is understood.

Risk of deal failure. For re-=proposals after failed deals, our assumption of a risk of deal failure strikes us as natural. There is always a risk that the buyer will walk, that some regulator intervenes, etc. Mathematically, our assumption is isomorphic to discounting of the deal consideration by the parties. In prior iterations of the model, we have also considered fixed bargaining costs or a deterioration in the deal value, which are formally somewhat different but lead to qualitatively similar results.[5]

[5] A shrinking deal pie means that eventually the pie will be less than the status quo value (or individual players' slices will be smaller than their status quo shares). At that point, the game comes to an end. The parties will reason backwards from there. Since the end-point is the status quo, this too will tend to give the shareholder only the status quo value.

Fixed period-to-period bargaining costs coerce the shareholder to "capitulate" early, but they could do much more than that, and yield absurd results, if one assumed that the manager could force the shareholder to remain in the bargaining indefinitely. They thus require more fine-tuning, which will always be debatable.

Sequencing of shareholder rights and manager's decision. Our sequencing of injunction before vote before monetary suit (appraisal or fiduciary duty damages) accords with observed reality, which is in turn structured by existing law. In any event, this sequencing is irrelevant for strategic choices. That the shareholder decides to sue after the manager moves, and that the manager cannot reverse course after the judicial decision is handed down, is also in accord with observed reality, but could make a difference under certain circumstances:

- Information provision: If judicial decisions are random, as they are in reality albeit not in our model, allowing the manager to withdraw after the court decides would allow the manager to "gamble" for a favorable ruling. Without such randomness, the timing is inconsequential because with symmetric information, both parties perfectly anticipate the judicial award.

- Commitment: If the shareholder had to sue for a monetary award—equivalently, to adjust the deal price—before the manager makes certain decisions, the shareholder could commit to sue or not to sue. In particular, the shareholder could commit not to sue for a higher payoff if that is the only way to get the manager to do a deal in the first place. However, we already capture the interesting part of this dynamic when we allow the deal structure chosen by the manager (or the law) to provide that an affirmative shareholder vote cuts off litigation and that the manager will not pursue an alternative transaction if the first one is voted down.

Availability of litigation. For ease of exposition, we model injunction and money suits as being always available. But note that $I = 0$ and $J = 0$ are at least the functional equivalent of injunction and money suit, respectively, being foreclosed.

Judicial decisions: I and J.

- For most purposes, underlying judicial decisions can be thought of as random and I and J merely as their expectations. The only exception is that the manager's strategy could change if I were random and the manager allowed to propose an alternative transaction after the initial one has been enjoined: the manager could then try their luck.

- There are economic and technical reasons not to allow I and J to depend on a. Economically, there are two ways to think of v and a. One way is that v is any observed monetary consideration, whether labelled "price," "consulting fees," etc. In this case, the whole point of judicial review would be to check or reset a, not to depend on it. Alternatively, one might view v as the economic consideration provided by the buyer to the manager, which is hidden information to everyone but the manager. In that case, the court only observes the product $(1-a)v$ and would be ill-equipped to adjust I or J as a function of a. Technically, dependence of I or J on a could sustain different solutions where the manager sets a particular a not because that is what the manager will get or to forestall litigation but because a affects I or J, which will be the shareholder's payoff in a litigation equilibrium.

  - The payoff distribution in real-world fiduciary duty damages litigation does depend on the product $(1-a)v$ because the award cannot be lower than zero, i.e., the total consideration received by the shareholder at the end of litigation is at least the deal price. The same could happen in appraisal if the courts took the deal price as a floor, as they were at some point believed to do (but no longer). Our model rules out this "option exercise price" dynamic.

2 Solution of the One-Shot Game

We now solve for the (subgame) perfect (Nash) equilibrium (SPNE) of the one-shot version of the model, i.e., where the manager gets to propose a deal (and deal structure) only once. The Appendix shows that the same equilibria obtain if the manager is allowed to re-propose deals indefinitely.

The one-shot game can be solved straightforwardly by backwards induction. Note that any stage after stage 1 is only reached if the transaction proceeds from the prior stage.

Stage 4 (Monetary Suit) The shareholder or plaintiff's attorney will sue if and only if $(1-a)v < J$—the deal provides less than guaranteed by the court—for a resulting shareholder payoff of

$\max\{J,(1-a)v\}$.

Stage 3 (Vote, if available) The shareholder will vote for the deal only if the proposed consideration–possibly adjusted by anticipated later monetary suit (stage 4)–is better than the status quo, i.e., if $\max\{J,(1-a)v\} \geq 1-s$.

Stage 2 (Injunction) An injunction is available if and only if $(1-a)v < I$, i.e., if the shareholder's part of the deal consideration is less than the minimum required by the court. A plaintiff's attorney will always ask for the injunction and block the deal because this will earn the fee, which is the attorney's only possible payoff from this game. By contrast, and analogous to the shareholder's voting criterion, the shareholder will not sue if $\max\{J,(1-a)v\} \geq 1-s$. In summary, the deal will not proceed past stage 2 if and only if $(1-a)v < I$ and either (1) there is a plaintiff's attorney or (2) $1-s > \max\{J,(1-a)v\}$.

Stage 1 (Manager's Deal Choice) To summarize stages 2-4, in any equilibrium in which the deal goes through, the shareholder payoff must be greater than or equal to:[6]

$$m^D \equiv \max\left\{J^D, \mathbf{1}_{PA} I^D, \mathbf{1}^D_{vote}(1-s), \min\left\{I^D, 1-s\right\}\right\}, D \in \{V, NV\}$$

Rationally, the manager will not offer more than that. The manager achieves his maximum payoff possible under deal structure D by proposing a such that

$$(1-a)v = m^D. \tag{1}$$

If the manager has a choice between deal structures with and without votes, the manager will choose the one with the lower m^D.[7] Of course, the manager will only do such deal if what the

[6] We denote by $\mathbf{1}_{PA}$ the indicator function for the presence of a plaintiff's attorney and by $\mathbf{1}^D_{vote}$ the availability of a shareholder vote under deal structure D. Recall that we have assumed that the parties prefer not to litigate, everything else being equal.

