Activism and Takeovers*

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At the core of agency problems in widely held firms is a *dual* coordination failure: Dispersed shareholders neither share in the cost of governance interventions (*ex post* free riding) nor sell shares unless the price at least matches the expected value improvement (*ex ante* free riding). Whether to confront the free-rider problem in its ex post or ex ante variant amounts to the choice between activism and takeovers. For small toeholds, the returns to these governance mechanisms have *inverse* comparative statics, and though less efficient, activism is more profitable when the potential value improvement is large. Activists are most effective when, instead of restructuring firms themselves, they broker takeovers. Such takeover activism is Pareto-improving and should earn superior returns, in part because it must pay more than what could be earned by free-riding on a tender offer instead.

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> Investors who jump in the stock after the activist has made its case in its original 13D will typically bump up the stock price, making it difficult... to buy additional stock at cheap prices... Even if investors buy the stock and stick around for however long it takes for the [activist] to succeed in its efforts, those shareholders share the benefit of the activism without spending anywhere near the time, money, and energy.
>
> —Orol (2008, 62-63)

1 Introduction

1.1 Dual free-rider problem

The separation of ownership from control that enables management to pursue its own interest is commonly considered the defining problem of corporate governance in public corporations (Berle and Means, 1932). This problem is rooted in the coordination failure of dispersed shareholders, who each find it too costly to engage management, let alone organize the others. Most corporate governance mechanisms are substitutes to fill the control void left by passive shareholders (e.g., boards of directors, optimal compensation, or class action), except for two that seek to resurrect dormant shareholder control: hostile takeovers and investor activism. In this paper, we compare these strategies and explore which form of shareholder intervention is more profitable or efficient under what circumstances.

For all their differences, these strategies confront the same problem. Activists run campaigns to pressure managers into certain actions or replace them via proxy fights. Dispersed shareholders do not share in the costs of such campaigns and thus *free-ride* ex post on any realized gains.[1] This kind of free-riding could be reduced by buying more shares before taking action. Thinking through this argument culminates in the idea that, as Grossman and Hart (1980) phrase it, "the free-rider problem can be avoided by use of the takeover mechanism." Famously, they go on to dismantle this argument: dispersed shareholders only sell shares if offered at least the expected post-takeover value, and hence also *free-ride,* but ex ante. Thus, free-riding, in its *ex ante* or *ex post* manifestation, is inevitable in widely held firms. This is well understood by practitioners, as the opening quote illustrates.[2]

[1]Considerable costs as well as failures of campaigns are well documented. For a sample of 1,492 campaigns from 2000 to 2007, Gantchev (2013) puts the average cost at $10.5 million, about a third of the average gross return of a campaign. Also, in a sample of 611 campaigns with well-specified objectives, Brav et al. (2010) find that 31.3 and 21.1 percent were, respectively, successful and partially successful in achieving their objective, leaving 47.6 percent of failed campaigns.

[2]The 13D filing mentioned in the quote must be submitted to the U.S. Securities and Exchange Commission by anyone who accumulates more than 5% of any publicly traded security in a public company. The filing discloses not only the identity but also the *objective* of the investor. The free-rider problem is a key issue in the regulatory debate on the level of the disclosure threshold: "[A] high-profile activist investor that files a 13D...would quickly attract many 'free-rider' copycat investors. That, in turn, would lead to short-term spikes in stock prices, making

To motivate the comparison further, consider the following *irrelevance* result: Suppose one blockholder with a stake of $t < 1/2$ in an otherwise widely held firm can increase share value from its current level of 0 to $V > 0$ at a private cost C—provided she obtains control. As a bidder, she gains control by acquiring $r > 1/2 - t$ shares at a price rP. Her profit is $(r + t)V - rP - C$. Since dispersed shareholders do not sell unless the price rP (at least) matches the post-takeover value of rV, this profit collapses to $tV - C$. As an activist, campaigning for control, her profit is also $tV - C$ (or less if campaigns add costs). The free-rider problem equalizes returns across both mechanisms.

We show that when incentives to improve firm value depend on ownership structure (Jensen and Meckling, 1976), this equivalence breaks down. Because bidders acquire majority ownership but activists retain minority interests, the equilibrium efforts diverge. This drives an endogenous wedge between their profits even absent differences in *traits*, based solely on how they *operate*.[3]

1.2 Trade-off between ex ante and ex post free-riding

One might surmise that takeovers are preferable when the scope for value improvement is large and incentives depend on ownership concentration. We show in Section 2 that the reverse holds. Returns to bidders decrease in the scope for value improvement, while those to activists increase. As a consequence, when incentives matter most, activism tends to be more profitable, although takeovers are more efficient from a social perspective.

A public goods analogy helps to see the robust intuition for this result. Suppose a public good yields spillover benefits for *tradable* assets (e.g., infrastructure and properties), and one "active" agent has incentives to provide a limited amount of the public good (e.g., a developer); thus, the beneficiaries constitute a so-called privileged group. With free-riding, the active group member cannot collect *voluntary contributions* to cover costs, which *limits* investment. As an alternative, she can *merge assets* by buying out other members, and recoup subsequent investment costs by paying less than what the assets will ultimately be worth. However, free-riders do not sell at such prices, again contributing nothing towards costs, and yet, merging assets *still raises* investment (incentives)—at a loss to the active member. Somewhat counterintuitively, increasing ownership works as a disadvantage, especially when incentives are more responsive to it.

On this argument alone, merging assets is privately suboptimal although it is socially efficient.

it more difficult for the activist to obtain a sufficiently large stake at affordable prices...Without a significant stake, the activist would have no leverage in negotiations with corporations" (Orol, 2008, 152). Empirically, the "spike" in stock prices following a 13D filing is stronger when the stated investment objective is activist and more confrontational (Brav et al., 2008; Klein and Zur, 2009).

[3] To be precise, bidders and activists in our framework are equally capable of improving firm value, their sole source of profit is the appreciation of an initial stake, and all trades are transparent (no noise traders). In sum, they are identical except that bidders "buy" control in form of a majority stake, while activists "work for" control with a minority stake. Both are fully subject to free-riding in the sense that either of them concedes all gains on non-toehold shares but bears all the costs.

However, in the corporate governance context, the active member must first obtain *authority* to provide the public good (1) by merging a majority of the assets or (2) by coordinating the group. A key factor in choosing between (1) and (2) is the marginal value of the public good. A higher marginal value raises the value of authority relative to the costs of coordinating the group. But it also raises ownership incentives and thus unrecompensed costs when merging assets. Hence, high marginal values favor costly coordination, while low ones favor merging assets. This logic maps into corporate governance where efforts to increase share value are a public good, activism requires costly coordination, and takeovers merge assets.

In practice, investors should perceive this trade-off as follows: Tender offers involve excessive takeover premiums that make no allowance for bidder costs. Hence, a larger potential for value improvement raises the premium more than *net* surplus. At the same time, it makes campaigns more rewarding relative to the costs. So, activism turns more profitable just at the time takeover premiums grow more excessive. This entails distinct return patterns. Tender offers with larger surpluses yield smaller bidder returns, whereas more valuable campaigns also are more profitable. Further, returns to activists generally exceed bidder returns from tender offers with the largest surplus. The empirical challenge is to measure returns *net of cost* and to identify *ceteris paribus* variation in the scope for value improvement.

1.3 Board prerogative and shareholder interventions

On account of the collective action problem in widely held firms, boards of directors are delegated the power to make decisions, including the authority to negotiate mergers, that are *binding* for all shareholders.[4] In Section 3, we analyze how this board prerogative interacts with activism and tender offers. Ideally, the board's central decision-making power overcomes free-riding, but the coordination problem reappears when boards resist control changes out of self-interest. Yet, the prerogative remains relevant insofar as *shareholders can seize control of boards*: Bidders can acquire just enough shares to gain control and absorb the remaining shares afterwards through a so-called *freeze-out merger*. Activists can wage campaigns that aim at brokering mergers with bidders, which has been referred to as *takeover activism* (or corporate control activism or merger activism).

Since forcing trades on shareholders, especially control transactions, can entail abuse, there is legal recourse: mergers can be contested in court and, if deemed to be in breach of fiduciary duty or unfair to dissenting shareholders, can be enjoined or amended.[5] The legal risk of a price

[4]Requiring shareholder approval for management-initiated M&A has become more common. If ratified, the transaction is collectively binding. This overcomes the free-rider problem for takeovers that management is in favor of, and allows shareholder to veto those that may not be in their interest. However, it does not resolve the problem that management may resist certain bidders nor the free-rider problem those bidders face if consequently making a tender offer. Our paper analyzes the latter setting.

[5]Virtually all major M&A transactions in the U.S. attract shareholder litigation. In 2013, lawsuits were filed

revision has opposite effects on the two corporate governance mechanisms.

In tender offers, the option to freeze out minority shareholders after acquiring control makes bidders ex ante *worse* off. To minimize unrecompensed costs, a bidder buys just enough shares to reach majority. Absent freeze-outs, she does so at a price equal to the value she creates owning half the shares. The freeze-out option introduces the *commitment problem* that, at this price, she would exercise a freeze-out. Due to the possible price revision in the freeze-out, shareholders then hold out for a higher price already in the initial offer. In equilibrium, the bidder still buys as few shares as needed, but at a premium at which a subsequent freeze-out is unattractive. The premium *de*creases with legal risk, as the temptation of a freeze-out (i.e., commitment problem) weakens.

By contrast, activists can only benefit from usurping the board prerogative to enter mergers. For a start, they can always resort to regular activism. But more importantly, for low legal risk, takeover activism can dominate both tender offers and regular activism, privately and socially. Intuitively, the legal risk of a price revision amounts to stochastic free-riding. In two-tier offers, this opportunity—afforded only those subjected to the freeze-out—bolsters *ex ante* free-riding in the initial offer. In takeover activism, where the merger involves no ex ante free-riding, the legal risk reinforces *ex post* free-riding, and this effect *in*creases with legal risk. Even as both bidders and activists can capture the board's merger prerogative, *how* they do so remains crucial.

Further, using the board's prerogative, takeover activists relax the trade-off between ex ante and ex post free-riding that characterizes the choice between regular activism and tender offers. By retaining minority stakes, activists avoid ex ante free-riding when acquiring control but resign themselves to ex post free-riding when afterwards improving firm value. Conversely, by buying majority stakes, bidders face less ex post free-riding once in control but more ex ante free-riding acquiring it. Cleverly, takeover activists limit ex ante free-riding during control acquisition, but through the merger, do not let their small stakes constrain incentives to generate value—that is, they also limit ex post free-riding, if not during, at least after the campaign. So, when possible, activists are better off acting as *control brokers*, rather than using control to implement value improvements on their own.[6]

1.4 Choice between governance mechanisms

Our main analysis studies the various governance strategies in isolation and compares outcomes. Section 4 considers situations in which several feasible strategies are rival or fallback options for

against 97.5 percent of deals with a transaction value greater than \$100 million (Cain and Solomon, 2014).

[6]This suggests that the combination of (a) board prerogative over M&A with (b) internal governance processes for shareholder activism may be more effective in (re)allocating control than the market for corporate control, for *two* reasons: mechanism (a) facilitates control transfers when there is no conflict of interest between management and shareholders, and it further makes mechanism (b) more potent when there are such conflicts—in both cases circumventing the ex ante free-rider problem in tender offers.

each other. This changes the outside options of bidders and activists, and thus required returns, and introduces substitution effects into the comparative statics.

The co-existence as feasible options affects tender offers and activism asymmetrically. Due to unrecompensed costs, optimal bids are pinned down by the majority requirement and the ex ante free-rider condition: as few shares as needed are bought at the target shareholders' "reservation price." Thus, the bidder's outside option is irrelevant for the offer terms or payoffs. By contrast, the potential of a tender offer erodes activists' already limited incentives and so reduces campaign profitability.

This reduction in campaign incentives is efficient in the case of a single "active" investor who can resort to *making a bid* if regular activism fails, since a takeover is socially preferable. This is not true when there is a separate bidder. In this case, an activist may prefer *free-riding on a bid* to waging a campaign, so that activism only emerges if the expected return exceeds the takeover premium forgone in expectation. We show that regular activism cannot clear this hurdle, making takeover activism the only relevant alternative. Furthermore, by revealed-preference arguments, takeover activism is Pareto-improving. The reduction of campaign incentives by potential tender offers is therefore welfare-decreasing in this case.

These results carry positive implications for returns across different types of activism and the co-evolution of activism and M&A. First, takeover activism should exhibit higher returns than other forms of activism for two reasons. When legal risk is low, it achieves a more efficient balance between ex ante and ex post free-riding, as explained earlier. In addition, only takeover activism can clear the hurdle rate created by potential takeover premiums, unlike regular activism, which never emerges when latent free-rider rents are positive. The implied return variation is consistent with existing evidence (Greenwood and Schor, 2009; Becht et al., 2017; Boyson et al., 2017; and Jiang et al., forthcoming).[7]

Second, takeover activism generates efficiency gains at the extensive and intensive margin: it enables takeovers that otherwise do not occur and replaces some tender offers with more efficient mergers. Thus, when the legal risk of mergers is low, institutional changes that facilitate activism should lead to a concurrent (1) increase in campaigns, (2) increase in total M&A activity, and (3) decline in hostile bids—which broadly matches patterns observed since the 1990s. Interestingly, according to our framework, the source of efficiency gains is the *limited* and *temporary* ownership of (takeover) activists—traits that are typically met with criticism.

[7] The last two papers share a focus on bidding *contests*, most notably a strategy called "deal-jumping" whereby activists engage already announced merger plans to push for a better deal. If there is no rival bidder, our analysis of regular activism applies, with the value improvement being a higher merger price. For cases where the activist supports a rival bidder, who could in principle compete with a tender offer *per se*, our comparison of takeover activism and tender offers sheds light on why "deal-jumping" may be preferable to contesting a friendly merger with just a tender offer, for both the activist and the rival bidder as well as target shareholders.

1.5 Related literature

Our paper bridges two literatures in corporate governance that have largely evolved separately. The tender offer literature explores means to overcome the *ex ante* free-rider problem, that is, exclusion mechanisms whereby bidders preclude target shareholders from part of the gains, often interacted with other frictions. In parallel, the literature on blockholders studies how incentives for activism ("voice"), limited by *ex post* free-riding, are affected by factors such as moral hazard in teams, stock liquidity, and "exit" as an alternative strategy. As the scope of work indicates, there are hosts of idiosyncrasies to explore *within* each governance mechanism.[8]

To compare these mechanisms on a level playing field, we abstract from many idiosyncracies studied in the above literatures. This means that neither mechanism is fine-tuned to its most effective version, but doing so isolates a trade-off inherent in their *modi operandi* (buying control versus working for control), which should operate also at the base of richer settings. Its empirical importance could be tested with our model predictions, notably about relative returns. Another benefit of a bare-bones framework is the cleaner analogy to the canonical public goods problem, and thanks thereto, more generalizable intuition.

The board's prerogative to enter into mergers is central to Corum and Levit's (2016) analysis of takeover activism and the literature on freeze-out mergers. Corum and Levit show that bidders are ill-suited to campaign for the prerogative to initiate the sale of targets to themselves, due to conflicts of interest in the respective price negotiation. (Relying on their analysis, we ignore the possibility that bidders act as their own takeover activists.) The freeze-out literature shows that bidders could, in principle, overcome the free-rider problem by "buying" the board's prerogative (Yarrow, 1985; Amihud et al., 2004). Our analysis is *comparative* and shows how the prerogative interacts differently with activism and tender offers in the presence of free-riding behavior and post-takeover moral hazard.

As concerns a single investor's choice between a tender offer and activism, the closest paper is Shleifer and Vishny (1986), who analyze a signaling game with a privately informed blockholder.[9] Their analysis also touches on the "equivalence" by noting that a tender offer cannot outperform activism unless the latter adds costs and that a genuine choice requires the mechanisms to have different cost-value ratios. They demonstrate this with exogenous costs and values. We consider symmetric information but endogenize the difference via ex post moral hazard à la Burkart et al. (1998).

[8]See, *inter alia*, Grossman and Hart (1980), Shleifer and Vishny (1986), Müller and Panunzi (2004), Burkart and Lee (2015a) for tender offers; and Winton (1993), Noe (2002), Kahn and Winton (1998), Maug (1998), Aghion et al. (2004), Faure-Grimaud and Gromb (2004), Edmans (2009), Admati and Pfleiderer (2009), Edmans and Manso (2011), Back et al. (2017) for active blockholders. See also the surveys by Burkart and Panunzi (2008) and Edmans (2014), and their lack of overlap. There is also a strand that explores *adverse* effects of blockholder intervention (e.g., Burkart et al, 1997; Pagano and Roell, 1998), which we abstract from.

[9]Elsewhere in the tender offer literature, minority blockholders, when considered at all, are confined to the role of passive sellers (Burkart et al., 2006; Ekmekci and Kos, 2016).

Information revelation is also the focus of Bebchuk and Hart (2001), who model activism as a shareholder vote and allow for rent-seeking types that decrease share value. In their setting, it is optimal to bundle takeover bids and shareholder votes: a vote overcomes ex ante free-riding while a cash offer protects shareholders from pure extraction. They, too, focus on exogenous cost-value ratios but informally discuss potential differentiating factors, such as ownership incentives. As we show, explicit consideration of such incentives uncovers an intrinsic trade-off between takeovers and activism.

Instead of considering a specific activist tactic, we model campaigns as mappings from costly effort to success probability. Such reduced-form "monitoring" models are common in corporate governance theory, but in Appendix B, we examine three specific tactics that each offer a micro-foundation for our specification: a coordination game of backdoor engagements (based on Brav et al., 2016), a proxy contest or shareholder voting game (similar to Maug and Rydqvist, 2009, and Brav and Matthews, 2011), and sequential escalation (based on Gantchev, 2013).

Finally, our paper is pertinent to discussions about what makes activist hedge funds "special." Most discussions have focused on comparisons to other institutional investors (Kahan and Rock, 2007; Brav et al., 2008). By contrast, our perspective on activism emerges from a comparison to hostile takeovers, which resonates with the historical twist that the antecedents of today's hedge fund activism are raiders of the 1980s takeover wave and blockholders who put targets "in play" for them (Orol, 2008; Carlisle, 2014).

