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Abstract

Buying and campaigning for control encounter different forms of free-riding behavior in widely held firms. We derive implications of this difference in a model with effort provision: First, changes in the marginal return to effort move bidder profits and activist profits in opposite directions, so activism can outperform tender offers despite being less efficient. Second, activists are more effective brokering takeovers than restructuring firms themselves. Third, such takeover activists earn excess returns in part since their hurdle rate is the foregone return from free-riding in tender offers. These predictions match evidence on takeover activism and activist hedge funds' performance.

Keywords: Free-rider problem, hedge fund activism, takeover activism, tender offers, market for corporate control, blockholders, M&A

JEL Classifications: G34, G23

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Buying and *campaigning for* control encounter different forms of free-riding behavior in widely held firms. We derive implications of this difference in a model with effort provision: First, changes in the marginal return to effort move bidder profits and activist profits in opposite directions, so activism can outperform tender offers despite being less efficient. Second, activists are more effective brokering takeovers than restructuring firms themselves. Third, such takeover activists earn excess returns in part since their hurdle rate is the foregone return from free-riding in tender offers. These predictions match evidence on takeover activism and activist hedge funds' performance.

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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

When a shareholder exerts effort to improve firm value, the other shareholders enjoy part of the benefits without sharing the costs, i.e., they free-ride. Without reaping the full benefits, individual shareholders, especially small ones, underinvest in governance. This results in the separation of ownership and control that is characteristic of widely held firms. Indeed, the underlying free-rider behavior is faced by any shareholder who seeks to reclaim control from incumbent managers—be it through activism or a takeover.

Dual free-rider problem. This is the gist of Grossman and Hart (1980): Passive shareholders free-ride *ex post* on gains realized from activist efforts.[1] Such free-riding could be reduced by buying more shares before improving firm value, which culminates in the notion that "the free-rider problem can be avoided by use of the takeover mechanism," as Grossman and Hart paraphrase it. Famously, they then dismantle it: dispersed shareholders sell shares only if the price incorporates the expected value improvement and thus free-ride too, but *ex ante*. As the opening quote illustrates, practitioners are familiar with both forms of free-riding.[2]

Taking this argument seriously, we develop a comparative theory of activism and takeovers

[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. Out of 611 campaigns with well-specified objectives, Brav et al. (2010) find that 52.4 were at least partially successful, leaving 47.6 percent of failed campaigns.

[2] The 13D form mentioned in the quote must be filed with 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 the identity and 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 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).

from the observation that they face *different* forms of free-rider behavior. To see that ranking the interventions is not obvious, consider the following irrelevance result: A blockholder with .1 of the equity in an otherwise widely held firm can improve share value from its status quo 0 to 100 at private cost 8—provided she obtains control. As a bidder, she buys $r \geq .4$ of the equity, paying rP, and her profit is $(.1 + r)100 - rP - 8$. Since the dispersed shareholders do not sell unless P (at least) matches the post-takeover value 100, this profit collapses to $.1 \times 100 - 8 = 2$. If she succeeds as an activist instead, her profit is also $.1 \times 100 - 8 = 2$ (or less if a campaign adds costs). In either case she appropriates none of the value improvement of the .9 of equity (initially) owned by the dispersed shareholders. In short, the free-rider problem equalizes the returns to both interventions.

Limited incentives vs. unrecompensed effort. The above reasoning ignores that ownership matters for incentives to improve firm value. Since activists retain minority stakes but bidders obtain majority stakes, their optimal efforts diverge. This drive an endogenous wedge between the values they create, without other differences in traits, based only on how they intervene. We study how this affects their profits in a model where they are equally capable of improving firm value through costly effort, their sole source of profit is the appreciation of initial stakes, neither faces legal obstacles specific to their intervention, and all trades are transparent. The purpose of levelling the playing field is to avoid giving any intervention mode particular restrictions or advantages. This leaves only the *core* distinction that, to gain control, bidders buy majority stakes and activists wage campaigns.