[7] Note that $m^V = \max\left\{J^V, \mathbf{1}_{PA} I^V, 1-s\right\}$ and $m^{NV} = \max\left\{J^{NV}, \mathbf{1}_{PA} I^{NV}, \min\left\{I^{NV}, 1-s\right\}\right\}$.

manager must offer is less than the maximum amount $M \equiv v - s - b$ that the manager can offer while not doing worse than in the status quo:

$$M \geq \min_{D} m^{D}. \tag{2}$$

Variation Now to the variation if the manager can implement a deal without a shareholder vote if the original deal with a vote has been derailed at stage 2 or 3. For this "backup deal," we can use the result from the basic game: if the manager's original proposal is enjoined or voted down, the manager would push through backup deal and pay the shareholder m^{NV} if and only if $M \geq m^{NV}$. It follows that if $M < m^{NV}$, the manager's "backup deal" option is irrelevant: the status quo obtains either way if the initial proposal is voted down or enjoined. Anticipating this, manager and shareholder in the initial proposal will behave just as they would if the re-proposal were unvailable.

By contrast, if $M \geq m^{NV}$, the shareholder's payoff from voting against or enjoining the deal is now m^{NV} instead of $1 - s$ since if the original proposal is turned down the manager will go forward reproposing a deal that gives m^{NV} to the shareholder. This means that, even if $m^{V} < m^{NV}$, the manager can no longer choose $D = V$ and force the shareholder to accept a payoff of just m^{V} since the shareholder knows that if he turns it down, the manager will ultimately offer m^{NV}. More formally, substituting accordingly in the analysis of stages 2 and 3 above, we now obtain that to get the initial deal through, the manager must offer $\max\left\{J^{V}, \mathbf{1}_{PA} I^{V}, m^{NV}\right\}$, which is simply equal to m^{NV} because we assume $\left\{I^{V}, J^{V}\right\} \leq \left\{I^{NV}, J^{NV}\right\}$. Consequently, when the manager is allowed to repropose after a failed original proposal, subject to the shareholder's litigation rights defined by $\left\{I^{NV}, J^{NV}\right\}$, then so long as the manager would ultimately still go forward at the reproposal stage, the result is that the manager will offer m^{NV} under either deal structure.

Summary. The only[8] SPNE[9] in the one-shot game is no deal if $M < \min_D m^D$, and otherwise a deal with shareholder payoff $\min_D m^D$ (or m^{NV} if the manager has the option of a "backup deal" and $m^{NV} \leq M$). In the Appendix, we show that the same SPNE–as far as deals and payoffs are concerned–obtain in the infinite game where the manager can re-propose deals.

3 Ex Post and Ex Ante Efficiency

We now consider the efficiency consequences of the legal regime and its bargaining outcome—as analyzed in the previous section—from an ex ante (investment) and ex post (who owns firm assets) perspective. We do so (only) for the baseline model; the impact of the variations will be obvious. To the extent we discuss possible rules in this section, we allow them to depend on all the variables. We defer to the next section the implications of imperfect information about the parameters.

3.1 Ex Post

Ex post, the firm should be sold, socially speaking, if and only if the buyer's valuation exceeds the firm's stand-alone value, $v \geq 1+b$. Figure 1 shows potential total firm value over various values of v if this first-best decision rule were followed. Up to $v = 1+b$, total firm value is flat at the status quo value $1+b$ (red horizontal line). From then on, total potential firm value—if the efficient decision is taken—rises 1-to-1 with v. We already know, however, that the private deal condition $M \geq \min_D m^D$ is not necessarily the same as the social ex post optimality condition $v \geq 1+b$.

Formally, let $\underline{v}$ be the lowest v for which the manager will do the deal given the rules, s, and b: $\underline{v} \equiv \min\left\{v | M \geq \min_D m^D\right\} = \min\left\{v | v \geq s+b+\min_D m^D\right\}$. Keep in mind that $\min_D m^D$ might depend on v and s, depending on the shareholder's legal rights. But note that $\underline{v}$ is nonetheless a cutoff value above which the manager will do the deal : the manager will do a deal if and only if $v \geq \underline{v}$ because $\frac{\partial M}{\partial v} = 1 \geq \frac{\partial m^D}{\partial v}$. Let buyers' valuations v—unknown when the rules are written—be

[8]Note that we have ruled out some knife-edge equilibria through players' "tie-breaker" preferences.

[9]For brevity, we do not spell out the full off-equilibrium strategies of the players, but we have mentioned them in the individual stages.

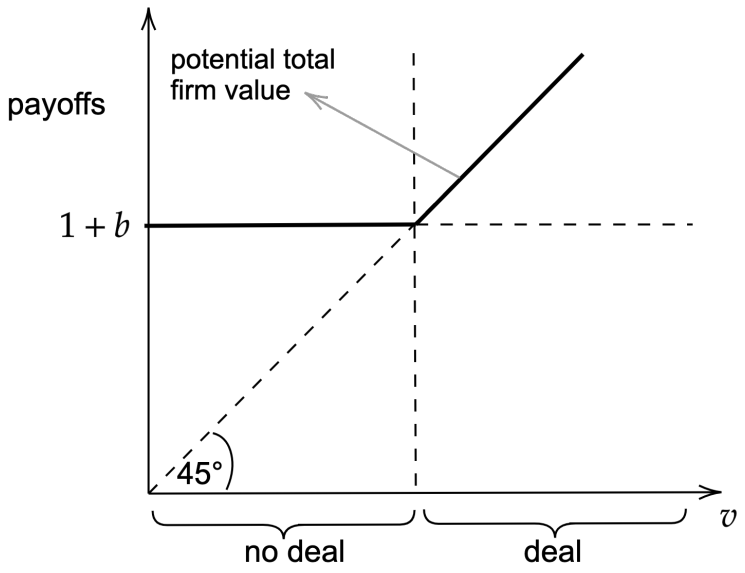

Figure 1: Ex Post Efficient Choice

distributed on $\mathbb{R}_0^+$according to cdf $F(\cdot)$. Conditional on a firm having been funded, expected ex post social welfare is

$$W^{post} \equiv F(\underline{v})(1+b) + \int_{\underline{v}}^{\infty} v dF(v). \tag{3}$$

Clearly, this expression is maximized at $\underline{v} = 1+b$. Call this maximum $\overline{W}^{post}$. Then we can rewrite (3) as

$$W^{post} = \overline{W}^{post} - \int_{1+b}^{\underline{v}} (v-1-b)\, dF(v). \tag{4}$$

The second term—the integral—is the expected welfare loss from $\underline{v} \neq 1+b$: lost deal surplus $v-1-b$ for $v \in (1+b, \underline{v})$ if $\underline{v} > 1+b$, and negative deal surplus $1+b-v$—from deals that should not have been done—for $v \in (\underline{v}, 1+b)$ if $\underline{v} < 1+b$.

Note that the shareholder's stake $1-s$ and payoff in any deal are *per se* irrelevant for ex post efficiency. But they can matter by shaping what deals get done, i.e., through $\underline{v}$. Giving the shareholder too much in a deal will make the manager not do socially efficient deals, i.e., it will lead to *entrenchment*. Conversely, giving the shareholder too little will make the manager do deals that are socially inefficient but allow the manager to *expropriate* the shareholder.