2 Takeover or activism

2.1 Scope for value improvement

Consider a firm with dispersed share ownership, except for a toehold $t < 1/2$ that is owned by a single investor. Following the takeover literature exploring the free-rider problem, we assume a mass $1 - t$ of shares distributed among an infinite number of shareholders whose individual holdings are both equal and indivisible.[10] If the investor gains control of the firm, she can create a value improvement $V(e, \theta) \geq 0$ where $e \geq 0$ denotes the investor's restructuring effort and $\theta > 0$ parameterizes the marginal return to effort. We refer to θ, which may capture investor-specific skill or firm-specific restructuring need, as the scope for value improvement. Restructuring effort comes at cost $C(e)$, which cannot be directly recouped from dispersed shareholders for lack of coordination.

Suppose the investor were to obtain control with an ownership stake $s \geq t$. She would then

[10] Relaxing these assumptions weakens the Grossman and Hart (1980) result that the target shareholders extract all the gains in security benefits on tendered shares (Bagnoli and Lipman, 1988; Holmström and Nalebuff, 1992).

solve the following restructuring effort problem:

$$\max_{e \geq 0} sV(e) - C(e). \tag{1}$$

This is analogous to the problem faced by the "owner-manager" in Jensen and Meckling (1976) when $1 - s$ of the shares are held by "outsiders." We assume that $V(.,.)$ and $C(.)$ are twice differentiable functions with the following properties:

Assumption 1. *$V_e(.,.) > 0$, $V_{ee}(.,.) \leq 0$, $V_\theta(.,.) > 0$, $V_{e\theta}(.,.) > 0$, $C_e(.) > 0$, and $C_{ee}(.) > 0$.*

In words, the value improvement strictly increases in effort and the scope for improvement. The return to effort is weakly decreasing, but strictly increasing in the scope for improvement. The cost of effort is increasing and convex. These conditions render the investor's payoff concave in restructuring effort.

Assumption 2. *$C_e(0) = 0$, $\lim_{e\to\infty} C_e(e) = \infty$, and $\lim_{e\to\infty} V_e(e, \theta) = 0$ for all θ.*

These Inada-type conditions ensure that the first-order condition of the restructuring effort problem always has an interior solution.

Assumption 3. *$C(0) \leq tV(0, \theta)$ for all θ.*

This assumption—restructuring costs do not exceed toehold gains under zero effort—ensures that the investor in principle wants control, by precluding cases in which she would stay passive even if *granted* control due to some "fixed" costs. It is trivially satisfied for $C(0) = 0$ and hence relevant only for $C(0) > 0$.

Assumptions 1 to 3 ensure a unique, interior solution and positive value for the restructuring effort problem. We add one more assumption, namely that returns to effort vanish as $\theta \to 0$, to guarantee that the set of θ for which tender offers are profitable is non-empty.[11]

Assumption 4. *$\lim_{\theta\to 0} V_e(e, \theta) = 0$ for all e.*

The solution to the restructuring effort problem applies to bidders and activists alike. Let $e(s, \theta)$ denote the optimal restructuring effort and $\Delta(s, \theta)$ the resulting payoff.

Lemma 1. *For any ownership stake $s \geq t$, $e(s, \theta)$ is unique and strictly positive. Furthermore,* $e(s, \theta)$ and $\Delta(s, \theta)$ *are strictly increasing in s and θ.*

Effort is inefficiently low for all $s < 1$ (Jensen and Meckling, 1976). Because $1 - s$ shares are held by dispersed shareholders who lack the coordination to compensate the "active" shareholder

[11]Given variation in θ is key to our analysis, we should note that whether θ is a parameter in the *public* value function V or the *private* cost function C is a priori not trivial, because only V appears in the free-rider condition. Still, as Appendix D explains in more detail, the main insight obtains in either case.

for costs, her effort depends only on her own stake: it increases in s (as free-riding is reduced), with the first best attained at $s = 1$ (where free-riding is eliminated). Further, effort and social surplus increase with θ. The social planner thus prefers $s = 1$ and higher θ; this is a useful benchmark.

By Assumption 3, the owner of the toehold would like to implement the value improvement. However, she does not have the formal authority to do so since $t < 1/2$. We consider two strategies for the investor to gain control. On one hand, she can simply "buy" control by acquiring at least $1/2 - t$ shares to end up with majority ownership. On the other hand, she can gain control even without majority ownership through "work," that is, by running a costly activist campaign.

2.2 Tender offer

Our tender offer model follows Burkart et al. (1998) but replaces diversion with effort provision as the post-takeover moral hazard problem. The bidder needs at least half of the voting rights to control the firm. All shares carry the same number of votes. The sequence of events is as follows:

In stage 1, the bidder with a toehold $t_b = t$ makes a first-and-final, conditional, restricted tender offer (r_b, p_b) where r_b is the fraction of shares she offers to acquire and p_b the per-share cash price, subject to her holding a final stake s_b greater or equal than fifty percent. Following the literature on control contestability, we assume that the incumbent management is opposed to the restructuring, which necessitates the tender offer, but is unable or unwilling to counterbid.[12]

In stage 2, the target shareholders noncooperatively decide whether to tender their shares. Since they are atomistic, they do not perceive themselves as pivotal for the tender offer outcome.

In stage 3, the takeover fails if the fraction of shares tendered falls short of $1/2 - t$. Otherwise, the bidder pays the bid price and gains control with a post-takeover stake of $s_b = t_b + r_b$. Once in control, she chooses her restructuring effort e_b.

Before solving the game, it is worth pointing out that the only reason a takeover may fail in this setting is the impact of the free-rider problem *on effort provision.*

Lemma 2. *If $e_b = 0$, the takeover succeeds.*

The game is solved backwards. If in control at stage 3, the bidder solves the restructuring effort problem (1) with $s = s_b$. Let $V^*(s_b, \theta)$ and $C^*(s_b, \theta)$ denote the resulting post-takeover firm value and restructuring cost. Lemma 1 characterizes the solution, and implies that social

[12] The lack of bidding competition is not important for our results. If we allow for rival bidders with different θ, competition may push the winning bidder to acquire more shares (than 50 percent), with the free-rider condition still binding, thereby aggravating the unrecompensed effort problem that we highlight further below (c.f., Burkart et al., 1998). Thus, the comparative statics that are key to our results would still hold, except that tender offers would be less profitable than in the case without bidding competition.

surplus $V^*(s_b, \theta) - C^*(s_b, \theta)$ would be maximized if the bidder acquired all outstanding shares, i.e., if $r_b = 1 - t_b$ so that $s_b = 1$.

At stage 2, each target shareholder accepts the offer only if the bid price at least matches the expected post-takeover share value: $p_b \geq E[V^*(s_b, \theta)]$. We assume that shares are tendered if the inequality is weakly satisfied.[13] Given this assumption and rational expectations, the bidder buys r_b shares with certainty in a successful bid,[14] and the free-rider condition is $p_b \geq V^*(t_b + r_b, \theta)$. Since the right-hand side increases in r_b, supply is upward-sloping as in Burkart et al. (1998): More acquired shares incentivize the bidder to exert more effort. The resulting increase in post-takeover share value in turn induces shareholders to retain their shares unless the bid price p_b increases as well.

Expressing the stage-2 and stage-3 equilibrium strategies as constraints, the bidder's tender offer problem at stage 1 can be written as

$$\begin{aligned}
\underset{r_b, p_b}{\text{maximize}} \quad & s_b V(e_b, \theta) - C(e_b) - r_b p_b && (2) \\
s.t. \quad & p_b \geq V(e_b, \theta_b) && (3) \\
& r_b \geq 1/2 - t_b && (4) \\
& s_b V_e(e_b, \theta) = C_e(e_b) && (5) \\
& s_b = t_b + r_b. && (6)
\end{aligned}$$

Constraints (3) to (6) are, from top to bottom, the free-rider condition (stage 2), the majority requirement for control, the post-takeover incentive constraint (stage 3), and the bidder's post-takeover equity stake.

Lemma 3 (Burkart et al., 1998)**.** *The bidder acquires $1/2 - t_b$ shares in a successful takeover.*

By Lemma 1, every tendered share increases the post-takeover share value by some measure dV and the bidder's costs by some measure dC. Since target shareholders extract dV through a corresponding price increase dp_b, the bidder is left with only the cost increase dC. Hence, the bidder is best off buying no more shares than needed.[15] In Grossman and Hart (1980), firm value increases contingent only on the allocation of *control*. Here, due to post-takeover moral hazard,

[13]This assumption avoids the coexistence of success and failure as equilibrium outcomes. Shareholders that expect a conditional offer to fail are indifferent between tendering and retaining. Breaking the indifference in favor of retaining supports failure as an equilibrium outcome regardless of the price, in which case a self-fulfilling failure equilibrium always coexists with any success equilibrium (Burkart et al., 2006).

[14]If bids were unrestricted, any equilibrium in which the takeover succeeds would feature r_b (randomly chosen) shareholders tendering such that $p_b \geq E[V(e_b)]$ is exactly binding. Hence, allowing for restricted offers does not alter the set of equilibria but spares us assumptions on how shareholders coordinate to tender precisely r_b shares.

[15]The bid restriction is not crucial for this result. The same outcome obtains as the unique rational expectations equilibrium even if the bidder must make an unrestricted offer, in which case she can steer the number of shares tendered through the bid price (Burkart et al., 1998).

it furthermore increases with any additional *ownership* the bidder acquires, which generates the "marginal" version of the free-rider problem.

Proposition 1. *In the tender offer game:*

(i) For any given θ, there exists a toehold threshold $\bar{t}_b > 0$ such that a takeover is unprofitable if $t_b < \bar{t}_b$.

(ii) There exists a toehold threshold $\bar{\bar{t}}_b > 0$ such that bidder profits strictly decrease in θ if $t_b < \bar{\bar{t}}_b$, converging to a positive level for $\theta \to 0$.

Takeovers can fail in spite of Lemma 2. This is due to the interaction of constraints (3) to (5): *Ex ante* free-riding shareholders demand a price that captures public gains but excludes private costs ((3)). Regardless of the price, the bidder must buy enough shares to gain a majority ((4)). At the same time, she cannot commit to *less* effort than the majority stake will induce, and *ex post* free-riding shareholders will share none of the costs ((5)). As a result, she compares private gains on her toehold $t_b < 1/2$ with private costs incurred under a majority stake $s_b \geq 1/2$. If t_b is too small, the former cannot recoup the latter.[16] We refer to this manifestation of the free-rider problem as "unrecompensed effort."

Moreover, bidder returns *decrease* in the scope for value improvement when t_b is below some threshold. To aid intuition, consider the total derivative of the bidder's profit with respect to θ:

$$t_b \frac{\partial V^*(1/2, \theta)}{\partial \theta} + \left[t_b \frac{\partial V^*(1/2, \theta)}{\partial e_b} - \frac{\partial C^*(1/2, \theta)}{\partial e_b} \right] \frac{de_b}{d\theta} \bigg|_{e_b^*}.$$

The first term captures the positive *direct* effect of θ on the toehold value for given effort. The second term reflects its *indirect* effect on the bidder's profit via effort, whose magnitude and sign depend on the wedge between the toehold t_b and the post-takeover stake $1/2$.[17] As t_b goes from $1/2$ to 0, the former vanishes while the latter shrinks towards $-\frac{\partial C^*(1/2,\theta)}{\partial e_b^*} \frac{de_b^*}{d\theta} < 0$. Intuitively, as toehold gains shrink, the compounding effect of θ on unrecompensed effort eventually dominates, namely, a greater scope for value improvement increases the *gap* between *ex post* optimal effort (for $s_b = 1/2$) and *ex ante* optimal effort (for $t_b < 1/2$).[18]

[16] The takeover literature has identified various sources of bidder gains in tender offers. Our analysis focuses on toeholds for comparative purposes because they constitute the main source of gains for activists (e.g., Becht et al. 2009; Brav et al. 2010). Brav et al. (2010) report that the median activist toehold in their sample is 6.3%.

[17] In a richer framework, the bidder may acquire all shares due to going-private or tax considerations that yield private benefits, or due to competition (fn.12). Even so, the unrecompensed effort problem persists, and in fact, is taken to its extreme: Owning all shares induces the maximum post-takeover effort, but as in partial bids, the bidder extracts none of the generated value on the additionally acquired shares. Thus, even if a full acquisition is preferable, it need not be profitable since any gains would have to offset the unrecompensed effort problem at its most severe. Given the optimality of partial bids is not crucial for our qualitative results, we have chosen the more parsimonious model without private benefits favoring a full acquisition.

[18] Fixed costs are irrelevant to Proposition 1. They are assumed to be smaller than exogeneous gains (Assumption 3) to highlight the cost of unrecompensed effort. Thus, takeovers may be frustrated even for $C(0) = 0$.

Thus, given that toeholds are limited, bidders' preferences turn out to be the *exact opposite* of the social planner's: they prefer the smallest possible s and benefit from lower θ.

2.3 Activism

Now suppose the toehold investor undertakes a campaign rather than a tender offer to obtain influence for carrying out the value improvement. In practice, activists employ a range of tactics spanning informal communications with management, public relations campaigns, shareholder proposals, and proxy contests (e.g., Brav et al., 2010). Instead of formalizing a specific procedure, we model activism in reduced form. We will clarify at the end of this subsection which properties of our "black box" formulation are critical to the results. Furthermore, in Appendix B, we discuss three different micro-foundations for our reduced-form model.

A campaign succeeds with probability $q(a, \psi, s)$ and imposes private cost $K(a)$ on the activist, where $a \geq 0$ denotes her campaign effort, $\psi \geq 0$ her campaigning skill, and s her equity stake. The assumption that s matters for q admits two interpretations. First, the activist's own voting power helps her chances of winning a proxy fight. This need not imply actual voting, as the mere threat can suffice for management to agree with the activist's demands.[19] Second, it lowers the number of other shareholders that she must mobilize for the campaign to succeed.

In analogy to Assumptions 1 and 2, we impose

Assumption 5. $q_a(.,.,.) > 0$, $q_{aa}(.,.,.) \leq 0$, $q_\psi(.,.,.) > 0$, $q_{a\psi}(.,.,.) > 0$, $q_s(.,.,.) \geq 0$, $K_a(.) > 0$, *and* $K_{aa}(.) > 0$

and

Assumption 6. $K_a(0) = 0$, $q(0,.,.) = 0$, *and* $\lim_{\psi\to\infty} q_a(.,.,.) = \infty$.

Assumptions 5 and 6 ensure that the campaign effort problem has a unique, strictly positive solution, thereby ruling out uninteresting outcomes. Furthermore, $\lim_{\psi\to\infty} q_a(.,.,.) = \infty$ allows us to fully vary the effectiveness of activism.

The activism game unfolds as follows: Owning an initial stake $t_a = t$, the activist decides in stage 1 whether to launch a campaign, and if so, chooses effort a. If the campaign succeeds, the activist chooses the restructuring effort e_a in stage 2 to improve firm value. Otherwise, the firm is not restructured. Figure 1 depicts the timelines of tender offers and activism, side by side.

Figure 1 about here

[19] For example, TPG/Axon engaged in 2012 SandRidge Energy with a consent solicitation, successfully forcing the CEO to resign and capturing four of eleven board seats. In 2013, Relational Investors in cooperation with the institutional investor CalSTRS submitted a Rule 14a-8 shareholder proposal and started a public relations campaign that successfully led to a split-up of Imken.

Following a successful campaign, the activist solves the restructuring effort problem (1) with $s = t_a$. By Lemma 1, the activist's restructuring effort is strictly less than the bidder's ($e_a^* < e_b^*$), since the takeover results in a larger stake ($s_b = 1/2 > t_a$), which raises the incentives to improve firm value.

Lemma 4. *A successful activist improves firm value less than a successful bidder.*

Lemma 4 is obvious but carries an important point: the advantage of activism cannot lie in improving firm value per se (at stage 3) inasmuch as this is more effectively achieved through a takeover. Therefore, any relative appeal of activism *must* reside in its approach to the free-rider problem—else, it is dominated by a tender offer.

At stage 1, if the activist has launched a campaign, she chooses campaign effort a to maximize $q(a, \psi, t_a)\Delta(t_a, \theta) - K(a)$ subject to $q(a, \psi, t_a) \leq 1$. Due to Assumptions 5 and 6, the optimal campaign effort is given by the first-order condition $q_a(a^+, \psi, t_a)\Delta(t_a, \theta) = K_a(a^+)$ if $q(a^+) < 1$, or else, by the boundary condition $q(\overline{a}) = 1$. Hence, $a^* = \min\{a^+, \overline{a}\}$, and the activist's expected profit from a campaign is $q(a^*, \psi, t_a)\Delta(t_a, \theta) - K(a^*)$. The next result characterizes the returns to activism.

Proposition 2. *In the activism game:*

(i) For any given θ, the success probability q goes to zero as $t_a \to 0$. Moreover, for $K(0) > 0$, there exists a toehold threshold $\overline{t}_a > 0$ such that a campaign is unprofitable if $t_a < \overline{t}_a$.

(ii) Activist profits strictly increase in θ for all $t_a > 0$.

Like bidders, activists require a sufficient toehold to make a profit, since they concede gains on the other shares to free-riding shareholders while bearing all costs. A smaller toehold reduces the activist's payoff $\Delta(t_a, \theta)$ from the value improvement after a successful campaign. This in turn reduces her incentives to invest in the campaign, lowering campaign effort a^* and success probability $q(a^*, \psi, t_a)$. The resulting low gains may be insufficient to recoup the fixed costs of a campaign if $K(0) > 0$.

But unlike bidder returns, activist returns always increase in the scope for value improvement. By remaining confined to a minority stake, the activist steers clear of ex ante free-riding and unrecompensed effort but instead surrenders to ex post free-riding by all other shareholders. The lack of ownership limits incentives, and therefore returns. This "limited effort" problem, however, is invariably mitigated by a larger scope for value improvement: never "overworking," the activist always benefits from greater incentives.[20] The contrast between Proposition 1ii and

[20]By contrast, a larger toehold t makes either strategy more profitable. In a tender offer, it increases a bidder's share in the value improvement and mitigates the unrecompensed effort problem. In activism, it increases an activist's share in the value improvement and the success probability of the campaign.

Proposition 2ii captures the key difference between the two shareholder governance mechanisms. Because of its central importance, this comparison is restated in the next proposition.

Proposition 3. *A larger scope for value improvement increases returns to activism but decreases bidder returns when toeholds are small.*

As a result, activism can be more profitable than tender offers—despite generating less value after a control transfer (Lemma 4) and additional costs to achieve the control transfer to begin with.