Our first and foundational result is that the profits from these interventions are generically *not* the same, even though both are subject to free-riding, and exhibit *opposite* comparative statics with respect to returns to effort. Revisiting the above example, suppose improving the value to 100 costs the blockholder only 7, and she can alternatively improve it to 200 at a cost of 20. In a takeover, shareholders form a conjecture $\hat{e} \in \{7, 20\}$ about the bidder's effort, and only sell if $P \geq V(\hat{e}) \in \{100, 200\}$. The bidder's profit is hence $(.1 + r)V(e) - rV(\hat{e}) - e$. Crucially, for *any* conjecture $\hat{e}$, the bidder's effort choice maximizes $(.1 + r)V(e) - e$. Since $(.1 + r)200 - 20 > (.1 + r)100 - 7$ for all $r \geq .4$, she chooses $e = 20$. Rational shareholders correctly infer this so that $\hat{e} = 20$, and the bidder's profit collapses to $.1 \times 200 - 20 = 0$. In contrast, since $.1 \times 200 - 20 = 0 < .1 \times 100 - 7 = 3$, the activist chooses $e = 7$ and her profit is 3. Surprisingly, the bidder fares now worse than the activist. This argument holds irrespective of whether efforts are incurred before or after the control change.

We show that this insight is general. In tender offers, dispersed shareholders sell their shares only if the takeover premium incorporates the expected post-takeover value improvement. Buying those shares raises the bidder's incentives to improve value, but paying the premium prevents her from recouping the costs of doing so. Crucially, when marginal returns to effort are higher, these unrecompensed effort costs increase because the bidder invests more effort. Thus, bidder profits decrease. Activism does not build on majority control. On the contrary, the point of the campaign is to compensate for the lack of it. The activist optimally limits her share purchases, balancing benefits from additional votes against unrecompensed effort costs. The limited stake constrains effort incentives, but profits under this constraint increase with the marginal return to effort. In consequence, activism can be more profitable than takeovers for high marginal returns to effort, despite being less efficient. The distinct predictions are that (1) tender offers with large increases in total firm value yield small bidder profits, while more valuable campaigns are also more profitable, (2) activism emerges in firms where even "small" changes have large effects on firm value, and (3) activist profits can exceed bidder profits even if the associated firm value improvements have the opposite ranking.

Takeover activism. Free-rider problems are at least partially addressed by the board of directors, who can act on behalf of shareholders and take decisions that are collectively binding. This includes its prerogative to negotiate mergers.[3] However, such mergers are contestable in court, and enjoined or amended if deemed in breach of fiduciary duty or unfair to minority shareholders.[4]

To examine how shareholder interventions interact with the board's merger prerogative, in the presence of legal risk, we extend the model: Bidders can acquire just enough shares to gain control and then absorb the remaining shares through a *freeze-out merger*. Similarly, in what is known as *takeover activism*, activists can pressure the board to negotiate a merger. Our second central result is that takeover activism can be more profitable than both regular activism and tender offers (with or without the freeze-out option), and generates larger value improvements than regular activism, consistent with evidence (Greenwood and Schor, 2009; Becht et al., 2017). This ranking emerges

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

[4]Virtually all major M&A transactions in the U.S. attract shareholder litigation. In 2013, lawsuits were filed against 97.5 percent of transactions with a value greater than $100 million (Cain and Solomon, 2014).

when legal risk and campaign costs are moderate or low, but the marginal return to effort is high.

The advantage of takeover activism is that it relaxes the trade-off between ex ante and ex post free-riding that characterizes the choice between regular activism and tender offers. By sticking to minority stakes, regular activists restrict ex ante free-riding while campaigning for control but allow more ex post free-riding when improving firm value. Conversely, by buying majority stakes, bidders reduce ex post free-riding but suffer ex ante free-riding when acquiring control. Takeover activists limit ex ante free-riding while pursuing control, but by using the merger prerogative to sell the whole firm to a bidder, also avoid that ex post free-riding erodes incentives to improve firm value. So, when possible, activists fare better as *control brokers* than by implementing value improvements on their own.

Our primary analysis considers tender offers and activism separately and compares outcomes. In the final part of the paper, we study situations where different interventions coexist as feasible options, focusing on those where bidder and activist are distinct parties and both present. Crucially, the alternative of free-riding on a tender offer lowers incentives to engage in activist campaigns. In fact, activism only materializes if it promises profits in excess of the latent takeover premium. This leads to our third main result: Regular activism never meets this condition, but takeover activism can. The prediction that only takeover activism can – and must – surpass a threshold profit equal to the free-rider rents in a takeover is again in line with the evidence that it is associated with higher profits than other types of campaigns (Greenwood and Schor, 2009; Becht et al., 2017).[5]