From the definition of $\underline{v}$, it is easy to verify that there are many legal rules (technically, infinitely many) that achieve the efficient $\underline{v} = 1+b$. One is to make $\min_D m^D$ equal to the shareholder's status quo payoff, $1-s$, regardless of the deal price. As we will see, a pure voting or a pure appraisal regime both achieve this. The intuition here is that if the shareholder always gets the status quo payoff, the manager is the residual claimant and will take the efficient decision. This is depicted in Figure 2. The manager gets the difference between total firm value (the bold line at the top of the figure) and the shareholder's fixed payoff (the horizontal line at $1-s$). As residual claimant, the manager takes the efficient action, which is to initiate a deal if and only if $v \geq 1+b$.

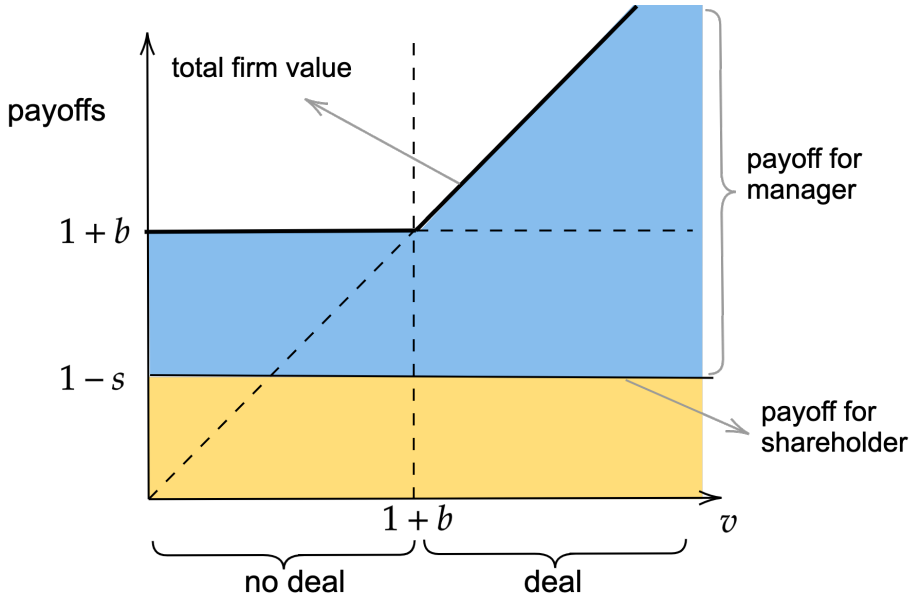

Figure 2: Ex post efficient choice induced by pure shareholder vote or appraisal

An alternative ex post efficient rule is to make $\min_D m^D$ appropriately proportional to v. Suppose $\min_D m^D = \lambda v$ for some $\lambda \in [0,1]$. The manager will then do a deal if and only if $(1-\lambda)v > s+b$, which reduces to $v > \frac{s+b}{1-\lambda}$. In order for this to induce socially efficient decisions by the manager, we must have $\frac{s+b}{1-\lambda} = 1+b$, which implies $\lambda = \frac{1-s}{1+b}$. Note that this efficient sharing rule gives the shareholder only his status quo share of the entire social value of the firm (including the manager's private benefits), which is smaller than his share of cash flow rights in the status quo, $1-s$. The reason the efficient sharing rule reduces the shareholder's share by dividing by $1+b$

is because the manager must be compensated for his lost private benefits in order to always sell when it is efficient to sell. A pure money suit rule $J^V = J^{NV} = \frac{1-s}{1+b}v$ or an injunction enforced by a plaintiff's attorney and $I^V = I^{NV} = \frac{1-s}{1+b}v$ (with or without a shareholdervote and/or appraisal) would achieve this efficient proportional sharing rule.

Suppose instead the shareholder receives deal consideration pro rata with their share in the status quo, $1-s$. This would result in the shareholder getting too much in deals with relatively little surplus, leading the manager to forego the deal rather than forego b. Specifically, giving the shareholder the "contractual" share $1-s$ of deal value v would lead to $\underline{v} = 1 + \frac{b}{s}$. This is depicted in Figure 3. The manager will initiate a deal only if the manager's deal payoff vs is at least as large as the manager's status quo payoff $b+s$. Graphically, deals will happen only to the right of the intersection of the ray from the origin vs—the manager's deal payoff—and the horizontal line at $b+s$—the manager's status quo payoff—i.e., beyond $\underline{v} = 1 + \frac{b}{s}$. This is the efficient cutoff value only if $b = 0$. If the manager gets any private benefits (or costs, for that matter)–$b \neq 0$–the cutoff value diverges from the efficient one, leading to the foregone deal surplus shown in the figure (or inefficient deals if we had drawn the figure for $b < 0$).