Proposition 4. *For small toeholds, activism tends to be more profitable than takeovers when the scope for value improvement is large, even though it is socially less efficient.*

As mentioned, any advantage of activism over takeovers must stem from its approach to the free-rider problem. Indeed, Propositions 3 and 4 highlight that the reason "buying control" differs from "working for control" is that they confront *different variants of free riding.* Buying control confronts *ex ante* free riding, which induces an unrecompensed effort problem that worsens when the returns to effort increase. Working for control succumbs to *ex post* free riding instead, which entails a limited effort problem that worsens when the returns to effort decrease. This makes it optimal to accept ex ante free riding (i.e., to make a bid) for small θ but ex post free riding (i.e., to run a campaign), even at additional cost, for large θ. That is, the two archetypal mechanisms for mobilizing shareholder control emerge profitable at opposite ends of the range of θ, even as both of them are fully subject to free riding.

Figure 2 about here

At the same time, takeovers are always more efficient because unrecompensed effort involves only a transfer of rents from bidders to target shareholders, whereas any forgone value creation and campaign costs represent deadweight losses. This divergence of private and social optimality occurs because the free-rider problem turns social benefits of takeovers (improved incentives) into private costs (unrecompensed effort), and by the same token, social costs of activism (campaign costs) into private benefits (avoiding unrecompensed effort).

In our framework, activism and takeovers emerge as "twin" strategies against the (dual) free-rider problem that have comparative advantages under different circumstances. In general, such strategies arise when free-riding undermines non-excludable improvements of *tradable* (and hence excludable) assets. As another example, consider infrastructure investments that generate spillover benefits for a large number of dispersedly owned properties. The first-best investment would be made by an "active agent" consolidating ownership of all properties, but this "market" approach may be unprofitable as current owners price in the expected appreciation of property values. Instead, easements may be coordinated through a costly "political" process to create some infrastructure, albeit at less than the first-best level. The "market" and "political" mechanisms correspond to takeovers and activism.

These insights depend very little on our specific reduced-form assumptions about the activism technology, $q(a, \psi, s)$ and $K(a)$—so long as activism is costly (or else, there is no agency problem to speak of). For example, Assumptions 5 and 6 serve to ensure a well-behaved campaign effort problem with a unique, possibly interior solution. But they are not crucial to the key comparative static: even in settings with fixed or corner values for campaign effort or with multiple solutions, the effect of θ on the activist's profit is always positive (in the case of multiplicity, for any locally stable solution). The example in Figure 1 is a case in point. With a corner solution for all θ, it is isomorphic to a model where campaigns always succeed, provided some fixed cost is incurred (which is a common modeling choice). Further, our assumption that campaign and restructuring efforts are sequential is to separate the "control stage" from the "restructuring stage" in parallel to the tender offer game, but little of substance changes if the activist instead determines a and e_a simultaneously.

The only important assumption is that neither q nor K depend directly on θ. This cuts both ways. Assuming that more valuable campaigns (higher θ) succeed more "easily" ($^{\partial q}/_{\partial \theta} > 0$) reinforces our main result. The converse—it is more "difficult" for such campaigns to succeed—could (but need not) overturn the result, depending on the assumed magnitude of this countervailing effect. But note that this requires shareholders to provide *less* support to campaigns they expect to gain *more* from.[21] In all the micro-foundations discussed in Appendix B, the direct effect of θ on q is zero or positive.

By no means do we dispute the existence of other differences between takeovers and activism; bidders and activists differ in access to sources of gains other than toeholds, defensive tactics available to management, and legal duties tied to various levels of ownership. Such institutional factors surely matter for the practical appeal of these governance mechanisms. We intentionally focus on the difference rooted in the *modi operandi* that *define* these mechanisms. This reveals a fundamental trade-off—between ex ante and ex post free riding—that would operate at the basis also of richer settings. Most added aspects would essentially modify q and K, or differentiate V and C across bidders and activists, neither of which alters the signs of the comparative statics, only the threshold value of θ at which the mechanisms switch rankings in terms of profitability.

[21] One could imagine scenarios in which a greater scope for value improvement coincides with required changes that are more detrimental to incumbent management, which can take actions (at some cost to itself) to make it harder for activists to succeed. Such an argument considers *simultaneous changes in two parameters*: potential value improvement and cost to management (i.e., management resistance). Any adverse impact on the efficacy of campaigns comes from the latter, not the former. Our comparative statics analysis pertains to *ceteris paribus* changes in the potential for value improvement (while keeping the intensity of management opposition implicitly fixed).

2.4 Post-disclosure share purchase

Activists often buy additional shares even after their ownership crosses the disclosure threshold, though their stakes ultimately remain limited.[22] To explore possible costs and benefits of these post-disclosure purchases we extend the previous activism game. In the new stage 0 the activist can buy r_a shares in the open market at a price p_a. These are "post-disclosure" trades insomuch as the activist's identity and intentions are commonly known. As in a tender offer, the potential sellers are homogeneous and atomistic price-takers. To level the playing field, we abstract from "noise traders" who would otherwise provide activists, but not bidders, with another source of gains (speculative profits). The subsequent stages remain unchanged: In stage 1, the activist chooses whether to start a campaign, and if so, her effort a. In stage 2, she chooses the restructuring effort e_a if the campaign was successful.

The solutions to the restructuring effort problem (stage 2) and to the campaign effort problem (stage 1) remain as before, except that the activist's stake in both instances is now $s_a = t_a + r_a$. If the activist happens to acquire $r_a \geq 1/2 - t_a$ shares in stage 0, there is no need to campaign since she has control; that is, even with zero effort ($a = 0$) the campaign succeeds with probability 1, i.e, $q\,(0, \psi, s_a \geq 1/2) = 1$. In this case, the activist becomes de facto a bidder, and it follows from Lemma 3 that $r_a = 1/2 - t_a$ is optimal in this case since purchasing more shares exacerbates the unrecompensed effort problem. We can therefore impose the restriction $s_a \leq 1/2$ without loss of generality.

The activist's share-purchase problem at stage 0 can be written as follows:

$$\begin{aligned}
\underset{r_a, p_a}{\text{maximize}} \quad & q(a, \psi, s_a)\Delta(s_a, \theta) - K(a) - r_a p_a && (7)\\
s.t. \quad & p_a \geq q(a, \psi, s_a)V^*(s_a, \theta) && (8)\\
& r_a \leq 1/2 - t_a && (9)\\
& a = a^* && (10)\\
& s_a = t_a + r_a. && (11)
\end{aligned}$$

where a^* is the solution to the stage-1 effort problem and $\Delta(s_a, \theta)$ represents the solution to the stage-2 effort problem.

This is nearly isomorphic to the tender offer problem (2)-(6) in Section 2.2. In particular, the free-rider condition (8) and incentive constraint (10) are analogues of (3) and (5) in the bidder's problem. The difference between the two share-purchase problems is as follows: Superficially, the minority constraint (9) replaces the majority contraint (4). Fundamentally, being a minority shareholder, the activist campaigns for influence to carry out the restructuring, and the success

[22] In the sample of Brav et al. (2010), the maximum stake accumulated by the median hedge fund during a campaign is 9.5 percent.

probability $q(a, \psi, s_a)$ of her campaign increases in her voting power s_a. Thus, conditional on the minority constraint, purchasing r_a additional shares directly raises the probability of gaining control. By contrast, conditional on the majority constraint, the r_b shares acquired in a tender offer are immaterial to the control allocation: the bidder has full control regardless of whether she owns 50% of the shares or more.

Proposition 5. *The activist's share-purchase problem has a solution and it may be interior.*

Buying additional shares comes with costs and benefits. On one hand, it induces unrecompensed effort since the activist cannot circumvent ex ante free-riding. She can only buy the r_a shares at their expected post-restructuring value. Earning nothing on them, she gains only from her toehold t_a, while subsequently exerting effort optimally for her ultimate stake $s_a = t_a + r_a$. On the other hand, a larger (voting) stake increases the success probability q for any given effort, which makes a campaign more worthwhile in spite of weak incentives.[23] Thus, the limited effort problem is mitigated, whereas the unrecompensed effort problem is aggravated. Essentially, by balancing 'greater influence' (more voting rights) against 'overworking' (induced by more cash flow rights), the solution to (7)-(11) trades off ex post against ex ante free riding. Whether the solution is interior or a corner depends on the relative curvatures of $K(.)$, $C(.)$, and $q(.)$. Also, it is simple to prove that the activist never buys additional shares if the influence effect is absent, i.e., $q_s(., ., .) = 0$.

Proposition 5 differs from results on "pre-disclosure" purchases, such as, e.g., Kyle and Vila (1991). In their model, bidders may buy shares in an anonymous open market before launching tender offers that generate value improvements (at a private cost), and these trades increase bidder profits.[24] These gains come at the expense of *noise traders*, but are limited by price impact, that is, by the partial revelation of bidder information through order flow. Our framework features neither noise traders nor asymmetric information. Share purchases are motivated by demand for influence[25] rather than speculation, and curbed by unrecompensed effort rather than information revelation.

The comparison of activism and takeovers in Section 2.3 carries over to the extended model. Specifically, Propositions 3 and 4 still apply since activism is weakly more profitable with post-disclosure share purchases than without: If the activist opts to buy additional shares, she must

[23] The insight that the activist buys shares to gain influence does not hinge on our assumption on $q(.)$ that the *marginal* return to effort increases with voting power. The result obtains for any specification with $\partial q/\partial s_a > 0$, that is, when the success probability for given effort increases in voting power, irrespective of the cross-derivative with effort. In fact, the activist is *more* eager to buy shares if voting power does *not* increase effort incentives.

[24] Back et al. (2017) study activists who can purchase shares before launching a campaign in a *dynamic* open market with noise traders. The forces that determine an activist's open-market trades are the same as in Kyle and Vila (1991), though conclusions regarding the impact of (noise trader) liquidity on the likelihood (or quality) of a governance intervention are richer and more nuanced.

[25] This is consistent with evidence that activists with more "hostile" intentions acquire larger stakes (Brav et al., 2010). If share purchases were driven only by speculative considerations, one might expect them to be larger in cases where changes are easier to elicit from management.

be better off, by revealed preference. Still, for low θ, the option of buying additional shares may not be a sufficient remedy for the limited effort problem, in particular due to the countervailing cost.

3 Takeover activism

The previous analysis developed the idea that the value of activism lies in its alternative approach to the free-rider problem, not in restructuring per se, which is better done through a takeover. In fact, resigning herself to a minority stake to avoid ex ante free riding is what allows an activist to possibly obtain control more cheaply, but also what holds back her incentives in restructuring by concomitantly tolerating ex post free riding. This insight suggests an interesting possibility: The tension between ex ante and ex post free riding can potentially be sidestepped if the activist does not seek to restructure the firm herself, but takes advantage of campaigns (to avoid ex ante free riding in the 'control stage') to seek the concentration of ownership in someone else's hands (to reduce ex post free riding in the 'restructuring stage').

In this section, we consider an activist whose aim is to induce a merger with a bidder who will restructure the firm. We refer to this as takeover activism, or synonymously as a brokered merger. Empirically, this form of activism is prevalent and the most profitable activist strategy (Greenwood and Schor, 2009; Becht et al., 2017).[26]

Since mergers are binding for all shareholders and preclude free-rider behavior, we must be careful (1) not to give takeover activism an a priori advantage over tender offers and (2) not to generate the trivial outcome that free-riding disappears. To this end, we introduce more realism: First, controlling owners can also execute mergers. This allows bidders, once in control, to merge (their acquisition firms) with the target firms, forcing minority shareholders to sell their shares in what is known as a *freeze-out* merger. Second, every merger is legally contestable, freeze-outs and brokered ones included, as shareholders can object to the terms at which they are forced to sell their shares.

Judicial standards of review for control transactions that mandate (some) shareholders to sell their shares fall in three categories. The sale of firms without a controlling owner falls under the *business judgement rule* not to second-guess good-faith board decisions made under a reasonable decision-making process. Sales initiated by management, possibly out of self-interest, can trigger

[26] Orol (2008) describes several links between activism and takeovers in practice. For example, he quotes a CEO who describes activist funds and private equity firms as "co-dependent": "The [private equity firms] encourage the hedge fund guys to put companies in play and the activists take positions in companies and pressure for auctions enabling private equity firms to get a hold of divisions or entire companies they might otherwise not have been able to." In another takeover-related strategy called "deal-jumping," activists engage firms with already announced merger plans to (block the proposed deal and) bargain or "shop" for higher bids. Jiang et al. (2015) document the impact of such campaigns. Our analysis sheds light on the value of this strategy to the extent that the activist spares a rival bidder from having to resort to a tender offer.

a heightened review criterion, though such so-called *Revlon duties* seldom apply when the target firm is 'put in play' by activists (*Lyondell Chemical Co. v. Ryan*). If a breach of fiduciary duty is determined, the transaction is enjoined or amended to give target shareholders improved terms. The sale of firms with a controlling owner is subject to the *entire fairness doctrine*, which is thus applicable to freeze-outs. This is a stricter standard that places the burden of proof on the board to demonstrate that the transaction under review is "inherently fair" to minority shareholders, or else the minority shareholders are awarded rescissory damages.[27]

In parallel to Section 2 we first analyse the tender offer game with two-tier offers, freeze-out, and a possible price revision following a successful shareholder litigation. We then examine the activism game in which the activist campaigns for the sale of the firm to the bidder.[28] For clarity of exposition and as in Section 2 , we derive the equilibrium of the two-tier tender offer game and of the takeover activism game assuming that the other governance mechanism is not available. That is, a brokered merger is not feasible should a tender offer fail, and vice versa. This allows us to cleanly uncover why takeover activism can work and the source of its advantage. The case where tender offers and takeover activism co-exist as feasible strategies is considered in Section 4.

3.1 Two-tier tender offer

Consider the tender offer game in Section 2.2 with one modification: Subsequent to a successful restricted bid (p_b, r_b) with $r_b \in [1/2 - t_b, 1 - t_b]$, the bidder can freeze out $f_b \in [0, 1 - r_b - t_b]$ minority shareholders at p_b.[29] Thereafter, the bidder chooses effort e_b. Finally, a legal challenge succeeds with probability ϵ in which case the freeze-out price is adjusted to the post-freeze-out firm value $V^*(e_b, \theta)$.

Following a tender offer with a freeze-out in principle resolves the free-rider problem (Yarrow, 1985; Amihud et al., 2004): If the bid succeeds, minority shareholders (those who did not tender their shares voluntarily) can be forced to also sell at the bid price, making a shareholder's payoff independent of her tendering decision. As Müller and Panunzi (2004) show, however, this effect is fragile insomuch as any legal risk associated with the freeze-out restores the free-rider problem in the initial offer. We generalize this argument to a setting where the value improvement depends on the bidder's ultimate stake. Surprisingly, the freeze-out option works to her disadvantage in this case.

[27] For a more extensive discussion, see Sections IV and V in Müller and Panunzi (2004).

[28] We do not allow an outsider to campaign for the sale of the target firm to *herself*. Related to legal questions such a strategy would invoke, the activist-bidder would face severe conflicts of interest that impair her ability to garner support. Corum and Levit (2015) develop a theory of takeover activism along these lines.

[29] Rather than imposing $r_b = 1/2 - t_b$ and the binary choice $f_b \in \{0, 1/2\}$ we allow for any $r_b \in [1/2 - t_b, 1 - t_b]$ and $f_b \in [0, 1 - r_b - t_b]$ and derive that the bidder optimally sets $r_b = 1/2 - t_b$ and chooses either $f_b = 0$ or $f_b = 1/2$ if she freezes-out.

Consider a freeze-out that increases the bidder's stake from $t_b + r_b$ to $s_b = t_b + r_b + f_b$. Taking into account the legal price-revision risk, her post-freeze-out restructuring effort problem is then $\max_{e_b} s_b V(e_b, \theta) - C(e_b, \theta) - \epsilon f_b [V(e_b, \theta) - p_b]^+$. This simplifies to $\max_{e_b} \widetilde{s}_b V(e_b, \theta) - C(e_b, \theta) + \epsilon f_b p_b$ with $\widetilde{s}_b \equiv t_b + r_b + f_b(1-\epsilon)$. Since $\epsilon f_b p_b$ is independent of e_b, Lemma 1 applies, and the bidder generates post-freeze-out firm value $V^*(\widetilde{s}_b, \theta)$ at cost $C^*(\widetilde{s}_b, \theta)$. That the freeze-out price may be revised upwards to the ultimate share value means, intuitively, that any ousted minority shareholders can still "free-ride" on f_b shares with probability ϵ. Due to this probabilistic ex post free-riding, the bidder's incentive-relevant, henceforth effective, stake is $\widetilde{s}_b = t_b + r_b + f_b(1-\epsilon)$ rather than s_b. Legal risk thus undermines incentives.

Turning to the optimal bid, it is instructive to first rule out two types of outcomes as equilibria of the two-tier tender offer game.

Lemma 5. *Any partial bid (p_b, r_b) with $p_b = V^*(t_b + r_b, \theta)$ and $r_b \geq 1/2 - t_b$ cannot be equilibrium outcome.*

Suppose the bidder acquired $r_b \geq 1/2 - t_b$ shares at a price p_b equal to the value she would create absent any subsequent share purchases. *At this price*, she would always buy more shares. If she maintained the same effort to create value, she would break even on the additional shares. But in fact, by creating more value afterwards, she makes herself better off. The unrecompensed effort problem does *not* kick in, since the price *remains at p_b* despite the increase in the bidder's stake. So, a freeze-out would occur. But this would imply that a shareholder who accepted the initial offer violated individual rationality or rational expectations: had she kept her shares, she would get the higher post-freeze-out value, or for shares sold in the freeze-out, the chance of an upward price revision.

Lemma 5 highlights the appeal of a freeze-out at a price *below* the post-freeze-out value, and the resulting tension with the free-rider condition in the initial offer. We now show that, due to this tension, a freeze-out *never* occurs under rational expectations.

Lemma 6. *The bidder never exercises the freeze-out option in equilibrium.*

By combining the tender offer with a subsequent freeze-out, the bidder's hope is to overcome the free-rider problem, that is, to buy shares at a price below their ultimate post-takeover value. Yet, as Müller and Panunzi (2004) show, if a freeze-out at such a price is anticipated, any legal risk—no matter how small—that the freeze-out price is revised upwards restores non-tendering as the dominant strategy for non-pivotal shareholders: at worst, it pays the same as tendering, and strictly more if the legal challenge to the freeze-out succeeds.

This means that, if the bidder plans a subsequent freeze-out, she must offer a price (at least) equal to the post-freeze-out value to succeed with the initial offer. But this defeats the purpose of the freeze-out, which is to overcome the free-rider problem. Indeed, at such a price, the bidder does *not* want to exercise the subsequent freeze-out option in our setting—any additional shares would only aggravate the unrecompensed effort problem.

Taken together, Lemmata 5 and 6 leave only one possibility: The tender offer is submitted at some price that makes the subsequent freeze-out unattractive.