Other findings. Our analysis yields further noteworthy results. First, the option to freeze out minority shareholders does not benefit bidders. In fact, it forces them to raise their initial bids, or else shareholders retain their shares in anticipation of a freeze-out. Second, bidders, activists, and M&A interact in interesting ways: Institutional changes that facilitate activism can lead to a (1) decrease in hostile bids, (2) increase in campaigns, and (3) *in*crease in total M&A. This matches trends observed since the mid-1990s. The third implication is a distinctive feature of our theory and would not obtain if takeover activism were merely a substitute for tender offers made infeasible by

[5]Related evidence in Boyson et al. (2017) and Jiang et al. (2018) concerns a strategy called "deal-jumping" whereby activists engage already announced merger plans to push for another or better deal. Absent a rival bidder, our analysis of regular activism can be applied with better merger terms being the value improvement. If the activist supports a rival bidder, our comparison of takeover activism and tender offers helps to explain 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.

takeover defenses. Our theory also implies that variation in market-wide takeover interest affects campaign activity and activist profits, which is supported by evidence (Greenwood and Schor, 2009; Becht et al., 2017).

Related literature. To our knowledge, we are first to build a comparative theory of shareholder interventions based solely on the comparison of ex ante and ex post free-riding highlighted by Grossman and Hart (1980) to motivate their analysis of takeovers. Doing so bridges the literatures on tender offers on one hand and active owners on the other. As the breadth of work shows, there are idiosyncrasies to explore within each governance mechanism.[6] Our model abstracts from these idiosyncracies. This puts the comparison on a level playing field, and isolates *baseline* differences due only to the modi operandi of bidders and activists. The comparative statics driven by these differences are surprising and novel.

Our activism model directly maps campaign effort to success probability. While reduced-form "monitoring" models are common in governance theory, we discuss three possible micro-foundations in Appendix B: backdoor engagement, proxy contest, and sequential escalation.[7] We conjecture that our results hold for any plausible model of activism since they concern a fundamental difference between the two broad categories of shareholder interventions, *buying control* and *working for control*, regardless of what "work" involves.

Our takeover model follows Burkart et al. (1998) but replaces costly diversion with costly effort.[8] This is more than merely switching variables. Our key results stem from comparative statics with respect to the marginal return to effort, whose analogue in Burkart et al. is the marginal cost of diversion. Burkart et al. do not study these comparative statics, and even if, the implications would not be the same, as we explain in Section 2.2.[9]

Like us, Shleifer and Vishny (1986) consider a blockholder who exerts effort and must gain control through either activism or a takeover to affect firm value, with two crucial differences. First,

[6] See, e.g., Winton (1993), Burkart et al. (1997), Kahn and Winton (1998), Maug (1998), Noe (2002), Aghion et al. (2004), Faure-Grimaud and Gromb (2004), Admati and Pfleiderer (2009), Edmans (2009), Edmans and Manso (2011) for active owners; and Grossman and Hart (1980), Hirshleifer and Titman (1990), Müller and Panunzi (2004), Marquez and Yilmax (2008), Burkart and Lee (2015a), Ekmekci and Kos (2016) for tender offers. See also the surveys by Burkart and Panunzi (2008) and Edmans and Holderness (2017).

[7] These micro-foundations are based on Brav et al. (2016), Maug and Rydqvist (2009), Brav and Matthews (2011), and Gantchev (2013).

[8] This aids the comparison to activists who are unable to divert significant resources from a firm. Toeholds constitute the main source of gains for activists (e.g., Becht et al. 2009; Brav et al. 2010).

[9] The comparative statics results in Burkart et al. (1998) concern changes in the bidder's required minimum stake (e.g., due to security-voting structure or competing bidders), which have the same effect in our model.

effort is a 0-1 choice such that ownership structure is irrelevant for positive effort.[10] Second, Shleifer and Vishny assume that the blockholder has superior information about the value improvement. This added information friction is necessary for the trade-off between takeovers and activism in their model. Our results rely only on free-riding, in its two alternative forms. We should note that the models also differ in whether effort occurs *before* or *after* control changes, but this difference is immaterial. Our results hold in either case.

Bebchuk and Hart (2001) compare tender offers and proxy fights as means to gain control in a model without (endogenous) effort provision. Hence, the effects and trade-offs we identify cannot arise. Instead, they consider private information and allow for control changes that harm target shareholders. The main result is that the combination of adverse selection and free-rider problems is overcome by a governance rule that allows bidders to call a shareholder vote on a merger without board approval. This is not allowed in practice where a collective merger decision cannot sidestep the board. For this latter setting, we show that takeover activism may emerge as the optimal intervention, and if so, approximates the mechanism envisioned by Bebchuk and Hart at higher cost.