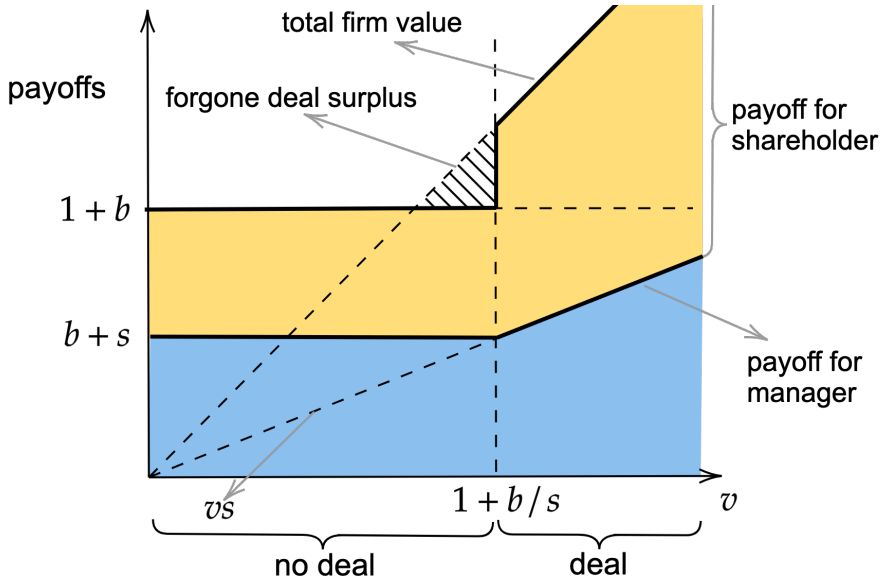

Figure 3: Ex post inefficient choice induced by naive proportional sharing rule

The inefficiency from the naive sharing rule can be dramatic as s gets small: $\lim_{s\downarrow 0} \underline{v} = \infty$ for $b > 0$ (and for $b < 0$, $\lim_{s\downarrow -b} \underline{v} = 0$ [10]). At the limit, for vanishing s, the manager will not do any deal, no matter how good, if the manager gets private benefits from running the firm (and will do any deal, no matter how bad, if the manager has private costs of running the firm). This is intuitive: if the shareholder gets everything in a deal, then the manager would rather keep the status quo's private benefits, regardless of deal value (inversely, for negative b, the manager would get rid of the firm at any cost for s small enough). It explains why managerial entrenchment is a problem primarily in widely held firms, i.e., firms with low s (although Bebchuk (1994) discusses cases where it matters for controlled firms). But it also shows that entrenchment is ultimately a problem created by the rules themselves, specifically the insistence that the shareholder gets the contractual share $1-s$ without adjustment for b, and how the golden parachute solves that problem, essentially by promise of a fixed deal payment offsetting b.

Notice that in the discussion thus far, the only thing that mattered was the deal cutoff $\underline{v}$ induced by the rules. In the figures, this is the point where firm value switches from the horizontal stand-alone value line $1+b$ to the 45-degree deal value line v, which we have emphasized by the switch from red to green. The willingness of the manager to sell the firm depends on the manager's payoff in the deal compared to his payoff in the status quo. As we have shown, a range of alternative ways to allocate deal surplus between the manager and the shareholder could achieve ex post efficiency, including giving the shareholder a fixed amount in any deal as well as an appropriately calibrated proportional sharing rule. Alternative efficient rules can therefore induce quite different allocations of deal surplus to the shareholder. This reflects that the amount of deal surplus the shareholder receives in a deal is on its own irrelevant for ex post efficiency, which turns only on managerial incentives.

[10] Recall our assumption $b \geq -s$, which ensures that it is rational for the manager to work at the stand-alone firm.

3.2 Ex Ante

By contrast, the amount of deal surplus received by the shareholder very much matters for the shareholder's decision to invest in the firm in the first place and hence for ex ante efficiency. Ex ante investment depends on the shareholder's overall investment return, which includes expected deal payoff. The firm will be financed in the first place only if its equity funding needs are less than the present value of the expected return that can be credibly promised to the investing shareholder. Part of that expected return comes from the possibility of a sale of the firm in a control transaction. Control transactions which give a share of the deal surplus to shareholders increase the ex ante expected return; more cynically, the prospect of the manager expropriating the shareholder through a squeezeout lowers the shareholder's expected return. In the graphs, the size of the light shaded area is suggestive of the shareholder's expected deal payoff (it would be equal to the expected deal payoff if v were uniformly distributed over the range of the horizontal axis).

The point is easiest seen by example. Imagine that when the firm needs to be financed, the probability of a merger opportunity with $v = 99$ is 50%. With the remaining 50% probability, no merger opportunity will arise and the firm is worth only 1. This might describe a biotech startup, where much of the value is in the opportunity to team up with a big pharma company in the future. For simplicity, assume for now that $b = 0$. This firm's gross value is thus $1/2 \times 99 + 1/2 \times 1 = 50$, and its net value is this minus its required up front investment. From a social perspective, any such firm with funding needs up to 50 should be financed. If the merger rule is pure voting or appraisal such that $\min_D m^D = 1 - s$, however, the maximum equity capital that could be raised is 1 (choosing $s = 0$). The reason is that, under merger rules that protect only the shareholder's status quo value of 1, that's all the shareholder would ever get. Depending on the distribution of funding needs and the founder's personal financial resources, there are thus potentially many valuable projects that cannot be financed if the rule is pure voting or appraisal. By contrast, if the rule is the ex post efficient proportional sharing damage or injunction rule mentioned above, *all* efficient projects could be financed in this stylized example. The reason is that these rules would allow pledging the entire value of the firm, including in any deal, to the shareholder-investor by

setting $s = 0$ (while also allowing to pledge less by means of $s > 0$).

Generically, the shareholder's gross return R conditional on having funded the firm in return for a share $1 - s$ under rules inducing a particular $\min_D m^D$ is

$$R\left(s; \min_D m^D\right) \equiv F\left(\underline{v}\right)(1-s) + \int_{\underline{v}}^{\infty} \min_D m^D dF\left(v\right). \tag{5}$$

Note that $R \leq W^{post}$ because $W^{post} - R = F\left(\underline{v}\right)(b+s) + \int_{\underline{v}}^{\infty}\left(v - \min_D m^D\right) dF\left(v\right) \geq 0$, where the inequality follows from $b+s \geq 0$ by (reasonable) assumption, ensuring the first term is positive, and from the definition/meaning of $\underline{v}$, ensuring the integrand in the second term and hence the entire integral is positive. Economically, $R \leq W^{post}$ must hold because the shareholder cannot get more than the collective payoff.[11]

Denote the highest achievable gross return $\overline{R}$ and let firms' external funding needs n be distributed—independently of v[12]—on $\mathbb{R}_0^+$according to cdf $G(\cdot)$. Ex ante social welfare is thus

$$W^{ante} \equiv \int_0^{\overline{R}} \left[W^{post} - n\right] dG(n). \tag{6}$$

Note that (6) depends on the maximum *achievable* gross return, $\overline{R}$. This does not mean that the gross return needs to be $\overline{R}$ in every firm. Firms with lower financing needs can set lower R, which may in turn be important to incentivize founder-managers to come up with the idea to be financed in the first place (an aspect that we do not model).

Equation (6) in conjunction with (5) shows the subtlety and potential tradeoff in setting merger rules. Everything else being equal, it is true that a rule is better if it maximizes ex post welfare, i.e., it allows all and only efficient mergers. This maximizes the integrand of (6) at $\overline{W}^{post} - n$. However, the rule also matters for the limit of integration of (6), with potentially offsetting effect:

[11] This would be different if the shareholder could force the manager into a negative value deal or if the manager went into the "game" with negative wealth. The former is ruled out by the structure of our game and of reality, and the latter is ruled out by our assumption that $b+s \geq 0$, which ultimately also reflects the realistic assumption that managers will not stay on in a company that gives them negative payoffs.