Proposition 6. *In the two-tier tender offer game the bidder acquires $r_b = {}^1\!/_2 - t_b$ shares at a premium, paying a price*

$$\underline{p}_b = \frac{\Delta(1 - {}^\epsilon\!/_2, \theta) - \Delta({}^1\!/_2, \theta)}{{}^1\!/_2 - {}^\epsilon\!/_2} > V^*({}^1\!/_2, \theta).$$

At any price that satisfies the free-rider condition, whatever the premium, the bidder prefers to buy as few shares as needed for control. This implies $r_b = 1/2 - t_b$ in equilibrium (Lemma 3). What remains then is to compute the lowest price that, for $r_b = 1/2 - t_b$, deters the bidder from exercising a freeze-out afterwards. Given Lemma 6, this price must satisfy the free-rider condition *strictly*, i.e., incorporate a *commitment premium.* As a result, the bidder is worse off than in the absence of the freeze-out option.

By contrast, in Müller and Panunzi (2004), the freeze-out option can never harm bidders. The key to this difference is post-takeover moral hazard. With exogenous value creation, $V(s, \theta) = \overline{V}$ for all $s \in [{}^1\!/_2, 1]$. So, once $p_b = \overline{V}$, the bidder is *indifferent* to the number of shares she acquires, and hence to the freeze-out option. In our setting, $V^*(s, \theta)$ increases in $s \in [{}^1\!/_2, 1]$. For example, $V^*({}^1\!/_2, \theta) < V^*(1, \theta)$. If $p_b = V^*({}^1\!/_2, \theta)$, the bidder is *tempted* into executing a full freeze-out, which target shareholders rationally foresee. At the opposite end, if $p_b = V^*(1, \theta)$, she is strictly *averse* to a freeze-out due to the unrecompensed effort problem. The resolution of this dilemma requires the bidder to incur the commitment cost, i.e., to pay a premium.

As legal risk increases, these two settings converge. In the limit, the bidder's effective stake under the optimal offer becomes $\lim_{\epsilon \to 1} \widetilde{s}_b = {}^1\!/_2$ for any freeze-out strategy f_b, since the price is almost surely revised to the post-freeze-out value. As a result, the value improvement becomes $V^*(\widetilde{s}_b, \theta) = V^*({}^1\!/_2, \theta)$—i.e., independent of the bidder's ultimate stake as in the setting without post-takeover moral hazard. Moreover, in this limit, the temptation to exercise the freeze-out option vanishes, and therewith the commitment premium, so that the bidder's profit is the same as in Section 2.2.

3.2 Brokered merger

The beginning of the takeover activism game replicates stages 0 and 1 of the activism game with share purchases (Section 2.4): Owning t_a shares, the activist can purchase r_a shares at a price p_a in a fully transparent market, launch a campaign, and if so, choose effort a. If the campaign succeeds, she pursues in stage 2 a merger with a bidder who already owns t_b shares. We assume that the activist makes a first-and-final offer (r_m, p_m) with $r_m \in [1/2 - t_b, 1 - t_b]$.[30] In stage 3, if the offer is declined, the merger fails. Otherwise, the bidder acquires r_m shares for $r_m p_m$, gains control, and chooses her restructuring effort e_b. If $r_m < 1 - t_b$, the merger is pro-rated among all target shareholders.[31] Finally, a legal challenge succeeds with probability ϵ, in which event the merger price is ex post adjusted to the full post-merger firm value. For simplicity, we assume that the legal risk is the same, even though the judicial standards of review are higher for freeze-outs. The timelines of two-tier tender offers and takeover activism are shown, side by side, in Figure 3.

Figure 3 about here

One interpretation of activists effectuating a *collectively binding* merger is that they pressure management into negotiating it. Another one is that they can call a vote on a proposed merger, which resolves the free-rider problem for the bidder if the vote is binding, i.e., sufficient (Bebchuk and Hart, 2001). Such sufficiency is assumed but does not restore efficiency in our model since the free-rider problem also afflicts the activist who campaigns for the vote, or proxy contest, to take place and succeed.

After a brokered merger, the bidder owns $s_b = t_b + r_m$ shares and sets her restructuring effort e_b to maximize $s_b V(e_b, \theta) - C(e_b) - \epsilon r_m [V(e_b, \theta) - p_m]^+$, where the last term reflects the risk of an upward price revision and is strictly positive because the bidder's participation constraint in the merger negotation implies $p_m < V(e_b, \theta)$. This simplifies to $\hat{s}_b V(e_b, \theta) - C(e_b) + \epsilon r_m p_m$ with $\hat{s}_b \equiv t_b + (1-\epsilon) r_m$. Given that $\epsilon r_m p_m$ is independent of e_b, Lemma 1 applies. The bidder's post-merger payoff under the optimal effort is hence $\Delta(\hat{s}_b, \theta) + \epsilon r_m p_m$. Like $\tilde{s}_b$ after a freeze-out, $\hat{s}_b$ represents the bidder's effective stake, which accounts for (the legal risk of) "probabilistic" ex post free-riding.

In stage 2, if in control, the activist chooses the merger terms (r_m, p_m) to maximize expected shareholder wealth $R(r_m, p_m, s_b, \epsilon) \equiv r_m [(1-\epsilon) p_m + \epsilon V^*(\hat{s}_b, \theta)] + (1 - r_m - t_b) V^*(\hat{s}_b, \theta)$ subject to the bidder's participation constraint $\Delta(\hat{s}_b, \theta) + \epsilon r_m p_m \geq r_m p_m$.

Lemma 7. *In a brokered merger, the bidder acquires the entire firm, and the target shareholders' expected merger revenue decreases in the legal risk.*

[30] For takeover activism to be profitable, activists must be able to extract enough from the merger negotiations after a campaign success. The above assumption relieves us from having to distinguish the bargaining parameters for which this is (not) the case. A secondary motivation is that it levels the playing field: The bidder in the tender offer game makes a first-and-final offer, and the regular activist in Section 2 extracts the maximum restructuring gains conditional on her stake. The above assumption puts the takeover activist on equal footing. That said, our results remain valid so long as the takeover activist has enough, if not all, bargaining power. Moreover, we show in an earlier version of the paper that bidders can, and would want to, balance the bargaining power allocation with the initial toehold allocation to make (or keep) takeover activism feasible.

[31] A pro-rated offer $r_m < 1 - t_b$ can be a restricted cash bid or as a cash-equity bid in which target shareholders receive cash plus $1 - t_b - r_m$ shares in the post-merger company.

As long as the activist has some bargaining power, target shareholders receive a fraction of the post-merger surplus. Since the surplus increases in the bidder's stake, the optimal offer involves selling the entire firm: $r_m = 1 - t_b$. Given full bargaining power, the expected merger revenue, or shareholder wealth, is $R^*(t_b, \epsilon, \theta) \equiv \Delta(\hat{s}_b^*, \theta) + \epsilon(1 - t_b)V^*(\hat{s}_b^*, \theta)$ where $\hat{s}_b^* = 1 - \epsilon(1 - t_b)$. The effect of legal risk ϵ is twofold: It increases the chance of an upward price revision but decreases the bidder's incentives to improve value. Since the bidder "prices in" the first effect (through her participation constraint), shareholder wealth is ultimately affected only by the second, adverse effect.

The expected merger revenue per acquired share is $p_m^*(t_b, \epsilon, \theta) \equiv \frac{R^*(t_b,\epsilon,\theta)}{1-t_b}$, and the activist receives $R_a^*(s_a, t_b, \epsilon, \theta) \equiv s_a p_m^*(t_b, \epsilon, \theta)$ from the merger. In stage 1, she selects campaign effort a to maximize $q(a, \psi, s_a)R_a^*(s_a, t_b, \epsilon, \theta) - K(a)$. As in the regular activism game, the solution a^* is given by the first-order condition or the boundary condition $q(a, \psi, s_a) = 1$. The activist's share-purchase problem at stage 0 is isomorphic to (7)-(11) in Section 2.4, except that $R_a^*(s_a, t_b, \epsilon, \theta)$ replaces $\Delta(s_a, \theta)$ in the activist's expected profit and $p_m^*(t_b, \epsilon, \theta)$ replaces $V^*(s_a, \theta)$ in the free-rider condition:

$$\underset{r_a, p_a}{\text{maximize}} \quad q(a, \psi, s_a)R_a^*(s_a, t_b, \epsilon, \theta) - K(a) - r_a p_a \tag{12}$$

$$s.t. \quad p_a \geq q(a, \psi, s_a)p_m^*(t_b, \epsilon, \theta) \tag{13}$$

$$r_a \leq 1/2 - t_a \tag{14}$$

$$a = a^* \tag{15}$$

$$s_a = t_a + r_a. \tag{16}$$

The legal risk ϵ affects campaign strategy as follows.

Lemma 8. *An increase in legal risk*

(i) weakly decreases the activist's campaign effort and success probability, and strictly so when the campaign may fail, and

(ii) weakly decreases the activist's post-disclosure stake, and strictly so when the share-purchase problem has an interior solution.

By reducing the expected merger revenue (Lemma 7), an increase in ϵ reduces the value of a successful campaign, in essence similar to a decrease in θ, which in turn weakens the activist's incentives to invest in effort or influence. In other words, it aggravates the limited effort problem.

We can now show that returns to takeover activism strictly increase in θ for all $\epsilon < 1$. In combination with the results that returns to tender offers without a freeze-out option decrease (Proposition 1ii) while two-tier offers with said option perform even worse (Proposition 6), this establishes an analogue of Proposition 4:

Proposition 7. *For small toeholds, takeover activism with $t_a + t_b = t$ tends to be more profitable than (two-tier) tender offers with $t_b = t$ when the scope for value improvement is large and legal risk is low. Moreover, for sufficiently low campaign costs, it is also socially more efficient.*

In both two-tier tender offers and takeover activism, control encompasses the right to "force" all (remaining) shareholders to sell their shares, albeit subject to the legal risk of a price revision. Crucially, given *voluntary* trades are outside the purview of the legal challenge, ex ante free riding persists in both post-disclosure trades and initial bids, since only those who hold out and must be forced to sell can get a price revision. But while bidders buy at least $1/2 - t_b$ shares, activists can freely reduce their trades. This is why legal risk reinforces *ex ante* free riding and unrecompensed effort in two-tier offers (Lemma 6), and *ex post* free riding and limited effort in takeover activism (Lemma 8). Key is, again, *how* control (here, to force the sale) is obtained. Indeed, as ϵ increases, two-tier offers become more lucrative (converging to single-tier offers), but takeover activism less so (and eventually unprofitable).

In terms of efficiency, recall that regular activism is dominated by tender offers, as it generates not only additional deadweight costs but also a smaller restructuring surplus. While the former still applies, the latter is not true for takeover activism since the merger concentrates ownership more than a (two-tier) tender offer. This creates a trade-off, so takeover activism can be socially preferable if campaigns are sufficiently cheap or effective.

That said, for very high legal risk, takeover activism is inferior. For $\epsilon \to 1$, ex post free-riding through a price revision on all shares acquired in the merger is nearly certain. Accordingly, the bidder's post-merger effort is commensurate with her toehold t_b. A tender offer generates more surplus in this case and saves campaign costs, making it more efficient and, for low θ, also more profitable.

The identified advantage of takeover activism does not rely on activist-bidder pairs holding larger *joint* toeholds than bidders in tender offers. It also does not involve "buying low and selling high," since all trades occur at the true expected share value. This is different from Cornelli and Li (2002) where arbitrageurs buy "cheap" due to noise traders whose expected losses relax the free-rider problem. Our papers speak to different real-world investment strategies: Arbitrageurs trade to help a given bid succeed, while takeover activists work to initiate a negotiated merger.[32]

4 Choice of governance mechanism

So far, we analyzed the various governance mechanisms in isolation and compared outcomes. In this section, we consider situations in which more than one mechanism is feasible. We focus on

[32] According to Orol (2008, 28), many successful takeover activists come from the "risk arbitrage" background analyzed by Cornelli and Li (2002) but have "transformed themselves" to bring about takeovers more proactively.

(potential) bidder-activist *pairs* and analyze this case, in turn, with and without tender offers. We also restrict attention to settings with low legal risk that accommodate takeover activism.

Before doing so, we briefly discuss the choices of a *single* "active" investor. Whether a tender offer comes with a freeze-out option is not at the bidder's discretion but a matter of law. Hence, the only relevant choice is between a tender offer and regular activism.[33] If a bid is undertaken, the optimal terms are independent of the bidder's outside option, since they are pinned down by the target shareholders' free-rider condition and the majority requirement. By contrast, an activist's choices *in* a campaign are independent of her outside option only if a subsequent bid is precluded. If so, Section 2.3 applies as is. However, if the activist can resort to making a bid after a failed campaign, she is less inclined to invest in effort and post-disclosure shares. In this case, a campaign is not as valuable as in Section 2.3, which improves efficiency by tilting the choice toward takeovers. Notwithstanding, the basic comparative statics underlying Propositions 3 and 4 still apply, since the activist's outside option decreases as θ increases. Thus, variants of these results continue to hold.

4.1 Activism when tender offers are infeasible

Now suppose there are both a (potential) bidder and activist. If the scope for value improvement (θ) is sufficiently high, activism is profitable while tender offers are not. In this parameter region, the only choice is which type of campaign the activist prefers to pursue.

Proposition 8. *For a given t_a, takeover activism is both more profitable and socially more efficient than regular activism when the legal risk is low.*

When the legal risk of mergers is low, takeover activism is the optimal governance mechanism, *privately* and *socially.* The example shown in Figure 4 assumes $\epsilon \to 0$, so that takeover activism outperforms regular activism along both dimensions for all θ, and in addition, (two-tier) tender offers once θ is high enough.

Takeover activism can simultaneously outperform regular activism and tender offers because, true to name, it combines the strengths of both alternative mechanisms: On one hand, takeover activists attenuate *ex ante* free riding in the 'control stage' by campaigning on minority stakes, keeping this edge on hostile bidders. On the other hand, unlike regular activists, they eliminate *ex post* free riding in the 'restructuring stage,' once in control, by arranging for the firm including their own stakes to be sold.[34] Thus, the source of their profitability and efficiency is *limited* and

[33] As mentioned earlier (footnote 28), we ignore takeover activism in this setting, as it requires the investor to campaign for selling the target to *herself.*

[34] While the comparison in Proposition 8 holds t_a constant, these incentive benefits can make takeover activism superior even if it were to involve a smaller activist toehold. Admati, Pfleiderer, and Zechner (1994) show that risk-averse investors must balance such incentive benefits against loss of diversification, a trade-off also relevant to the comparison of these governance mechanisms but abstracted from in our model with risk neutrality, which focuses on the free-rider problem.

temporary ownership—traits often criticized by opponents of investor activism.

Figure 4 about here

4.2 Takeover activism or (two-tier) tender offers

Once tender offers are feasible, regular activism is no longer a relevant option. With the optimal bid restricted to $r_b = 1/2 - t_b$, a potential activist would be allotted a pro rata sale of $t_a\gamma$ shares, where $\gamma^{-1} \equiv \frac{1-t_b}{1/2-t_b}$ measures how oversubscribed the offer is. Thus, she would earn $t_a v_a^f$, where $v_a^f \equiv \gamma p_b + (1-\gamma)\, V^*(1/2, \theta)$, where $p_b = \underline{p}_b$ in two-tier offers (Proposition 6) and $p_b = V^*(1/2, \theta)$ in single-tier offers. In either case, v_a^f is weakly larger than $V^*(1/2, \theta)$. By contrast, her expected gain from a regular campaign, $t_a q(a^*) V^*(s_a, \theta) - q(a^*) C^*(s_a, \theta) - K(a^*)$, is strictly smaller than $V^*(1/2, \theta)$ since $s_a < 1/2$. Intuitively, as a free-rider in a tender offer, she benefits from a larger post-takeover value without bearing any costs.

The choice between tender offers and takeover activism is not as trivial, as brokered mergers lead to greater post-takeover value creation. While the optimal bid remains (pinned down by the free-rider condition and hence) the same, a latent bid affects merger negotiations and campaign incentives (Figure 5).

Figure 5 about here

As threat points in the merger negotiations, the tender offer payoffs can shift the merger price p_m up or down, depending on the distribution of bargaining power. Under our assumption that the activist has all the bargaining power so that the bidder's threat point is strictly binding, p_m decreases—but this is not generally the case. Nonetheless, for any bargaining power distribution, $p_m \geq v_a^f$ due to the activist's threat point, and mutually beneficial terms to split the gains from trade $\triangle(1, \theta) - \triangle(1/2, \theta)$ always exist.

The campaign effort problem becomes $\max_a q(a, \psi, s_a) s_a p_m + (1 - q(a, \psi, s_a)) s_a v_a^f - K(a)$. In the marginal return to effort, $\frac{\partial q}{\partial a} s_a (p_m - v_a^f)$, the term $-v_a^f$ captures that the fallback option makes failure less unattractive. An increase in p_m has a countervailing effect, though on balance, effort decreases.[35] Still, because $p_m \geq v_a^f$, the activist always has incentives to exert some effort conditional on starting a campaign.

Last, a campaign is not started unless the expected profit (including revenue from the tender offer after a failed campaign), $\Pi^*_{ta}(t_a, \theta) + [1 - q(a^*, \psi, s_a^*)]\, t_a v_a^f$ exceeds $t_a v_a^f$. So, the rents that can be earned as a free-rider in a tender offer raise the return required from takeover activism.[36]

[35] The offset is partial since the merger price p_m increases less than the activist's outside option v_a^f—unless she has *no* bargaining power in the merger negotiations, though in that case she would earn the same in the merger as in a tender offer, so she never runs a costly campaign to begin with.

[36] This temptation to free-ride as a non-atomistic minority blockholder in a (future) tender offer is the same as in Zingales (1995), where it plays a central role for rent extraction in the optimal design of initial public offerings.

Proposition 9. *If tender offers are feasible, regular activism never emerges. Takeover activism*

(i) emerges only if the expected campaign profit $\Pi^*_{ta}(t_a, \theta)$ *exceeds* $q(a^*, \psi, s^*_a)t_a v^f_a > 0$*, and*

(ii) is always Pareto-improving when it emerges.

In the example depicted in Figure 6, the fallback option undermines the campaign incentives and profit so much that takeover activism never emerges if a tender offer is feasible, even when a campaign would produce a larger social surplus and higher private return (in the sense of being more profitable to the activist than the tender offer is to the bidder). Since tender offers become *less* profitable with higher θ, takeover activism is, generally, eliminated below some threshold $\hat{\theta}$. But since activism becomes *more* profitable with higher θ, the campaigns that are eliminated are the *least* profitable ones. By truncating the return distribution of takeover activism from below, the coexistence of tender offers raises the average return of campaigns that occur in equilibrium.

Figure 6 about here

Empirically, (abnormal) returns to activism are the highest for takeover activism (Greenwood and Schor, 2009; Becht et al., 2017). Our analysis offers a two-fold explanation for this pattern: Takeover activism can relax the trade-off between ex ante and ex post free-riding (Proposition 8), and latent tender offer premiums increase the hurdle rate for takeover activism (Proposition 9i). Both effects are stronger, the more effective activism (q, K) is. In particular, note that the hurdle rate created by free-rider rents, $q(a^*, \psi, s^*_a)t_a v^f_a$, increases with the success probability of the campaign.

Since takeover activism requires the voluntary participation of activist and bidder, it cannot make them worse off: bidders bargain for at least their tender offer profit in merger negotiations, while activists only start campaigns if they expect to earn more than in a tender offer. Dispersed shareholders get the same price as the activist in any transaction, but share none of the campaign costs. Hence, if the activist prefers a campaign, the same holds *a fortiori* for them. Any takeover activism that occurs is therefore not only efficient but even Pareto-improving. If anything, there is too little takeover activism given that potential takeover activists may free-ride on tender offers rather than work to broker mergers.

4.3 Activism and acquisition modes

Takeover activism improves welfare along the extensive and intensive margin. If tender offers are infeasible, it facilitates control changes that otherwise do not occur. If tender offers are feasible, it replaces restricted bids with negotiated mergers, thereby increasing ownership concentration and hence restructuring incentives. These effects entail a positive comparative statics prediction:

Proposition 10. *For low legal risk, larger ψ facilitate takeover activism, which in turn promotes overall takeover activity but reduces tender offers.*

This resonates with broad empirical patterns. The frequency and profitability of campaigns correlate with M&A activity (Greenwood and Schor, 2009; Becht et al., 2017). Furthermore, the surge in hedge fund activism since the 1990s (Sharara and Hoke-Witherspoon, 1993; Bradley et al., 2010; and Fos, 2013) has coincided with a rise in total M&A volume but a decline in hostile bids (Betton et al., 2008, Fig. 9). It has been argued that the surge was triggered by regulatory changes that made it easier for active shareholders to communicate and coordinate their efforts. Though, changes in market conditions and anti-takeover practices offer alternative explanations for these patterns (Davidoff, 2013).

A tacit, but conceptually crucial, premise of Proposition 10 is that some changes (ψ) mitigate free-riding in activism—*though not in tender offers.* One possible reason is that the coordination problem in activism is a *communication* problem: other shareholders must be persuaded to back the campaign, but given such information, find it individually rational to do so (see, e.g., the micro-foundations in Appendix B). By contrast, the coordination failure in tender offers involves lack of *commitment*: dispersed shareholders cannot be persuaded to sell below the expected post-takeover value. The difference in the nature of these coordination problems may be of empirical interest, and of importance for the co-evolution of these governance mechanisms as information technologies continue to improve.

5 Conclusion

A comparative corporate governance theory examines how alternative mechanisms fare against the same frictions on a level playing field. We compare shareholder governance mechanisms in widely held firms—takeovers and activism—where free-rider behavior is the defining friction. We identify comparative advantages based solely on the fact that they face different manifestations of this behavior. This provides a deep-seated rationale for the coexistence of these mechanisms as well as comparative predictions about returns to bidders and activists. It explains also why takeover activism can outdo both tender offers, on one hand, and regular activism, on the other. Last, it has implications for how legal and technological changes may shape the co-evolution of these mechanisms, which has seen a secular shift as of late (Solomon, 2013; Fujita and Barreto, 2017).

The two manifestations of free-riding are: As bidders acquire control, dispersed shareholders free-ride *ex ante* by selling their shares only if the takeover premium incorporates the expected post-takeover gains. Acquiring those shares increases bidders' incentives to improve share value afterwards, but paying the premium prevents them from recouping the costs of doing so. These unrecompensed costs are their costs of gaining control. Instead of paying said premium, activists run costly campaigns to gain influence over management. Still, dispersed shareholders free-ride, now *ex post* on realized gains, as activists own minority stakes but, like bidders, bear all costs. The key is that a larger scope for value improvement (marginal return to effort when in control) raises unrecompensed costs, but reduces the importance of campaign costs relative to the value of control. So, the mechanisms emerge profitable at opposite ends. Takeover activism combines the "best of both worlds." It allows activists to sidestep ex ante free-riding when gaining control, and by way of mergers, bidders to improve firm value without ex post free-riding. Interestingly, the efficiency of activism originates in *limited* and *temporary* ownership, traits that are usually met with criticism.

Our framework can also inform policy debates. In a previous version, we discuss empty voting and activist-bidder alliances (Burkart and Lee, 2015b). In takeover activism, empty votes help to overcome the free-rider problem in campaigns but are reunified with cash flow rights through the mergers prior to value creation. Thus, they increase control contestability without distorting incentives. In addition, ex ante alliances help when activists are wary of being unable to recoup sunk campaign investments through the merger negotiations. By limiting their own toeholds and inviting activists to buy into targets, bidders can shift bargaining threat points in the activists' favor to seed takeover activism. Though, such "Trojan horse" tactics are liable to insider trading allegations.[37]

We see two more open avenues. First, the approach to endogenously breaking the equivalence between ex ante and ex post free-riding, by pairing the free-rider problem with other elements, could be fruitful in exploring other differences between takeovers and activism. For example, one could study the role of financing frictions when control-seeking investors possess limited wealth, or that of multiple blockholders in the choice between the two mechanisms. Second, there may be collective action problems outside of corporate governance for which the "markets" (merging assets) versus "politics" (costly coordination) prism we used in our public goods analogy provides a useful perspective.

[37]A highly publicized case involved the pharmaceutical company Valeant and the hedge fund Pershing Square. With financial backing from Valeant, Pershing Square accumulated a 9.7 percent toehold in Allergan and then pushed for a sale of the company to Valeant. Valeant and Pershing Square were sued for insider trading. Allergan eventually sold itself to another firm, Actavis, but Valeant and Pershing Square are said to have pocketed about $2.6 billion from the Actavis deal via their toehold (De La Merced et al., 2014; and Benoit and Hoffman, 2014). In a comment, then-SEC Chair Mary Jo White warned against such "toehold deals" (Gandel, 2015).

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Appendix A: Additional proofs

Proof of Lemma 1

Assumption 1 implies $sV_{ee}(e)-C_{ee}(e)<0$ for all e, i.e., strict concavity of the objective function, and Assumption 2 implies $sV_e(0)-C_e(0)=sV_e(0)>0$ and $\lim_{e\to\infty} sV_e(e)-C_e(e)=-\infty$. Hence, the first-order condition $sV_e(e,\theta)=C_e(e)$ has a unique, strictly positive solution, and identifies the global maximum provided that the associated investor payoff is positive. This last condition holds because $\Delta(s,\theta)\geq sV(0,\theta)-C(0)>tV(0,\theta)-C(0)\geq 0$, where the last weak inequality applies Assumption 3. By the implicit function theorem, $\frac{\partial e(s,\theta)}{\partial s}=-\frac{V_e(e,\phi)}{sV_{ee}(e,\phi)-C_{ee}(e)}>0$ and $\frac{\partial e(s,\theta)}{\partial \phi}=-\frac{V_{e\theta}(e,\phi)}{sV_{ee}(e,\phi)-C_{ee}(e)}>0$. Furthermore, $\frac{\partial \Delta(s,\theta)}{\partial s}=[sV_e(e,\phi)-C_e(e)]\frac{de}{ds}+V(s,\theta)>0$ and $\frac{\partial \Delta(s,\theta)}{\partial \theta}=[sV_e(e,\phi)-C_e(e)]\frac{de}{d\theta}+sV_\theta(s,\theta)>0$ by the envelope theorem. ■

Proof of Lemma 2

For $e_b=0$, the post-takeover firm value is $V(0,\theta)$. Even without any gains on the shares acquired in the tender offer, her profit is $t_bV(0,\theta)-C(0)$, which is positive by Assumption 3. ■

Proof of Lemma 3

For admissible e_b and r_b, the objective function decreases in p_b. Hence, p_b is optimally set to its lower bound in (3): $p_b=V(e_b,\theta)$. Substituting this into the objective function and differentiating with respect to s_b yields $[t_bV_e(e_b,\theta)-C_e(e_b)]\frac{\partial e_b}{\partial s_b}$. If this derivative is negative for all $s_b>t_b$, s_b is optimally set to its lower bound given by (4). This is indeed the case: While $\frac{\partial e_b}{\partial s_b}>0$ by Lemma 1, it follows from (5) that $t_bV_e(e_b,\theta)-C_e(e_b)<0$ since $t_b<s_b$. ■

Proof of Proposition 1

Using Lemma 3 and the binding free-rider condition, the bidder's profit can be written as $\Pi_b^*(t_b,\theta)=t_bV^*(1/2,\theta)-C^*(1/2,\theta)$. Part (i) follows from $\partial\Pi_b^*/\partial t_b>0$, $\Pi_b^*(0,\theta)=-C^*(1/2,\theta)<0$, and $\Pi_b^*(1/2,\theta)=\Delta(1/2,\theta)>0$ by Lemma 1. Next, since $V^*(1/2,\theta)\equiv V(e_b^*,\theta)$ and $C^*(1/2,\theta)\equiv C(e_b^*,\theta)$ depend also indirectly on θ via e_b^* (i.e., the incentive constraint (5)), $\frac{d\Pi_b^*}{d\theta}=t_bV_\theta(e_b^*,\theta)+[t_bV_e(e_b^*,\theta)-C_e(e_b^*,\theta)]\frac{de_b^*}{d\theta}$. This is strictly negative if $t_bV_\theta(e_b^*,\theta)<-[t_bV_e(e_b^*,\theta)-C_e(e_b^*,\theta)]\frac{de_b^*}{d\theta}$. As $t\to 0$, the left-hand side goes to 0, while the right-hand side goes to $C_e(e_b^*,\theta)\frac{de_b^*}{d\theta}>0$. Combined with $\lim_{\theta\to 0}\Pi_b^*(t,\theta)=tV(0,0)-C(0)\geq 0$ (Assumption 3), this implies part (ii). ■

Proof of Proposition 2

Denote the expected campaign profit by $\Pi_a^*(t_a,\theta)\equiv q(a^*,\psi,t_a)\Delta(t_a,\theta)-K(a^*)$. As $t_a\to 0$, $\Delta(t_a,\theta)\to -C(0)$, and hence $a^*\to 0$. Thus, $\lim_{t_a\to 0} q(a^*,\psi,t_a)=0$ and $\lim_{t_a\to 0}\Pi_a^*(t_a,\theta)=$

$-K(0)$. This proves part (i). Next note that $\partial\Delta/\partial\theta = t_a V_\theta(e_a^*, \theta) > 0$ by the envelope theorem applied to the restructuring effort problem at stage 2. If $a^* = \overline{a}$, this directly implies part (ii) because $q(a^*, \psi, t_a)$ and $K(a^*)$ remain fixed. If $a^* = a^+$, note that $\partial\Pi_a^*/\partial\Delta = q(a^*, \psi, t_a) > 0$ by the envelope theorem applied to the campaign effort problem at stage 1. Together with the fact that θ affects $\Pi_a^*(t_a, \theta)$ only through $\Delta(t_a, \theta)$, this implies part (ii). ■

Proof of Proposition 4

First, takeovers are more efficient: Since the objective function in the restructuring effort problem (1) is strictly concave, $V(e, \theta) - C(e, \theta)$ increases in e for all $e \leq e(1, \theta)$. The social surplus is $V^*(1/2, \theta) - C^*(1/2, \theta)$ in a takeover and $q(a, \psi, t_a)[V^*(t_a, \theta) - C^*(t_a, \theta)] - K(a)$ in a campaign. Note that $V^*(t_a, \theta) - C^*(t_a, \theta) < V^*(1/2, \theta) - C^*(1/2, \theta)$, since $e(t_a, \theta) < e(1/2, \theta) < e(1, \theta)$. Furthermore, $q(a, \psi, t_a) \leq 1$ and $K(a) \geq 0$. Second, activism can nevertheless be more profitable, as the example in Figure 2 shows. ■

Proof of Proposition 5

For admissible a and r_a, the objective function decreases in p_a. Hence, p_a is optimally set to its lower bound by (8): $p_a = q(s_a)V^*(s_a, \theta)$. Substituting this into the objective function using $\Delta(s_a, \theta) = s_a V^*(s_a, \theta) - C^*(s_a, \theta)$ yields $\max_{s_a \in [t, 1/2]} q(a^*(s_a), \psi, s_a)[tV^*(s_a, \theta) - C^*(s_a, \theta)] - K(a^*(s_a))$ where $a^*(s_a)$ is the solution to (10) for a given s_a. All components of the objective function are continuous in s_a and the domain of s_a is compact, so a maximum exists. To show that the maximum can be interior, consider the example in Figure 1, for which $\Delta(s_a, \theta) = \frac{s_a^2\theta^2}{2c}$, $V^*(s_a, \theta) = \frac{s_a\theta^2}{c}$, and $C^*(s_a, \theta) = \frac{s_a^2\theta^2}{2c}$. Further, given interior solutions for campaign effort, $q^*(s_a, \psi, \theta) = \frac{\psi^2}{k} s_a^2 \Delta(s_a, \theta)$ and $K^*(s_a, \psi, \theta) = \frac{\psi^2}{2k}\frac{\theta^4}{4c^2} s_a^6 - \underline{k}$. Using these expressions and the free-rider condition $r_a p_a = r_a V^*(s_a, \theta)$ in the objective function, the stage-0 problem simplifies to $\max_{s_a \in [0, 1/2]} q^*(s_a, \psi, \theta)[tV^*(s_a, \theta) - C^*(s_a, \theta)] - K^*(s_a, \psi, \theta) = \frac{\psi^2 s_a^5 \theta^4}{2kc^2}\left(t - \frac{3}{4}s_a\right) - \underline{k}$. The objective is concave in s_a, and the first-order condition yields $s_a^* = \frac{10}{9}t$. Thus, if starting with a pre-disclosure toehold of 5 percent, the activist uses post-disclosure purchases to raise her stake to 5.5 percent. ■

Proof of Lemma 5

Consider the bidder's interim (post-bid, pre-freeze-out) expected profit. Without a freeze-out, it is $\Pi^{NoF}_{V^*(t_b+r_b,\theta)} = t_b V^*(t_b + r_b, \theta) - C^*(t_b + r_b, \theta)$. With effort at $e(r_b + t_b, \theta)$, the expected profit from a freeze-out would be $\hat{\Pi}^F_{V^*(t_b+r_b,\theta)} \equiv \widetilde{s}_b V^*(t_b + r_b, \theta) - C^*(t_b + r_b, \theta) - (1 - \epsilon) f_b p_b$. Note that $\hat{\Pi}^F_{V^*(t_b+r_b,\theta)} - \Pi^{NoF}_{V^*(t_b+r_b,\theta)} = (1 - \epsilon) f_b V^*(t_b + r_b, \theta) - (1 - \epsilon) f_b p_b = 0$. But her optimal post-freeze-out effort is $e(\widetilde{s}_b, \theta)$. So, the expected freeze-out profit is $\Pi^F_{V^*(t_b+r_b,\theta)} \equiv \widetilde{s}_b V^*(\widetilde{s}_b, \theta) -$

$C^* (\widetilde{s}_b, \theta) - (1-\epsilon) f_b p_b$. Since $\widetilde{s}_b V^*(\widetilde{s}_b, \theta) - C^* (\widetilde{s}_b, \theta) > \widetilde{s}_b V^*(t_b + r_b, \theta) - C^* (t_b + r_b, \theta)$ by revealed preference, $\Pi^F_{V^*(t_b+r_b,\theta)} > \hat{\Pi}^F_{V^*(t_b+r_b,\theta)} = \Pi^{NoF}_{V^*(t_b+r_b,\theta)}$. Thus, the bidder executes the freeze-out. But then the free-rider condition in the initial offer must have been violated: Those that retained their shares get $z \equiv (1-\epsilon)p_b + \epsilon V^*(\widetilde{s}_b, \theta)$ or, even better, $V^*(\widetilde{s}_b, \theta)$ per share—the former if part of a freeze-out, otherwise the latter—whereas those that tendered their shares get $p_b < z$. ■

Proof of Lemma 6

If anticipating a freeze-out, shareholders would only tender if $p_b \geq (1-\epsilon)p_b + \epsilon V^*(\widetilde{s}_b, \theta)$, respectively, $p_b \geq V^*(\widetilde{s}_b, \theta)$. Therefore, there would be no risk of a price revision in equilibrium, which simplifies the bidder's effort problem to $\max_{e_b} s_b V(e_b, \theta) - C(e_b)$ with $s_b \equiv t_b + r_b + f_b$. Accordingly, the post-freeze-out firm value would be $V^*(s_b, \theta)$. Hence, while the bidder's interim expected profit would hence be $\Pi^{NoF}_{V^*(t_b+r_b,\theta)} = (t_b + r_b)V^*(t_b + r_b, \theta) - C^* (t_b + r_b, \theta)$ without a freeze-out, it would be $\Pi^F_{V^*(t_b+r_b,\theta)} = (t_b + r_b)V^*(s_b, \theta) - C^*(s_b, \theta)$ with a freeze-out. By revealed preference, $(t_b + r_b)V^*(t_b + r_b, \theta) - C^* (t_b + r_b, \theta) > (t_b + r_b)V^*(s_b, \theta) - C^* (s_b, \theta)$, respectively, $\Pi^{NoF}_{V^*(s_b,\theta)} > \Pi^F_{V^*(s_b,\theta)}$. So, the bidder would refrain from the freeze-out, in contradiction to the shareholders' premised anticipation. ■