[12] In a fuller model, n and v might be correlated. Note, however, that we are holding the scale of the stand-alone firm fixed at 1 in financial value (or $1+b$ in total value). Conditional on this normalization, it is not obvious that n and v would be correlated. In any event, the intuition of the model would not be enhanced by adding this complication.

everything else being equal, a rule is better if it maximizes $\overline{R}$, i.e., if it allows the maximal pledge of gross return to the shareholder-investor. Intuitively, a firm that never comes into existence contributes nothing to social welfare, however optimally its merger would be chosen if it did come into existence. That said, the two maximization problems are related because $R \leq W^{post}$: if the firm is worth little ex post because no or few value-maximizing deals are pursued, there is little to promise to the shareholder-investor (and it would not be socially efficient to invest much anyway).

Let us examine the tradeoff more closely through the lens of (5). Holding $\underline{v}$ constant, (5) and hence the limit of integration in (6) strictly increases in $\min_D m^D$. The more the shareholder gets in a deal, the higher the shareholder's expected gross return, and hence the more firms can be funded–assuming the deal happens. But this assumption is unwarranted because the shareholder's cut of the deal $\min_D m^D$ does affect whether a deal happens, i.e., $\underline{v}$ is not necessarily constant when $\min_D m^D$ changes. (Note that $\min_D m^D$ is technically a function of v, which can change without affecting $\underline{v}$. To the extent the value of the function at $\underline{v}$ changes, $\underline{v}$ definitely changes with it.) To see this, consider giving the shareholder *all* the deal consideration ($\min_D m^D = v$) and all the standalone-firm value ($s = 0$) in a firm with some managerial private benefit $b > 0$. This gives $R(0;v) = F(\underline{v}) + \int_{\underline{v}}^{\infty} v dF(v)$, which is maximal for given $\underline{v}$, but unfortunately–for funding–also gives $\underline{v} = \infty$–no deal ever gets done–such that ultimately $R(0;v) = 1 = R(0,1)$, i.e., the shareholder only gets what the shareholder would have gotten with appraisal or voting (while social welfare is strictly lower due to lost deals).

Let us compare from this ex ante perspective the rules we have considered previously from the ex post perspective. A pure appraisal or voting regime induces $\min_D m^D = (1-s)$ and thus $\underline{v} = 1+b$, as we saw above, and now $R(s;1-s) = F(1+b)(1-s) + \int_{1+b}^{\infty}(1-s)dF = 1-s$, which is maximized over s at $s = 0$ for $\overline{R} = 1$. Thus, pure appraisal or voting achieves ex post efficiency, as we saw above, but allows financing of firms ex ante only up to investment need $n = 1$–no matter how high the expected v going forward for firms that do get funded. A litigation regime can do much better. As we have seen, the idealized litigation regime with $J^V = J^{NV} = \frac{1-s}{1+b}v$ (or equivalent injunctions with plaintiff's attorney) induces the same ex post optimal $\underline{v}$ as appraisal but

also $R\left(s;\frac{1-s}{1+b}v\right) = F(1+b)(1-s) + \int_{1+b}^{\infty} \frac{1-s}{1+b} v dF > R(s;1-s)$, i.e., it allows pledging a bigger gross return to the shareholder-investor and hence financing more firms.

If the litigation rule does not adjust for b, as seems likely in reality, there is a tradeoff. As we have seen, if $J^V = J^{NV} = (1-s)v$, then $\underline{v} = 1 + \frac{b}{s}$, leading to potential ex post inefficiency and concomitant ex ante inefficieny if $b \neq 0$. Nonetheless, even the naive sharing rule can do better than the appraisal rule. For example, let $b = 1$, $v \sim unif[3,5]$, and $n \sim unif[2,3]$. Then no firm can be financed under an appraisal or vote regime because the maximum gross return that can be promised to the shareholder-investor is 1, only half the minimum required external investment of 2. By contrast, under a naive sharing rule, the deal threshold $\underline{v} = 1 + b = 2$ will be met by any deal that occurs, such that the naivete of the sharing rule does not lead to ex post losses after all. Ex ante, the sharing rule allows a promise of gross return $(1-s)\left\{F(2) + \int_2^{\infty} v dF\right\} = (1-s)4$, with maximal value 4 at $s = 0$. In this example, the naive sharing rule achieves the first best ex post and ex ante, while the appraisal/voting rule generates zero social value.

4 Discussion

[VERY UNDERDEVELOPED]

4.1 Complications

The real world presents at least two complications that we have thus far ignored, both related to limited information.

We have treated all parameters as if they were known at the time of the deal. In reality, it is likely that the shareholder or the judge or both do not know b, and it is possible that they do not know v. Indeed, it is possible that the status quo value, which we normalized to 1, is unknown: *past* dividends and–less so–profits are observable, but not necessarily the firm's *future* earnings potential.

Which of these is harder to know, and hence which remedy seems relatively more or less ap-

pealing, partly depends on the deal structure. In an arms' length cash deal without managerial participation in the buyout, v is very easy to observe (it is the cash price), assuming side payments to the manager can be successfully policed and hence deterred. In an MBO or squeezeout, v is very hard to observe. That said, MBOs and squeezeouts are also the transactions where shareholders are most at risk of being stiffed (assuming they bargained for a part of the deal surplus). The correspondence is likely partly technological: some buy-outs truly require management participation, and some companies truly are more valuable without minority shareholders around. But in other part, the correspondence is endogenous: managers/owners choose MBOs and squeezeouts as the means to stiff the minority precisely because the expropriation is hard to observe in these transactions (unlike a naked cash payment to the manager/owner). That is why it would be dangerous to forego judicial remedies based on v because of concerns about the difficulty of estimating it.

An additional reason not to be deterred by information problems is that money suits only need to be correct in expectation: at the time the judgment is handed down, the deal is set, so that random error does not matter. That is if parties are risk-neutral. If the the manager and shareholder are not risk neutral, then this noise is costly, especially if one considers the possibility that the manager might have to pay a very large random amount. Injunctions avoid this risk but create another problem, which is that the manager can gamble that the judge not enjoin a low-ball offer – random error is not irrelevant with injunctions.

As we have repeatedly emphasized, a shareholder approval requirement only protects the status quo entitlement $1-s$. If more is to be given to the shareholder, there is thus no alternative to judicial remedies and the ensuing judicial valuation. If the status quo value $1-s$ is deemed sufficient, then there is a design choice between appraisal and voting rights. Since both protect the same, one should have both only if there is concern that neither is functioning well, perhaps because some judges are corrupt while shareholders are poorly informed.[13] (That said, such frailties could also make these rights counterproductive, as when judges are bribed to block an efficient transaction.) Either the shareholder or the judge (or, more to the point, the judicial process) might be better on

[13]For a paper focused on shareholder's information acquisition and the implications for proxy fights, see Bhattacharya (1997).

information grounds. Initially, shareholders will almost surely be better informed than the judge, especially if we consider specialized shareholders such as merger arbitrage hedge funds or private equity funds. However, the judge oversees a discovery process that can unearth information that was not available to the shareholders. Of course, this process comes at a cost.