Proof of Proposition 6

At $p_b = V^* (t_b + r_b + \delta, \theta)$ with $\delta > 0$, the bidder's profit from acquiring $r_b \in [1/2 - t_b, 1 - t_b)$ shares is $\Pi^{r_b}{}_{V^*(t_b+r_b+\delta,\theta)} = (t_b + r_b)V^* (t_b + r_b, \theta) - C^* (t_b + r_b, \theta) - r_b V^* (t_b + r_b + \delta, \theta)$, while her profit from acquiring $r_b + \delta$ shares is $\Pi^{r_b+\delta}{}_{V^*(t_b+r_b+\delta,\theta)} = t_b V^* (t_b + r_b + \delta, \theta) - C^* (t_b + r_b + \delta, \theta)$. Since $(t_b + r_b)V^* (t_b + r_b, \theta) - C^* (t_b + r_b, \theta) > (t_b + r_b)V^* (t_b + r_b + \delta, \theta) - C^* (t_b + r_b + \delta, \theta)$, it follows that $\Pi^{r_b}{}_{V^*(t_b+r_b+\delta,\theta)} > \Pi^{r_b+\delta}{}_{V^*(t_b+r_b+\delta,\theta)}$. Given $p_b \geq V^*(t_b+r_b, \theta)$ must hold in equilibrium, $r_b = 1/2 - t_b$ is optimal (Lemma 3). To buy no more than $r_b = 1/2 - t_b$ in equilibrium, the bidder must choose p_b such that a subsequent freeze-out is unprofitable. To derive the optimal freeze-out strategy, write the bidder's interim expected payoff from a freeze-out as $\Pi^F_b = \widetilde{s}_b V(e_b(\widetilde{s}_b, \theta), \theta) - C(e_b(\widetilde{s}_b, \theta), \theta)) - (1-\epsilon) f_b p_b$, where $e_b(\widetilde{s}_b, \theta)$ is the post-freeze-out restructuring effort, and take the total derivative with respect to f_b for a given p_b. This yields $\frac{d\Pi^F_b}{df_b} = (1-\epsilon)V(e_b(\widetilde{s}_b, \theta), \theta) + [\widetilde{s}_b V_e(e_b(\widetilde{s}_b, \theta), \theta) - C_e(e_b(\widetilde{s}_b, \theta))] \frac{\partial e_b(\widetilde{s}_b,\theta)}{\partial \widetilde{s}_b} - (1-\epsilon)p_b$. Applying the first-order condition for restructuring effort, $\widetilde{s}_b V_e(e_b(\widetilde{s}_b, \theta), \theta) = C_e(e_b(\widetilde{s}_b, \theta))$, simplifies this to $\frac{d\Pi^F_b}{df_b} = (1-\epsilon)V(e_b(\widetilde{s}_b, \theta), \theta) - (1-\epsilon)p_b > 0$. Since $V(e_b(\widetilde{s}_b, \theta), \theta)$ increases in f_b, the optimal freeze-out—if one is profitable—is $f^*_b = 1 - r_b - t_b$. To deter a freeze-out given $r_b = 1/2 - t_b$, p_b must hence satisfy $1/2 V^* (1/2, \theta) - C^* (1/2, \theta) \geq (1 - \epsilon/2) V^* (1 - \epsilon/2, \theta) - C^* (1 - \epsilon/2, \theta) - \frac{1-\epsilon}{2} p_b$, respectively, $\Delta(1/2, \theta) \geq \Delta(1 - \epsilon/2, \theta) - \frac{1-\epsilon}{2} p_b$. Imposing equality and solving for the price yields $\underline{p}_b$. While implied by Lemma 5, $\underline{p}_b > V^*(1/2, \theta)$ can be shown explicitly by setting $p_b = V^*(1/2, \theta)$

in the inequality, which then simplifies to $\left(1-\frac{\epsilon}{2}\right)V^*(1/2,\theta)-C^*\left(1/2,\theta\right)\geq\Delta(1-\epsilon/2,\theta)$, which is false by revealed preference. ■

Proof of Lemma 7

Since $\partial R/\partial p_m>0$, the activist optimally increases p_m until the bidder's participation constraint $\Delta(\hat{s}_b,\theta)\geq(1-\epsilon)r_m p_m$ binds. Therefore, $r_m p_m=\frac{\Delta(\hat{s}_b,\theta)}{1-\epsilon}$, which reduces the expected merger revenue to $\Delta(\hat{s}_b,\theta)+\epsilon r_m V^*(\hat{s}_b,\theta)$. Since both $\Delta(\hat{s}_b,\theta)$ and $V^*(\hat{s}_b,\theta)$ strictly increase in $\hat{s}_b$, it is optimal to set $r_m=1-t_b$, which yields $\hat{s}_b^*=1-\epsilon(1-t_b)$ and $\Delta(\hat{s}_b^*,\theta)=\hat{s}_b^*V(e_b(\hat{s}_b^*,\theta),\theta)-C(e_b(\hat{s}_b^*,\theta))$. So, the optimal merger revenue is $R^*(t_b,\epsilon,\theta)\equiv V(e_b(\hat{s}_b^*,\theta),\theta)-C(e_b(\hat{s}_b^*,\theta))$. Given Assumptions 1 to 3, $V(e,\theta)-C(e)$ strictly increases in all $e<e(1,\theta)\equiv\arg\max_e V(e,\theta)-C(e)$. Further, by Lemma 1, $e_b(\hat{s}_b^*,\theta)<e_b(1,\theta)$ because $\hat{s}_b^*<1$ and $\partial e_b/\partial\hat{s}_b^*>0$. Hence, $R^*(t_b,\epsilon,\theta)$ strictly increases in $\hat{s}_b^*$, which in turn strictly decreases in ϵ. ■

Proof of Lemma 8

Part (i). Conditional on a campaign, the optimal campaign effort is given by either the first-order condition or the upper corner solution. Interior solutions satisfy (FOC1) $\frac{\partial q}{\partial a}R_a^*(s_a,t_b,\epsilon,\theta)-\frac{\partial K}{\partial a}=0$ and (SOC1) $\frac{\partial^2 q}{\partial a^2}R_a^*(s_a,t_b,\epsilon,\theta)-\frac{\partial^2 K}{\partial a^2}<0$. Applying the implicit function theorem yields

$$\frac{\partial a^+}{\partial\epsilon}=\frac{-\frac{\partial q}{\partial a}\frac{\partial R_a^*}{\partial\epsilon}}{\frac{\partial^2 q}{\partial a^2}R_a^*(s_a,t_b,\epsilon,\theta)-\frac{\partial^2 K}{\partial a^2}}<0.$$

The denominator is strictly negative by (SOC1). The numerator is strictly positive since $\frac{\partial R_a^*}{\partial\epsilon}<0$ by Lemma 7 and $q_a(.,.,.)>0$ by Assumption 5. For use in part (ii), note also that

$$\frac{\partial a^+}{\partial s_a}=\frac{-\frac{\partial q}{\partial a}\frac{\partial R_a^*}{\partial s_a}}{\frac{\partial^2 q}{\partial a^2}R_a^*(s_a,t_b,\epsilon,\theta)-\frac{\partial^2 K}{\partial a^2}}>0$$

Here, the numerator is strictly negative since $\frac{\partial R_a^*}{\partial s_a}>0$.

Part (ii). For admissible a and r_a, the bidder's payoff (12) decreases in p_a, so p_a is optimally set to its lower bound by (13): $p_a=q(a,\psi,s_a)p_m^*(t_b,\epsilon,\theta)$. Substituting this and $R_a^*(s_a,t_b,\epsilon,\theta)=s_a p_m^*(t_b,\epsilon,\theta)$ in (12) yields $\max_{s_a\in[t_a,1/2]}q(a^*(s_a),\psi,s_a)t_a p_m^*(t_b,\epsilon,\theta)-K(a^*(s_a))$ where $a^*(s_a)$ is the optimal effort for a given s_a, or with a slight abuse of notation to save space,

$$\max_{s_a\in[t_a,1/2]}q^*(\psi,s_a)t_a p_m^*(t_b,\epsilon,\theta)-K^*(s_a). \tag{17}$$

The domain of s_a is compact and the objective function is continuous in s_a. An interior solution s_a^* satisfies (FOC2) $\frac{\partial q^*}{\partial s_a}t_a p_m^*(t_b,\epsilon,\theta)-\frac{\partial K^*}{\partial s_a}=0$ and (SOC2) $\frac{\partial^2 q^*}{\partial s_a^2}t_a p_m^*(t_b,\epsilon,\theta)-\frac{\partial^2 K^*}{\partial s_a^2}<0$.

Applying the implicit function theorem yields

$$\frac{\partial s_a^+}{\partial \epsilon} = \frac{-\frac{\partial q^*}{\partial s_a}\frac{\partial p_m^*}{\partial \epsilon}t_a}{\frac{\partial^2 q^*}{\partial s_a^2}t_a p_m^*(t_b,\epsilon,\theta) - \frac{\partial^2 K^*}{\partial s_a^2}} < 0.$$

The denominator is strictly negative by (SOC2). The numerator is strictly positive since $\frac{\partial p_m^*}{\partial \epsilon} > 0$ by Lemma 7 and $\frac{\partial q^*}{\partial s_a} = \frac{\partial q}{\partial s_a} + \frac{\partial q}{\partial a}\frac{da^*}{ds_a} > 0$ by Assumption 5 and $\frac{da^*}{ds_a} \geq 0$, as shown in part (i). ■

Proof of Proposition 7

As mentioned, we show that parts (i) and (ii) of Proposition 2 apply equally to takeover activism. Once the free-rider condition is incorporated in the objective function, (12)-(16) can be written as: $\max_{s_a \in [t_a, 1/2]} q(a,\psi,s_a)A(s_a,\theta) - K(a)$ subject to the campaign effort constraint $g(s_a,a,\theta) = 0$ where $g(s_a,a,\theta) = q_a(a,\psi,s_a)B(s_a,\theta) - K_a(a)$ for interior effort and $g(s_a,a,\theta) = q_a(a,\psi,s_a) - 1$ for corner solutions. As the total merger revenue $R^*(s_a,t_b,\epsilon,\theta)$ strictly increases in θ, so do $A(s_a,\theta) \equiv t_a p_m^*(t_b,\epsilon,\theta)$ and $B(s_a,\theta) \equiv s_a p_m^*(t_b,\epsilon,\theta)$. The Lagrangian of the problem is $\mathcal{L} = q(a,\psi,s_a)A(s_a,\theta) - K(a) + \lambda g(s_a,a,\theta)$. By the envelope theorem, the effect of θ on the activist's optimal payoff is $\frac{\partial \mathcal{L}^*}{\partial \theta} = q(a^*,\psi,s_a^*)A_\theta(s_a^*,\theta) + \lambda g_\theta(s_a^*,a^*,\theta)$. Since $A_\theta(s_a^*,\theta) > 0$, and $g_\theta(s_a^*,a^*,z) = q_a(a,\psi,s_a)B(s_a,\theta) > 0$ or $g_z(s_a^*,a^*,\theta) = 0$, part (ii) holds: $\frac{\partial \mathcal{L}^*}{\partial \theta} > 0$. For part (i), note that $\lim_{t_a \to 0} A(s_a,\theta) = 0$. Last, the statement about efficiency in the above proposition is explained in the text below. ■

Proof of Proposition 8

Let $\mathcal{R}$ and $\mathcal{T}$ denote regular activism and takeover activism. Define $z \in [\mathcal{R},\mathcal{T}]$. Once the free-rider condition is incorporated in the objective function, both (7)-(11) and (12)-(16) collapse to the generic problem: $\max_{s_a \in [t_a, 1/2]} q(a,\psi,s_a)A(s_a,z) - K(a)$ subject to the campaign effort constraint $g(s_a,a,z) = 0$ where $g(s_a,a,z) = q_a(a,\psi,s_a)B(s_a,z) - K_a(a)$ for interior effort and $g(s_a,a,z) = q_a(a,\psi,s_a) - 1$ for corner solutions. Note that $A(s_a,\mathcal{R}) = t_a V_a^*(s_a,\theta) - C^*(s_a,\theta)$ and $B(s_a,\mathcal{R}) \equiv \Delta(s_a,\theta)$, whereas $A(s_a,\mathcal{T}) = t_a p_m$ and $B(s_a,\mathcal{T}) = s_a p_m$. Now let $\epsilon \to 0$. By $\lim_{\varepsilon \to 0} p_m = \frac{\Delta(1,\theta)}{1-t_b}$, $A(s_a,\mathcal{T}) > A(s_a,\mathcal{R})$ and $B(s_a,\mathcal{T}) > B(s_a,\mathcal{R})$ for all $s_a \leq 1/2$ and all $t_a \geq 0$. Focusing on this limit, define $A(s_a,z)$ and $B(s_a,z)$ to be differentiable and strictly increasing in $z \in [\mathcal{R},\mathcal{T}]$. The generic problem has the Lagrangian $\mathcal{L} = q(a,\psi,s_a)A(s_a,z) - K(a) + \lambda g(s_a,a,z)$, to which we can apply the proof of Proposition 7 by relabeling z as θ. ■

Proof of Proposition 9

Both parts follow from the discussion in the surrounding text.

Proof of Proposition 10

When tender offers are infeasible, an increase in ψ never reduces tender offer activity. At the same time, it can promote takeover activism, and thereby otherwise infeasible takeovers. When tender offers are feasible, an increase in ψ strictly promotes takeover activism (as regular activism is dominated), so some tender offers may be displaced by mergers. To see this, note that campaign success is strictly profitable since $p_m > v_a^f$ (as long as the activist has some bargaining power). Thus, if campaigning is sufficiently cheap and effective, it outdoes free-riding on tender offers. By Assumption 6, this is increasingly the case as $\psi \to \infty$. $\blacksquare$

Appendix B: Micro-foundations of activism function

We discuss three models of specific forms of activist/shareholder engagement from the existing literature and how they map into our reduced-form representation.

B.1 Wolfpack activism

In Brav et al. (2017), hereafter BDM, activism takes the form of shareholders pressuring management through backdoor communications. Activism succeeds if a sufficient number of shareholders are engaged. Since the engagement decisions are made by dispersed shareholders, a coordination problem arises.

Consider a simplified version of what BDM label the "activism game" for a given ownership structure, using primarily our own notation. As in our model, the (lead) activist owns a non-atomistic stake s_a, while the other shares are uniformly distributed among (a continuum of) dispersed shareholders. A mass $\overline{A}$ of the dispersed shareholders is *potentially skilled*; the rest is *unskilled*. Potentially skilled investors are *actually skilled* with probability γ, which is common knowledge. A campaign succeeds if a mass $\eta = \overline{\eta} - s_a$ of dispersed shareholders decides to engage the firm alongside the activist, where η is a measure of management resistance. We assume that only actually skilled investors are able to engage.[38] Engagement decisions are non-cooperative, and prior to any engagement, it is privately revealed to each investor whether or not she is skilled.

To engage, a shareholder must incur a private cost c_s. A successful campaign increases share value by $V^*(s_a, \theta)$.[39] Since gains in share value are public (non-excludable), it is irrational for a dispersed (non-pivotal) shareholder to engage, unless she also receives some private (excludable) benefit. In short, there is a free-rider problem. In BDM, engagement allows skilled investors to signal their type (to the market), which yields a reputational benefit R.[40] This private benefit relaxes the free-rider problem. If R is large enough and η is common knowledge, there are three possible equilibrium constellations: For $\eta \leq 0$, it is a dominant strategy for skilled shareholders to engage, since the campaign is bound to succeed. For $\eta > \gamma\overline{A}$, it is a dominant strategy not to engage, since the campaign is bound to fail. Last, for $\eta \in (0, \gamma\overline{A}]$, two equilibria exist, in which all or none of the skilled shareholders engage.

BDM focus on the last and generic case, in which a coordination game arises between skilled shareholders due to strategic complementarities. To refine the equilibrium, they assume that

[38] In BDM, all investors are able to engage, but only skilled ones choose to do so in equilibrium.

[39] In BDM, the lead activist may gain less per share due to higher engagement costs. Translated to our model, this would mean $C^*(s_a) + K(a^*) > c_s$.

[40] In BDM, the reputational benefit is more endogenous, as the strength of the signal depends on the unskilled shareholders' engagement decisions (see footnote 38 above). They show that the two types of investors separate in equilibrium under certain parameters (for which the value of a "pooling" reputation relative to the engagement cost is too low for unskilled investors to gamble on it).

skilled investors receive noisy private signals $x_{s,i} = \eta + \frac{1}{a}\epsilon_i$, $i \in [0, \gamma\overline{A}]$, where a measures the precision of the signals. Under this information (or global games) structure, equilibrium is unique and involves threshold strategies: a skilled investor engages if her signal is below some threshold value x_s^*, and otherwise remains passive. Because of the signal noise, investors can err, that is, wrongly engage or remain passive. As a result, when ϵ is bounded away from zero, a campaign has a probabilistic outcome, i.e., $q \in (0,1)$, even when the true realized state is $\eta \leq \gamma\overline{A}$. When the signal precision a increases, a campaign has the "correct" outcome more often, and in the limit $a \to 0$, succeeds whenever it can be successful.

The above can be mapped to our framework by adding the assumption that the lead activist controls the signal precision a at private cost $K(a, \psi)$ with $K_a > 0$, $K_\psi < 0$, $K_{\psi a} < 0$, where ψ is a measure of communication skill. In words, the activist's effort affects the skilled investors' inferences about the ease with which the campaign might succeed. In reduced form, this would generate a success probability function q that depends on a and ψ as postulated in our model. In addition, the above setting also matches our reduced-form assumption that the lead activist's stake s_a has a direct effect on q: larger s_a reduce η , which ceteris paribus raises the probability that the campaign succeeds.

Finally, in the above setting, as in our model, q is only indirectly dependent on θ through the payoff conditional on success, $V^*(s_a, \theta)$. In particular, because any gains in share value are public benefits, they cancel out of the conditions that determine non-pivotal shareholders' engagement decision. However, if one endogenizes the ownership structure prior to the engagement decision, potentially skilled investors are more inclined to "buy into" the firm (at some opportunity cost as in BDM) when $V^*(s_a, \theta)$ is larger in anticipation of a (more profitable) campaign. This would increase the mass of skilled investors in the subsequent activism game, and thereby increase the success probability q *for any given a and ψ*. In reduced form, this would amount to $q_\theta > 0$, and hence reinforce the key comparative statics in our model.

B.2 Proxy contest

In our current setup with perfect information and only value-increasing activists, there is no reason for a proxy contest to ever fail. For a realistic setting where an activist must campaign to attract the votes of other shareholders, we need to introduce the possibility that she may extract private benefits at the expense of shareholder value once in control.

Suppose an activist can be one of two types: If successful, a *good* type raises share value by $V_G \equiv V^*(s_a, \theta) > 0$, whereas a *bad* type reduces it to $V_B < 0$ by extracting private benefits. Let λ be the commonly known prior probability that an activist is the good type.[41] If $\lambda V_G + (1-\lambda)V_B \geq$

[41] The assumption that proposals brought to vote can but need not be in every shareholder's interest features in models of shareholder voting both on management proposals (e.g., Maug and Rydqvist, 2009) and on activist proposals (e.g., Bravs and Matthews, 2011).

0, dispersed shareholders will vote for the activist even without any additional information. We assume that this condition is violated so that the activist must engage in (costly) communication to garner more votes.

A simple communication model is that the activist can emit a signal at cost $K(a)$, which is "noisy" in the sense that a random fraction $\tilde{\beta}$ of the other shareholders assimilate the information. The good activist can employ this communication technology to supply "evidence" revealing her type to those who end up assimilating the "evidence."[42] If $\tilde{\beta}$ is a continuously distributed variable on $(0,1)$ with mean $\overline{\beta}(a,\psi)$, $\overline{\beta}_a > 0$, $\overline{\beta}_\psi > 0$, and $\overline{\beta}_{a\psi} > 0$, this model generates a success probability function q that increases a and ψ.[43] Moreover, larger s_a decrease the number of additional votes the activist needs to win the contest, and thus increase q for any given a and ψ. By contrast, θ affects q only through the activist's choice of a. These properties are all consistent with our reduced-form specification.

An alternative communication model with similar implications lets both activist types send out information that dispersed shareholders assimilate as noisy signals. Suppose a random mass $\tilde{\beta} \in (0, 1-s_a)$ of dispersed shareholders assimilate independent signals $x_i \in \{G, B\}$, $i \in [0, \tilde{\beta}]$, with $\Pr(x_i = G\,|\text{bad}) = \rho \in (0, 1/2)$ and $\Pr(x_i = G\,|\text{good}) = a \in (1/2, 1)$, which is to say that signal G indicates a good type. If the good type can increase its probability a of generating signal G at some private cost $K(a,\psi)$ with $K_a > 0$, $K_\psi < 0$, $K_{\psi a} < 0$, where ψ is a measure of communication skill, this also generates a success probability function q that depends on a, ψ, and s_a as postulated in our reduced-form specification. In addition, however, θ has a direct effect on q: for a larger V_G (which increases in θ), a smaller posterior probability that an activist is of the good type suffices to sway shareholder votes. Intuitively, it becomes "easier" to persuade the other shareholders to back the campaign, which reinforces the comparative statics in our model.[44]

[42] This is in the spirit of Dewatripont and Tirole (2005) where information is somewhere in-between "hard" and "soft" in that communication *effort* can convert the signal into "hard" information with some probability—only in our case the receivers, which are the shareholders, do not (need to) exert any effort to assimilate the information.

[43] Strictly speaking, since atomistic shareholders are non-pivotal, they are indifferent about whether and how to vote. With n discrete shareholders and simple majority rule, the above setting induces sincere voting in equilibrium: knowing her vote only matters when the vote is close (i.e., the other shareholders' signals cause their votes to be equally split), each shareholder wants it to tilt the outcome in the "right direction" given her signal. Since this remains true for $n \to \infty$, sincere voting is a plausible assumption also for our setting.

[44] If we were to introduce value-decreasing types also in our analysis of tender offers, we would have to consider the pressure-to-tender problem that shareholders sell their shares at prices below the status quo value (Bebchuk, 1985). Such equilibria are based on weakly dominated strategies and often ruled out by invoking Pareto dominance (as e.g., in Müller and Panunzi, 2004). Similarly, if one required shareholder ratification by vote as a necessary condition for tender offers to be valid (Bechuk and Hart, 2001), Pareto dominance rules out that shareholders, each perceiving her vote as non-pivotal, all vote the "wrong way." Thus, Pareto dominance ensures that any bidder—irrespective of type—must bid at least the status quote value, so shareholders are never harmed by accepting the bid.

B.3 Sequential escalation

Activists are known not only to have recourse to a range of tactics but also to sequence them, progressing to hostile tactics (e.g., proxy contest) only after less hostile ones (e.g., backdoor communications) fail. We now describe how such a dynamic setting, inspired by Gantchev (2013), maps into our static formulation.

Suppose a campaign comprises a discrete, finite number n of potential stages (including, e.g., backdoor communications, media campaigns, and proxy contests). In stage $s \in \{1, \ldots, n\}$, the activist chooses stage-s effort a_s at private cost $K_s(a_s)$ to determine the probability $q_s(a_s)$ that the campaign succeeds in stage s. If it does, the activist moves to the restructuring stage and raises share value by $V^*(s_a, \theta)$. Otherwise, she moves to stage $s+1$ unless $s = n$, in which case the game ends with a failed campaign. Activists can "skip" stages by setting $a_s = 0$ and moving to $s+1$, and can "exit" campaigns at any stage k by setting $a_s = 0$ for all $s \in \{k, k+1, \ldots n\}$.[45] Let every q_s and K_s satisfy Assumptions 5 and 6.

An effort vector $\mathbf{a} = (a_1, \ldots, a_n)$ summarizes a campaign strategy. Given strategy $\mathbf{a}$, $q(\mathbf{a}) \equiv \sum_{s=1}^{n} q_s(a_s) \prod_{k=0}^{s-1}(1 - q_k(a_k))$ and $K(\mathbf{a}) \equiv \sum_{s=1}^{n} K_s(a_s) \prod_{k=0}^{s-1}(1 - q_k(a_k))$ with $q_0(a_0) = 0$ are, respectively, the ex ante success probability and expected campaign costs. Both q and K are continuous in all a_s, as they are compositions (specifically, sums of products) of continuous functions. Moreover, q is increasing in all a_s: $\frac{\partial q}{\partial a_s} = \frac{\partial q_s}{\partial a_s} \Pr(\text{no success before } s) - \frac{\partial q_s}{\partial a_s} \Pr(\text{success after } s) > 0$, since "success after s" is a strict subset of "no success before s." K is not necessarily increasing in all a_s everywhere since costs incurred in early stages, by raising the chance of early success, can obviate the need to expend costs in later stages. But for any strategies $\mathbf{a}$ and $\mathbf{a}'$ such that $q(\mathbf{a}') > q(\mathbf{a})$ but $K(\mathbf{a}') < K(\mathbf{a})$, strategy $\mathbf{a}$ is *dominated*. Restricting attention to the subset of undominated strategies, which is without loss of generality, recovers the trade-off that a higher ex ante success probability q comes at a higher ("campaign effort" as measured by the) expected cost K. Our static specification is akin to this restricted dynamic problem.

Since q and K combine elements that are concave (q_s) and convex ($1-q_s$, K_s) in a_s, they need not be globally convex or concave. A unique solution $\mathbf{a}^*$ is still guaranteed, since Assumptions 5 and 6 apply to all stage functions q_s and K_s. This is simple to see by backwards induction: The stage-n problem is isomorphic to our static framework, and thus has a unique solution and value function V_n. The activist's problem in stage $n-1$ can be written $\max_{a_{n-1}} q_{n-1}(a_{n-1}) \Delta(s_a, \theta) - K(a_{n-1}) + (1 - q_{n-1}(a_{n-1})) V_n$. Rearranging the objective function to $q_{n-1}(a_{n-1}) \hat{\Delta}_{n-1}(s_a, \theta) - K(a_{n-1}) + V_n$ with $\hat{\Delta}_{n-1}(s_a, \theta) \equiv \Delta(s_a, \theta) - V_n$ shows that this, too, is isomorphic to our static framework save for an adjusted payoff conditional on success and added constant; thus, a unique solution and value function V_{n-1} exists. (If $\hat{\Delta}_{n-1}(s_a, \theta) < 0$, the solution is to skip stage $n-1$.)

[45] Unlike in Gantchev (2013), the activist's outside option is zero regardless of when she exits a campaign. This is consistent with our framework where the firm retains its status quo value when an activist exits and all (exit) trades are fully transparent.

Proceeding recursively to stage 1 yields a unique $\mathbf{a}^*$.

Finally, the expected campaign profit under the optimal strategy $\mathbf{a}^*$ is increasing in θ, i.e., $\frac{\partial V_1}{\partial \theta} > 0$. In analogy to our static results, $\frac{\partial V_n}{\partial \theta} > 0$. Going backwards, by the envelope theorem, $\frac{\partial V_{n-1}}{\partial \theta} = q_{n-1}(a^*_{n-1})\frac{\partial \Delta}{\partial \theta} + \big(1 - q_{n-1}(a^*_{n-1})\big)\frac{\partial V_n}{\partial \theta} > 0$, as $\frac{\partial V_n}{\partial \theta} > 0$ and $\frac{\partial \Delta}{\partial \theta} > 0$. Applied recursively until stage 1, these steps establish $\frac{\partial V_1}{\partial \theta} > 0$.

To summarize the dynamic setting: ex ante success probability increases in (expected) effort cost (ignoring dominated strategies), a unique optimal campaign strategy exists, and the activist's equilibrium expected payoff increases in the scope for value improvement. These key properties are mirrored in our static formulation. As an aside, regardless of mathematical details, the notion of sequential escalation provides conceptual support to our framework: Sequencing implies that a campaign can fail. If the activist's arsenal enabled her to (ultimately) always succeed, rational managers would give in at the outset. Resistance, which leads to subsequent escalation, makes sense only if believed to have some chance of success. Sequencing also implies that campaigns are costly; otherwise, there would be no benefit (option value) of delaying tactics.

Appendix C: Example

Since solving nested optimization problems (here: restructuring, campaign, and share purchase) quickly becomes tedious, we abstract in this example from the activist's post-disclosure trades (stage 0). This omission is not crucial: it makes (takeover) activism weakly less productive and efficient, but does not affect the main qualitative insights.

C.1 Scope for value improvement

Let $V(e,\theta) \equiv \theta e + \underline{v}$ and $C(e) \equiv \frac{c}{2}e^2$. For a given stake s, the solution to the restructuring effort problem (1) is $e^* = s\frac{\theta}{c}$. The associated firm value and effort costs are $V^*(s,\theta) = s\frac{\theta^2}{c} + \underline{v}$ and $C^*(s,\theta) = s^2\frac{\theta^2}{2c}$. The social surplus from restructuring, for a given stake s, is $S_r(s) \equiv V^*(s,\theta) - C^*(s,\theta) = s\frac{\theta^2}{2c} + \underline{v}$. (We keep this notation for the restructuring surplus throughout the different cases below.) This strictly increases in s, so $s = 1$, i.e., full ownership concentration would lead to the first-best restructuring outcome.

C.2 Tender offer

Given $s_b = 1/2$ (Lemma 3), the post-takeover values for restructuring effort, firm value, and effort costs are, respectively, $e_b^* = \frac{\theta}{2c}$, $V^*(1/2,\theta) = \frac{\theta^2}{2c} + \underline{v}$, and $C^*(1/2,\theta) = \frac{\theta^2}{8c}$. The social surplus under a tender offer is $S_b(t_b) \equiv S_r(1/2) = V^*(1/2,\theta) - C^*(1/2,\theta) = \frac{\theta^2}{4c} + \underline{v}$, which strictly increases in θ. However, the bidder's tender offer profit is $\Pi_b^*(t_b,\theta) = t_b V^*(1/2,\theta) - C^*(1/2,\theta) = \left(t_b - \frac{1}{4}\right)\frac{\theta^2}{2c} + t_b\underline{v}$. This strictly decreases in θ for all $t_b < 1/4$, and is negative for all $t_b < \frac{\theta^2}{4\theta^2 + 8c\underline{v}}$. That is, in the notation of Proposition 1, $\bar{\bar{t}}_b = 1/4$ and $\bar{t}_b = \frac{\theta^2}{4\theta^2 + 8c\underline{v}} < 1/4$.[46]

C.3 Activism

For a given activist toehold $t_a < 1/2$, restructuring effort, firm value, and effort costs following a successful campaign are, respectively, $e_a^* = t_a\frac{\theta}{c}$, $V^*(t_a,\theta) = t_a\frac{\theta^2}{c} + \underline{v}$, and $C^*(t_a,\theta) = t_a^2\frac{\theta^2}{2c}$. The activist's payoff from a successful campaign (excluding sunk campaign costs) is therefore $\Delta(t_a,\theta) = t_a V^*(t_a,\theta) - C^*(t_a,\theta) = t_a^2\frac{\theta^2}{2c} + t_a\underline{v}$. This strictly increases in θ, i.e., $\Delta_\theta(t_a,\theta) > 0$ for all t_a and θ.

Let $q(a,\psi,t_a) \equiv t_a\psi a$ and $K(a) \equiv \frac{k}{2}a^2 + \underline{k}$. If launching a campaign, the activist solves the campaign effort problem $\max_{a\geq 0} q(a,\psi,t_a)\Delta(t_a,\theta) - K(a)$. In our example, the solution is $a^* = \min\{\frac{t_a\psi}{k}\Delta(t_a,\theta), \frac{1}{t_a\psi}\}$. Since $\Delta_\theta(t_a,\theta) > 0$, there exists a unique $\hat{\theta} \geq 0$ such that $a^* = \frac{1}{t_a\psi}$ if and only if $\theta \geq \hat{\theta}$. For $\theta < \hat{\theta}$, the activist's expected profit is $\Pi_a^*(t_a,\theta) = \frac{1}{2k}(t_a\psi\Delta(t_a,\theta))^2 - \underline{k}$.

[46] Independent of this setting, 25 percent is a generous upper bound on the toehold in light of disclosure laws. For example, a shareholder in the U.S. (UK) must disclose her holdings once they exceed 5 percent (3 percent) along with any control intentions.

For $\theta \geq \hat{\theta}$, it is $\Pi_a^*(t_a, \theta) = \Delta(t_a, \theta) - \frac{k}{2t_a^2\psi^2} - \underline{k}$. In either case, $\Pi_a^*(t_a, \theta)$ strictly increases in θ, as $\Delta_\theta(t_a, \theta) > 0$. So, taking both cases together, the expected campaign profit monotonically increases in θ.

The social surplus is $S_a(t_a) \equiv q(a^*, \psi, t_a)S_r(t_a) - K(a^*) = t_a\psi a^* \left(t_a \frac{\theta^2}{2c} + \underline{v}\right) - \frac{k}{2}\left(a^*\right)^2 - \underline{k}$. It can also be written as the sum of the activist's and free-riding shareholders' expected profits: $S_a(t_a) = \Pi_a^*(t_a, \theta) + q(a^*, \psi, t_a)(1 - t_a)V^*(t_a, \theta)$. We know that $\Pi_a^*(t_a, \theta)$ is increasing in θ. The same is true for the second term, since a^* (weakly) increases in θ and $V^*(t_a, \theta)$ strictly increases in θ. Thus, $S_a(t_a)$ strictly increases in θ. At the same time, since $q(a^*, \psi, t_a) \leq 1$, $t_a < 1/2$, and $K(a^*) > 0$, it is true that $S_a(t_a) < S_b(t_b)$ for all $t_a, t_b < 1/2$.

C.4 Two-tier tender offer

In equilibrium, the bidder accumulates 50 percent of the shares and refrains from a freeze-out. Thus, the social surplus is the same as in the simple tender offer without the freeze-out option. However, since the bidder must pay a commitment premium to deter the freeze-out, her expected profit is different: $\Pi_f^*(t_b, \theta) = \Delta(1/2, \theta) - (1/2 - t_b)\underline{p}_b$ with $\underline{p}_b = \frac{\Delta(1-\epsilon/2, \theta) - \Delta(1/2, \theta)}{1/2 - \epsilon/2}$. Figure 4 depicts the limit $\epsilon \to 0$, where $\lim_{\epsilon\to 0} \Pi_f^*(t_b, \theta) = \Delta(1/2, \theta) - (1/2 - t_b)\underline{p}_b^{\max}$ and $\lim_{\epsilon\to 0} \underline{p}_b = 2\left[\Delta(1, \theta) - \Delta(1/2, \theta)\right] \equiv \underline{p}_b^{\max}$. Given the functional forms of V and C, we obtain $\Delta(s, \theta) = s^2 \frac{\theta^2}{2c} + s\underline{v}$, so $\underline{p}_b^{\max} = \frac{3\theta^2}{4c} + \underline{v}$ and $\lim_{\epsilon\to 0} \Pi_f^*(t_b, \theta) = (3/4 t_b - 1/4)\,\frac{\theta^2}{c} + t_b\underline{v}$.

C.5 Takeover activism

If a campaign succeeds, total expected merger revenue is $R^*(t_b, \epsilon, \theta) = \Delta(\hat{s}_b^*, \theta) + \epsilon(1 - t_b)V^*(\hat{s}_b^*, \theta)$ with $\hat{s}_b^* = 1 - \epsilon(1 - t_b)$. The merger revenue per share is $p_m^*(t_b, \epsilon, \theta) = \frac{R^*(t_b, \epsilon, \theta)}{1 - t_b}$. Now let $\epsilon \to 0$, which is the limit depicted in Figure 4, where $\lim_{\epsilon\to 0} \hat{s}_b^* = 1$, $\lim_{\epsilon\to 0} R^*(t_b, \epsilon, \theta) = \Delta(1, \theta)$, and $\lim_{\epsilon\to 0} p_m^*(t_b, \epsilon, \theta) = \frac{\Delta(1, \theta)}{1 - t_b}$.

Assuming $q(a, \psi, t_a) \equiv t_a\psi a$ and $K(a) \equiv \frac{k}{2}a^2 + \underline{k}$, as for regular activism above, the campaign effort problem in this limit is $\max_{a\geq 0} q(a, \psi, t_a)\frac{t_a}{1 - t_b}\Delta(1, \theta) - K(a)$. The solution is $a^* = \min\{\frac{t_a\psi}{k}\frac{t_a}{1 - t_b}\Delta(1, \theta), \frac{1}{t_a\psi}\}$. Since $\Delta_\theta(1, \theta) > 0$, there exists a unique $\hat{\theta} \geq 0$ such that $a^* = \frac{1}{t_a\psi}$ if and only if $\theta \geq \hat{\theta}$. For $\theta < \hat{\theta}$, the activist's expected profit is $\lim_{\epsilon\to 0} \Pi_{ta}^*(t_a, \theta) = \frac{1}{2k}(\frac{\psi}{1 - t_b}t_a^2\Delta(1, \theta))^2 - \underline{k}$, while for $\theta \geq \hat{\theta}$, it is $\lim_{\epsilon\to 0} \Pi_{ta}^*(t_a, \theta) = \frac{1}{1 - t_b}t_a\Delta(1, \theta) - \frac{k}{2t_a^2\psi^2} - \underline{k}$. It is monotonically increasing in θ across both regions, since $\Delta_\theta(1, \theta) > 0$.