4.2 Real-World Regimes

Under current statutory law, shareholders' default protections in mergers are the requirement of a shareholder vote *and* appraisal (e.g., sections 251(c), 262 of the Delaware General Corporation Law [DGCL]). Appraisal explicitly aims to award $1-s$ (DGCL s. 262(h)). As we just discussed, one of them is redundant if both judges and shareholders are sophisticated, as Delaware judges and some shareholders are. Appraisal has a quirk however, that distinguishes, it from the money suit regime that we have analyzed, which is that only the shareholders who affirmatively ask for appraisal benefit from it. As one of us has argued elsewhere (Spamann (2022)), this creates the big risk that only the sophisticated avail themselves of the remedy, a situation we arguably had with "appraisal arbitrage" for several years. That arbitrage was also driven by another quirk of appraisal at the time, which was the perception that Delaware judges would never awards less than the agreed deal price, essentially transforming appraisal into an option that, due to the possibility of upward court error, was irrational not to take even if the deal price was good. Both of these problems lead us to favor the shareholder vote over appraisal.

The equitable overlay of statutory law–fiduciary duties–presents a better version of money suit that is essentially what we model and that is potentially better than the vote. The basic rule is that in any conflicted transaction, the conflicted fiduciary–which includes controlling shareholders–has to prove "entire fairness" of the transaction. To the extent relief is granted, it will be granted for all shareholders, assuming the action was brought as a class action, as it usually is (by a plaintiff's attorney). What is "entirely fair" is open to debate, and the courts do not provide clarity on this issue. Our analysis suggests that courts should take it to mean something like $(1-s)\,v$ or, if they

can, $\frac{1-s}{1+b}v$ if ex ante investment is a consideration.[14]

The fiduciary duty of loyalty puts limits on, and triggers judicial review of, side payments to managers but does not rule them out if they are approved by independent directors. Our analysis supports this position and counsels openness to payments for no particular reason except doing a deal, as in a golden parachute. As we have seen, not allowing such side payments can lead to entrenchment. This risk is particularly high when s is low, which provides another justification–besides power–why side payments should be reviewed more leniently when the beneficiary is simply a manager (low s) rather than a controlling shareholder (high s).

As we mentioned in the introduction, courts have put important limits on litigation after shareholder approval in recent years (*Corwin*; *MFW*). Our analysis suggests that this is a mistake. The vote only protects shareholders' status quo value, while efficient ex ante investment arguably requires (the possibility of) giving shareholders a part of the deal surplus. To be sure, we caveated even in the introduction that all is well if shareholder interests are represented by a faithful board (or special committee). To the extent the conditions for cutting off litigation achieve this, there is no problem (but our analysis highlights just how crucial it is that this goal is truly achieved). But *Corwin* specifically shuts off litigation to review the board's faithfulness, and hence an important deterrent to keep them faithful. The problem is not that *Corwin* allows shareholders to vote to cut off costly litigation after the fiduciaries have acted. That might interfere with efficient deterrence if litigation costs are high, but it is a general problem (cf. Shavell (1982)) and limited to relatively low shareholder losses. The real problem is that *Corwin* bundles the deal vote and the absolution vote, i.e., shareholders can only get the deal if they absolve the fiduciaries from liability. Shareholders face a take-it-or-leave-it-offer, which allows the manager/fiduciaries to hold shareholders down to their status quo payoff.

Finally, our analysis is not limited to mergers in the technical sense. Trivially, our analysis

[14]This and everything else in this paper should be open to "contractual" adjustment including charter drafting. There is no policy justification, in particular no externality, that would warrant a mandatory rule (cf. Spamann (2022)). In reality, "entire fairness" is part of the duty of loyalty, which is mandatory (cf. DGCL s. 102(b)(7)). It is arguably possible, however, to contract around this, essentially by carving out particular actions from the purview of the duty of loyalty (Coates IV (1999)).

also applies to equivalent transactions executed by way of asset sale followed by dissolution, etc. Less obviously, our analysis also applies to sales of control as modelled in Bebchuk (1994). Bebchuk considers the sale of a control block of shares by the initial controlling shareholder to a new controlling shareholder, and compares two rules: the market rule (MR) under which the controller can freely sell, and the equal opportunity rule (EOR) under which the controller can only sell if the other shareholders have the opportunity to be bought out at the same price per share. In our setup, the EOR (MR) is equivalent to a litigation regime ensuring that the shareholder gets $(1-s)v$ ($(1-s)(v-b')$), where b' is the new owner's private benefits and v is the total firm value under the new owner, as before. Given our general discussion above, we thus immediately get the special results of Bebchuk (1994) that the EOR prevents efficient transactions (assuming $b > 0$, as in Bebchuk (1994)) (proposition 2) while the MR allows inefficient transactions (corollary 1). Indeed, the latter result pops out extremely clearly in our setup if one considers the manager's payoff, which is v minus the shareholder's, namely $sv+(1-s)b'$: the larger the acquirer's private benefits, the more the manager gets, which easily overwhelms the efficiency consideration $v > 1+b$, the more so the smaller is s.

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Appendix: Infinite Game

We now solve the infinite game in which the manager can re-propose deals.

To simplify the analysis, we recast the original game into the following structure of a bargaining game with identical strategy space for manager's choice of deal and shareholder's approval:

1. Manager chooses a permissible deal structure, being either:

   (a) no deal (status quo prevails, game ends);

   (b) a deal not requiring shareholder approval but paying at least $L \equiv \max\left\{J^{NV}, I^{NV}\right\}$ (game ends); or

   (c) an offer to the shareholder paying at least $l \equiv \max\left\{J^{V}, \mathbf{1}_{PA} I^{V}\right\} \leq L$;

2. If this stage is reached, shareholder approves or disapproves. If shareholder disapproves, go back to stage 1.

This formulation nests the possibilities that shareholder approval (a) is always required ($I^{NV} = \infty \Rightarrow L = \infty$) or (b) not required and not in the manager's interest ($\left\{J^{NV}, I^{NV}\right\} = \left\{J^{V}, I^{V}\right\}$). Note that $\max\{l, 1-s\} = m^{V}$.

The complexities of the original game that we have stripped away from the recast game are irrelevant for the manager's and shareholder's possible back-and-forth:

- The only role of the original game's money suit and plaintiff's attorney's injunction is effectively to impose a lower bound on "offers" by manager to shareholder.[15] This bound is weakly higher without a vote ($\max\left\{J^{NV}, \mathbf{1}_{PA} I^{NV}\right\}$) than with a vote ($\max\left\{J^{V}, \mathbf{1}_{PA} I^{V}\right\}$) (because we have realistically assumed $\left\{J^{NV}, I^{NV}\right\} \geq \left\{J^{V}, I^{V}\right\}$, and if we had not, the manager would simply ignore the dominated vote option).