The social surplus is $S_{ta}(t_a) \equiv q(a, \psi, t_a)S_r(1) - K(a^*) = t_a\psi a^* \left(\frac{\theta^2}{2c} + \underline{v}\right) - \frac{k}{2}\left(a^*\right)^2 - \underline{k}$. It can also be written as the sum of the activist's and free-riding shareholders' expected profits: $S_{ta}(t_a) = \Pi_{ta}^*(t_a, \theta) + q(a^*, \psi, t_a)(1 - t_a)V^*(1, \theta)$. Since both terms strictly increase in θ, the same is true for $S_a(t_a)$. Note that the comparison to the social surplus under (two-tier) tender offers is ambiguous: Successful takeover activism leads to a larger restructuring surplus, $S_r(1) > S_r(1/2)$, but tender offers save on the campaign costs $K(a^*)$.

C.6 Takeover activism with tender offer as fallback option

The optimal two-tier tender offer is unchanged. So, for $\epsilon \to 0$, we know from C.4 that the bid is $\underline{p}_b^{\max} = \frac{3\theta^2}{4c} + \underline{v}$, and the activist gets $v_a^f = \gamma \underline{p}_b^{\max} + (1-\gamma)\, V^*(1/2, \theta) = (1+\frac{\gamma}{2})\frac{\theta^2}{2c} + \underline{v}$ per share. Now consider the merger. As the activist has full bargaining power, merger revenues are pinned down by the bidder's participation constraint: $\lim_{\epsilon\to 0} R^*(t_b, \epsilon, \theta) = \Delta(1, \theta) - \lim_{\epsilon \to 0} \Pi_f^*(t_b, \theta) \equiv \hat{R}$, where $\Pi_f^*(t_b, \theta)$ is the bidder's two-tier tender offer profit from C.4 and her threat point. For our chosen functional forms, $\hat{R} = (1-t_b)(\frac{3\theta^2}{4c} + \underline{v})$ and $\lim_{\epsilon\to 0} p_m^*(t_b, \epsilon, \theta) = \frac{\hat{R}}{1-t_b} = \frac{3\theta^2}{4c} + \underline{v} \equiv \hat{p}_m$. Note that $\hat{p}_m - v_a^f = (1-\gamma)\frac{\theta^2}{4c} > 0$ since $\gamma < 1$.

Assuming $q(a, \psi, t_a) \equiv t_a \psi a$ and $K(a) \equiv \frac{k}{2}a^2 + \underline{k}$ as before, the campaign effort problem is $\max_{a\geq 0} q(a, \psi, t_a) t_a \left(\hat{p}_m - v_a^f\right) + t_a v_a^f - K(a)$. The solution is $a^* = \min\{\frac{t_a \psi}{k} t_a(\hat{p}_m - v_a^f), \frac{1}{t_a \psi}\}$. Since $\frac{\partial}{\partial \theta}(\hat{p}_m - v_a^f) > 0$, there exists a unique $\hat{\theta} \geq 0$ such that $a^* = \frac{1}{t_a\psi}$ if and only if $\theta \geq \hat{\theta}$. The activist's expected profit is $\lim_{\epsilon\to 0} \Pi_{ta}^*(t_a, \theta) = \frac{1}{2k}(\psi t_a^2(\hat{p}_m - v_a^f))^2 + t_a v_a^f - \underline{k}$ for $\theta < \hat{\theta}$, and $\lim_{\epsilon \to 0} \Pi_{ta}^*(t_a, \theta) = t_a \hat{p}_m - \frac{k}{2t_a^2\psi^2} - \underline{k}$ for $\theta \geq \hat{\theta}$. It monotonically increases with θ across both regions. A campaign emerges if and only if $\lim_{\epsilon\to 0} \Pi_{ta}^*(t_a, \theta) \geq t_a v_a^f$.

C.7 Numeric parameters used for Figures 2, 4, and 6

Set $c = 1$, $k = .5$, $\underline{v} = 10$, $\underline{k} = .94$, $\psi = 20$, and $\epsilon \to 0$. In addition, set $t_a = t_b = .1$ for (two-tier) tender offers and regular activism. For takeover activism, set $t_a = .1$ and $t_b = 0$, unless a tender offer should co-exist as a fallback option, in which case $t_a = t_b = .1$ is maintained.

- Tender offer:
  - The bidder's profit is $\Pi_b^*(.1, \theta) = -.075\theta^2 + 1$.
  - The social surplus is $S_b(.1) = .25\theta^2 + 10$.
- Activism:
  - The optimal campaign effort is $a^* = \min\{.02\theta^2 + 4, 1/2\}$, which is $a^* = 1/2$ for all $\theta \geq 0$. The expected campaign profit in this corner solution is $\Pi_a^*(.1, \theta) = 0.005\theta^2 - .0025$.
  - The social surplus under activism is then $S_a(.1) = .05\theta^2 + 8.9975$.
- Two-tier tender offer:
  - The bidder's profit is $\lim_{\epsilon\to 0} \Pi_f^*(t_b, \theta) = -.175\theta^2 + 1$. A tender offer materializes only if $\theta \leq \sqrt{\frac{40}{7}}$.
  - The social surplus is the same as in a simple tender offer: $S_b(.1) = .25\theta^2 + 10$.
- Takeover activism:

- The optimal campaign effort is $a^* = \min\{.3\theta^2 + 4, 1/2\}$, which is $a^* = 1/2$ for all $\theta \geq 0$. The expected campaign profit is $\lim_{\epsilon \to 0} \Pi^*_{ta}(.1, \theta) = .05\theta^2 - .0025$.
- The social surplus is then $S_{ta}(.1) = .5\theta^2 + 8.9975$.

• Takeover activism with tender offer as fallback option

- Profit and surplus under the optimal (two-tier) tender offer is the same as above. Also, recall that the offer is only feasible for $\theta \leq \sqrt{\frac{40}{7}} \approx 2.39$. The *pro rata* factor in the offer is $\gamma = \frac{4}{9}$.
- The activist's payoff from a tender offer is $t_a v_a^f = \frac{11}{180}\theta^2 + 1$. Her payoff in a merger is $t_a \hat{p}_m = \frac{3}{40}\theta^2 + 1$.
- If a campaign is launched, the activist's optimal effort is $a^* = \min\{\frac{1}{18}\theta^2, 1/2\}$, which is $a^* = 1/2$ for all $\theta \geq 3$.
- For $\theta < 3$, the expected campaign profit is $\lim_{\epsilon \to 0} \Pi^*_{ta}(.1, \theta) = \frac{1}{1296}\theta^4 + \frac{11}{180}\theta^2 + .06$. The activist only starts a campaign if this exceeds $t_a v_a^f$, or respectively, $\theta > \sqrt[4]{\frac{121824}{100}} \approx 5.91$, which violates $\theta < 3$. Thus, no campaign is started.
- For $\theta \geq 3$, the expected campaign profit is $\lim_{\epsilon \to 0} \Pi^*_{ta}(.1, \theta) = \frac{3}{40}\theta^2 - .0025$. The activist only starts a campaign if this exceeds $t_a v_a^f$, or respectively, $\theta > \sqrt{\frac{7218}{100}} \approx 8.50$. But for these values of θ, a tender offer is infeasible.
- In summary, when tender offers are feasible, i.e., for all $\theta \leq \sqrt{\frac{40}{7}}$, the activist prefers to free-ride on the tender offer as opposed to start a campaign. As a result, campaigns emerge only for $\theta > \sqrt{\frac{40}{7}}$, in which case the expected campaign profit is the one without the tender offer as a fallback option.

Appendix D: Heterogeneous cost functions

For any specification of the effort choice problem where the "productivity" or "skill" parameter θ is embedded in the value function V, there is an isomorphic specification where it is embedded in the cost function C instead. So, in most models, it is irrelevant where θ appears. This is, for example, true of the activism game.

In the tender offer game, however, there is a difference. The free-rider condition (3) includes *public* gains V but not *private* costs C, and hence reduces the bidder's *ex ante* profit to

$$t_b V - C \tag{18}$$

where the bidder's share in V—but not in C—is modulated by her initial stake t_b. At the same time, the effort choice is governed by the post-takeover incentive constraint

$$1/2 V_e = C_e \tag{19}$$

where V_e is modulated by the majority stake $1/2$.

Consider the specification in the paper, and in particular the derivatives $V_\theta > 0$ and $V_{\theta e} > 0$. $V_\theta > 0$ captures bidder heterogeneity that is independent of effort. In a setting with *exogenous* post-takeover values, this is the only variation. By contrast, $V_{\theta e} > 0$ implies via (19) that higher θ-types are inclined to exert more effort, thus *endogenously* generating more value. This drives unrecompensed costs. Yet, as θ increases, sufficiently large "windfall" gains on $t_b V$ in (18) via the exogenous variation can offset the rise in unrecompensed costs. This is one reason Proposition 1ii conditions on *sufficiently small toeholds*. As t_b shrinks, the windfall gains disappear.

Now, if θ appears in the cost function, the exogenous effect is captured by $C_\theta < 0$, while the endogenous effect is captured by $C_{\theta e} < 0$. The difference to above is that C is not modulated by t_b, or any other variable, in (18). Thus, small t_b no longer guarantee that, as θ increases, the windfall gain is less than the increase in unrecompensed costs. In this specification, this would require the assumption that $|C_\theta|$ is sufficiently smaller than $|C_{\theta e}|$—as the analogue of the "small toeholds" condition. A straightforward example that satisfies the assumption is that *fixed* costs do not vary across bidders.

So, in essence, the specifications are analogous: the overarching requirement is that variation in bidder "incentives" outweighs variation in bidder "endowments." That is, our results obtain so long as ownership incentives a là Jensen and Meckling (1976) are the driving force. In fact, we can formulate *separate* parameters for marginal and fixed costs, and focus on the first, which would more cleanly reflect our point of departure that *marginal* incentives break the equivalence of takeovers and activism—a setting with only endowments takes us back to the irrelevance result in Section 1.

Figures

	Tender offer (Buying control)	**Activism** (Working for control)
Stage 1: Control	• Bidder decides whether to make a tender offer, and if so, chooses the offer terms	• Activist decides whether to start a campaign, and if so, chooses the campaign effort
Stage 2: Restructuring	• If the bid succeeds, bidder sets the restructuring effort	• If the campaign succeeds, activist sets the restructuring effort

Figure 1: The timelines for tender offer and activism games can be divided into a "control stage" and a "restructuring stage." The games differ only in the control stage.

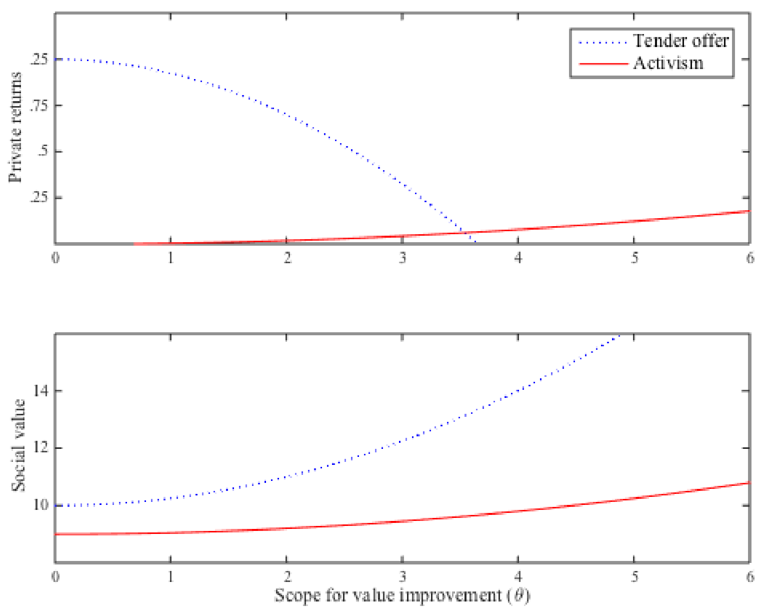

Figure 2: This graph assumes $V(e, \theta) \equiv \theta e + 10$, $C(e) \equiv \frac{e^2}{2}$, $q(a, t_a) \equiv 20 t_a a$, $K(a) \equiv \frac{a^2}{4} + .94$, and $t_a = t_b = .1$. As the scope for value improvement increases, bidder returns decrease, whereas the returns to activism increase; above some threshold, activism is more profitable (upper panel). However, from a social perspective, takeovers are always more efficient (lower panel).

	Two-tier tender offer	**Takeover activism**
Stages 0-1: Control	• Bidder decides whether to make a tender offer, and if so, chooses the offer terms	• Activist decides whether to start a campaign, and if so, can buy more shares and sets the campaign effort
Stage 2: Forced sale	• If the bid succeeds, bidder can execute a freeze-out merger	• If the campaign succeeds, activist can negotiate a binding merger
Stage 3: Restructuring	• After the freeze-out decision, bidder sets restructuring effort	• If the merger succeeds, bidder sets the restructuring effort
Stage 4: Lawsuit	• The freeze-out price is potentially revised	• The merger price is potentially revised

Figure 3: Once in control, bidders and activists can force other shareholders to sell their shares by executing a (freeze-out) merger (stage 2). In either case, this could in principle overcome the free-rider problem, save for the legal risk of a price revision (stage 4).

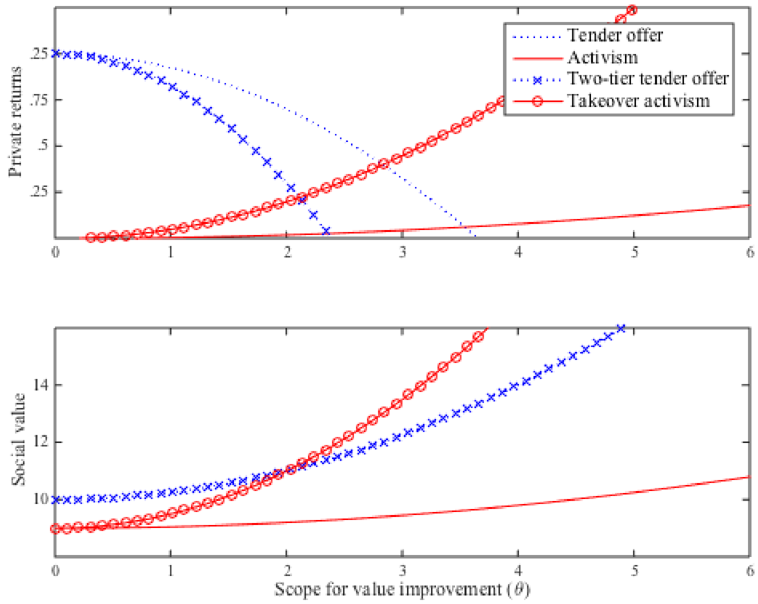

Figure 4: This graph is based on the same assumptions as Figure 2, and in addition, $\epsilon \to 0$ (low legal risk). For takeover activism, it assumes the toeholds $(t_a, t_b) = (.1, 0)$. Tender offers with a freeze-out option (two-tier offers) are as efficient as those without, but less profitable. Takeover activism outperforms regular activism in profitability and efficiency. As the scope for value improvement increases, it dominates the other strategies both privately and socially.

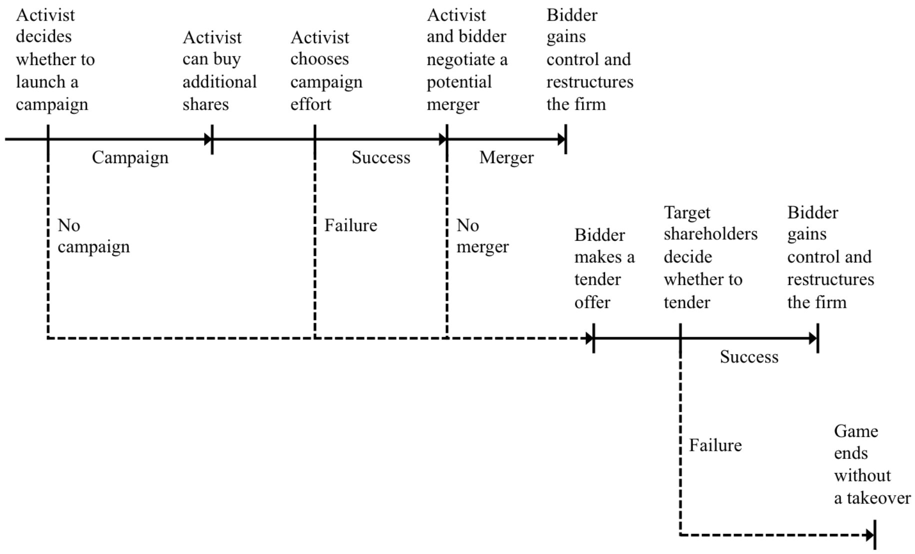

Figure 5: In takeover activism with a tender offer as fallback, payoffs from the potential tender offer matter as outside options when (1) deciding whether to start a campaign, (2) choosing the campaign effort, and (3) negotiating a merger.

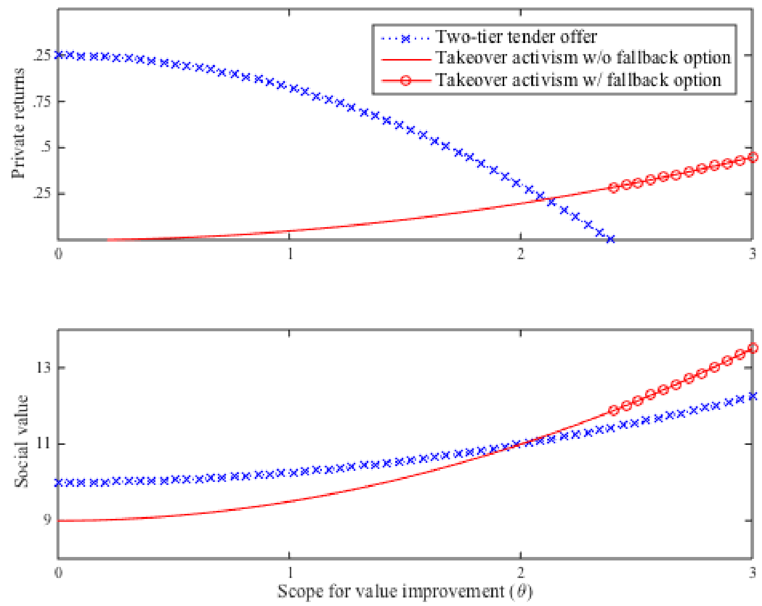

Figure 6: This graph is based on the same assumptions as Figure 4, except that it assumes the toeholds $(t_a, t_b) = (.1, .1)$ for takeover activism. The solid red lines show payoffs from takeover activism in the absence of tender offers. The red circles show where takeover activism emerges if tender offers coexist as feasible options; where they are not, potential activists prefer to free-ride on tender offers. By the same token, with tender offers as a fallback option, takeover activism only emerges when it is Pareto-improving.