[15] Technically, the original game's subgames of stage 4 (money suit) and, as far as the plaintiff's attorney is concerned, stage 2 (injunction) have strictly dominant strategies for the shareholder and plaintiff's attorney, respectively, to sue if and only if the offer is less than L. Hence we and the players can take as given that offers below L will be enjoined or "corrected" to a higher offer, as the case may be. In particular, the manager will not rationally make an offer that will be enjoined because this creates one round's delay cost without benefit, and is indifferent between making an offer that will later be "corrected" upward or making the higher offer right away.

- The original game's shareholder injunction is relevant only if the shareholder does not already have a voting right ($\{J^{NV}, I^{NV}\} = \{J^V, I^V\}$), there is no plaintiff's attorney ($\mathbf{1}_{PA} = 0$), and injunction is not rendered obsolete by money suit ($I^D > J^D$). In this case, the shareholder's choice whether to seek an injunction is equivalent to an approval right, and we can think of the manager having a choice between transactions (1) without a shareholder approval right but offering at least I^D or (2) with a shareholder approval right but a lower minimum offer of J^D.

  – The original game never presents a meaningful three-way choice between vote, no vote but shareholder injunction, and neither vote nor injunction. When the manager formally has the choice between the first two, the one with the lower J (vote) dominates the other (I is irrelevant because there cannot be a plaintiff's attorney, or else the shareholder injunction would not matter in the first place).

If the manager pursues a deal without shareholder vote ("going it alone"), the manager will set the lowest possible compensation for the shareholder, namely L. The manager will go it alone rather than not doing any deal if and only if the manager's payoff from this, $v - L$, is at least as high as the manager's status quo payoff, $s + b$, or equivalently $M \leq L$. One of the two options is thus irrelevant, and we must distinguish equilibria in the two cases.

Solution if $M < L$

Claim. If $M < m^V$, no deal is possible, and the status quo prevails.

Proof Since we are considering the case $M < L$, the manager will never go it alone. The shareholder can thus guarantee their status quo payoff $1 - s$ by always voting against the deal, and will never accept less. Offers below l are not possible. Hence the minimum required offer is m^V. At the same time, the manager will never offer more than M because this would generate a lower payoff for the manager than no deal.[16] Consequently, no deal is possible if

[16]Technically, this is only true for offers that are accepted. However, any such offer will be accepted (i.e., voted in

$M < m^V$.

Claim If $M \geq m^V$, then the only SPNE is for the manager to propose a deal offering the shareholder m^V in any period and for the shareholder always to accept (such that the deal happens in period 0).

Proof: First, a deal must happen in any SPNE: if not, the manager could do better by offering $m^V \geq 1-s$ (the shareholder's status quo payoff) in the first round and obtaining $v - m^V \geq s+b$ for themselves (recall that we have assumed the parties prefer deal if otherwise indifferent). Second, the deal must happen immediately in any subgame, or else the manager could offer the shareholder the shareholder's payoff plus epsilon in the first round and keep the remainder of the gained surplus (from avoided deal failure) to themselves. Finally, let the maximum payoff for the shareholder in any such deal be $\hat{x}$. We already know that we must have $\hat{x} \geq m^V$. To complete the proof, we will show that this must hold with equality, $\hat{x} = m^V$. Suppose not, i.e., $\hat{x} > m^V \geq 1-s$. Then in any subgame with deal $\hat{x}$, the shareholder's strategy would have to be to reject any offers $x \in \left[m^V, \hat{x}\right)$, or else the manager would do better offering such x. That strategy would be subgame perfect only if the shareholder did better by rejecting than accepting x for any possible equilibrium deal x' in the next subgame: $x \leq (1-\pi)(1-s) + \pi x' \, \forall x \in \left[m^V, \hat{x}\right)$. Since the game is stationary, however, we must have $x' \leq \hat{x}$ and thus $x \leq (1-\pi)(1-s) + \pi\hat{x} \, \forall x \in \left[m^V, \hat{x}\right)$, implying $x - (1-s) \leq \pi(\hat{x} - (1-s)) \, \forall x \in \left[m^V, \hat{x}\right)$. This could hold only if $\hat{x} = 1 - s \leq m^V$, a contradiction.

Note Intuitively, no deal giving the shareholder any deal surplus is subgame perfect because the shareholder cannot rationally reject a slightly lower offer (except as committed by litigation), knowing that the highest possible payoff next period is less due to posssible deal failure. It does not matter in the proof whether the deal can break down between manager's offer and shareholder vote, or between vote and next offer. Intuitively, since both players' consent is

favor of) in SPNE because no higher offer can be made and accepted in SPNE later.

required for the deal, the distinction is meaningless.

Solution if $M \geq L$

If $M \geq L$, no SPNE can yield less than $v - L$ for the manager, or else the manager could do better by going it alone immediately.[17] In particular, it cannot be (part of) an SPNE for the status quo to be preserved, for the manager to go it alone later, or for the manager to offer more than L. The only question is if it is possibly part of an SPNE that the manager propose, and the shareholder accept, a deal that gives the shareholder less than L. We need to distinguish two cases:[18]

Claim. If $1 - s \geq L$, the only SPNEs are those in which in each subgame the manager immediately goes it alone or the parties immediately "agree" to a deal with the same shareholder payoff L.

Proof: Let $\underline{x} \leq L$ be the lowest shareholder payoff in any agreed deal in any subgame. For the shareholder rationally to agree to $\underline{x}$, it must be at least as high as the worst payoff the shareholder could get by rejecting the deal. If the shareholder rejected the deal, three things could happen in SPNE: with probability $1 - \pi$ the deal fails and the shareholder gets $1 - s$, whereas with probability π the deal may proceed and the shareholder gets the equilibrium payoff from the next subgame, which–as we established up front–can only be the manager going it alone with payoff L for the shareholder or a negotiated deal with payoff in $[\underline{x}, L]$ for the shareholder. Thus, the shareholder's expected payoff from rejecting the deal is at worst $(1-\pi)(1-s) + \pi \min\{\underline{x}, L\} = (1-\pi)(1-s) + \pi\underline{x}$ if deals can break down between shareholder decision and manager's next move, or $\min\{L, (1-\pi)(1-s) + \pi\underline{x}\}$ if deals can break down between the manager's move and the shareholder decision. In the first case we would have to have $\underline{x} \geq (1-\pi)(1-s) + \pi\underline{x}$, i.e., $\underline{x} \geq 1 - s \geq L$, whereas in the second case, we would have to have $\underline{x} \geq \min\{L, (1-\pi)(1-s) + \pi\underline{x}\} \geq \min\{L, (1-\pi)L + \pi\underline{x}\} =$

[17] Recall that we have assumed that the manager prefers deal if deal and no deal are otherwise payoff-equivalent.
[18] Recall that in the relevant parameter subspace, $\max\{\mathbf{1}_{PA} I^{NV}, J^{NV}\} > \max\{\mathbf{1}_{PA} I^{V}, J^{V}\}$.

$(1-\pi)L+\pi\underline{x}$, i.e., $\underline{x} \geq L$; in either case, the condition can only hold with equality, $\underline{x} = L$ because we also must have $\underline{x} \leq L$ or else the manager would better go alone.

Claim. If $1-s < L$ and deals can break down between the shareholder's decision and the manager's next move, the only SPNE is for the manager to offer m^V in any subgame and for the shareholder to accept only this and higher offers.

Proof: Let the maximum payoff for the shareholder in any subgame of any SPNE be $\hat{x}$. We already established up front that, if $M \geq L$, any SPNE must end with a deal. Such deal must give the shareholder at least m^V because negotiated deals are constrained to offer at least l and the shareholder will not rationally agree to anything less than $1-s$ given that the shareholder's payoff in a unilateral deal is $L > 1-s$. Hence we know $\hat{x} \geq m^V$. The proof is complete if we show that this must hold with equality, $\hat{x} = m^V$, which we have already done, see the proof for the case $m^V \leq M < L$.

Claim. If $1-s < L$ and deals can break down between the manager's move and the shareholder's decision, it is always an SPNE for the manager to go it alone in any subgame and for the shareholder to reject any deals yielding less than L[19]. In addition, if $\tilde{x} \geq m^V$, any immediate "negotiated" deal giving $x \in \left[m^V, \tilde{x}\right]$ to the shareholder can be (the first round) of an SPNE, where $\tilde{x} \leq L$ is defined by $(1-\pi)(s+b)+\pi(v-\tilde{x}) = v-L$.[20] No SPNEs with other payoffs are possible.

Proof: Going it alone for the manager and rejecting anything less for the shareholder is clearly a Nash equilibrium; it is also subgame perfect because if the manager did not go it alone, the shareholder would do strictly worse by accepting anything less than L rather than waiting for

[19] As far as payoffs are concerned, it does not matter if the first possibility of deal breakdown is only after the shareholder has first been able to vote (and after the manager's subsequent opportunity to go it alone). The shareholder at the first vote understands the unique SPNE going forward and will not vote for a deal that gives the shareholder less. Alternatively, the shareholder could even vote against a deal offering the SPNE payoff because the manager will deliver that at the next move anyway.

[20] In words, $\tilde{x}$ is the negotiated deal share given to the shareholder at which the manager would be indifferent between going it alone now or offering the deal to the shareholder and have it accepted, at the risk that the deal breaks down beforehand.

the manager to go it alone next round. The alternative SPNE payoff of $x \in \left[m^V, \tilde{x}\right]$ can be supported by the following strategies: the manager offers x until accepted but if the manager ever offered less then the manager would thereafter go it alone; the shareholder accepts any offer of x or more except that if ever offered less, nothing below L in subsequent rounds. This is a Nash equilibrium because by definition of $\tilde{x} \geq x$, the manager does better "paying" x in a negotiated deal than L in going alone, even at the risk of deal failure, whereas the shareholder does better accepting $x \geq m^V \geq 1-s$ now than next period, by which time the deal might have broken down. The equilibrium is subgame perfect because given stationarity, the manager still does better offering x than going alone even after the shareholder rejected an offer of x, while the shareholder would get $L > x$ after rejecting anything less than x (and we have already shown that the strategies in the subgame after an offer below x are an SPNE). Preserving the status quo or deals giving the shareholder more than L are ruled out by the general considerations pertaining to the case $M \geq L$, while offers below l are barred and offers below $1-s$ could not be rationally excepted by a shareholder who gets at least $1-s < L$ by rejecting all offers. Deals with $x \in (\tilde{x}, L)$ would not be incentive compatible for the manager by definition of $\tilde{x}$.

Note The fact that the manager can still implement the deal before the next possibility of deal failure after the shareholder decides changes the shareholder's calculation. This means that the highest *expected* payoff the shareholder could possibly get at $t'-1$ by refusing an offer is not $(1-\pi)(1-s)+\pi L$ but L . Conversely, making an offer is no longer automatically incentive compatible for the manager because it runs the risk of deal failure.

Summary and Comparison to One-Shot Game

We have shown that, with one exception discussed next paragraph, all equilibria have immediate deals giving the shareholder the minimum of L and m^V provided this minimum is not larger than M (in which case there is no deal). (Some conditions were stated in terms of $1-s \gtreqless L$ but it implies $m^V \gtreqless L$ since $m^V = \max\{l, 1-s\}$ and $l \leq L$.) Now $L = m^{NV}$ unless $\mathbf{1}_{PA} = 0 \wedge I^{NV} >$

$J^{NV}, 1-s$, in which case the deviation between L and m^{NV} is inconsequential because then $L > m^{NV} = \max\left\{J^{NV}, 1-s\right\} \geq \max\left\{J^{V}, 1-s\right\} = m^{V}$. Thus we have shown that the deal is $\min_D m^D$ as in the baseline one-shot game.

The exception is that there are more possible equilibria if (i) $m^V < L \leq M$ and (ii) deal breakdowns occur *after the manager's and before the shareholder's decision* (rather than the other way around). In this case, the shareholder payoff could also be L or anything in $\left[m^V, \tilde{x}\right]$. The robust equilibrium is the one paying the shareholder L. The equilibrium with shareholder payoff $x \in \left[m^V, \tilde{x}\right]$ disappears for π small enough. Condition (ii) is the infinite-game equivalent of the "backup deal" variation of the one-shot game, which under condition (i) has an almost identical equilibrium (deal with shareholder payoff m^{NV}) to the robust equilibrium here.

In summary, we have established that the equilibria of the infinite game are identical to the equilibria of the one-shot game, except that there are multiple equilibria under the prior paragraph's conditions (i) and (ii), of which the robust one differs from the one-shot game's if $\mathbf{1}_{PA} = 0 \wedge I^{NV} > J^{NV}, 1-s$ (in which case the one-shot game gives the shareholder $\max\left\{J^V, 1-s\right\}$ while the infinite game's robust equilibrium gives the shareholder the larger payoff I^{NV}.