Corum and Levit (2018) and our paper provide the first analyses of interactions between bidders and activists. Corum and Levit too assume that, as is observed in practice, activists can seek (to influence) merger negotiations.[11] Their key insight is that a bidder is ill-suited to run such a campaign for herself due to a conflict of interest from which a takeover activist is immune. Their analysis focuses on takeover activism, and involves no comparison to regular activism or to tender offers, which are exogenously restricted. We derive the complementary result that, even when alternative mechanisms are unrestricted, takeover activism can prevail endogenously as the more effective means to confront the dual free-rider problem.

The comparison to takeovers also offers another perspective on what makes activist hedge funds "special," discussions of which center on comparisons with other institutional investors (e.g., Kahan and Rock, 2007; Brav et al., 2008). Our perspective resonates with the historical fact that the antecedents of today's hedge fund activists are raiders and blockholders who put targets "in play"

[10] Relatedly, a genuine trade-off requires that takeovers and activism differ in their cost-value ratios, which Shleifer and Vishny illustrate with exogenous costs and values. In our model, cost-value ratios are endogenous since a difference in final stakes implies different strictly positive effort levels.

[11] They also observe that if legal rules governing mergers were altered to adopt the Bebchuk-Hart proposal, the role of takeover activism in their model and in practice would be diminished.

during the 1980s takeover wave (Orol, 2008; Carlisle, 2014). Surprisingly, it suggests that the strengths of activism originate in traits that are usually seen as drawbacks: *limited* and *temporary* ownership.

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.[12] 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. This productivity parameter may capture investor-specific skill or firm-specific restructuring need. Restructuring effort comes at a cost $C(e)$.

Suppose the investor had control with an ownership stake $s \geq t$. She would then solve the following problem:

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

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

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

In words, the return to effort is strictly positive but weakly decreasing. Further, it strictly increases with the productivity parameter. 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 conditions ensure that the first-order condition of the restructuring effort problem always has an interior solution.

[12] 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).

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

This assumption—toehold gains under zero effort exceed restructuring costs—precludes cases in which the investor would remain 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 solution with positive value for the restructuring effort problem. To guarantee that the set of θ for which tender offers are profitable is non-empty, we further impose the assumption that returns to effort vanish as $\theta \to 0$.[13]

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

The solution to the restructuring effort problem will apply 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.*

Because $1 - s$ shares are held by shareholders who free-ride, the investor's effort depends only on her own stake: it increases with s, and the first best is attained at $s = 1$. Effort and surplus also increase with productivity θ.

By Assumption 3, the owner of the toehold would like to implement value improvements. However, she lacks the formal authority to do so since $t < 1/2$. We consider two strategies for gaining control. On the one hand, she can "buy" control by acquiring at least $1/2 - t$ shares. On the other hand, she can gain control even without a majority stake through "work," that is, by running a costly activist campaign.

2.2 Tender offer

Our tender offer model follows Burkart et al. (1998) except that the bidder engages in effort provision instead of diversion. She 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:

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

In stage 1, the bidder with a toehold $t_b = t$ makes a first-and-final, restricted tender offer to buy r_b shares at a cash price of p_b per share, conditional on her holding a final stake s_b no less than 50 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.[14]

In stage 2, the target shareholders noncooperatively decide whether to tender their shares. Being atomistic, each perceives herself as non-pivotal for the tender offer outcome.

In stage 3, the takeover fails if less than $1/2 - t$ shares are tendered. Otherwise, the bidder pays the offered 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. When the unobservable effort is exerted relative to the control change is not important for our results, as we discuss later.

Before solving the game, it is worth highlighting that the only reason a takeover may fail in this setting is the impact of the free-rider problem *on effort provision*. For $e_b = 0$, the post-takeover firm value is $V(0, \theta)$, and even without any gains on the shares acquired in the tender offer, the bidder's profit is $t_b V(0, \theta) - C(0)$, which is positive by Assumption 3.

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 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: $p_b \geq E\left[V^*(s_b, \theta)\right]$. We assume that shares are tendered if the inequality is weakly satisfied.[15] Given this assumption and rational expectations, the bidder buys r_b shares with certainty in a successful bid,[16] and the free-rider condition is $p_b \geq V^*(t_b + r_b, \theta)$. Since

[14] Lack of bidding competition is not important for our results. If we allow for rival bidders with different θ, competition pushes the winning bidder to acquire more shares, with the free-rider condition still binding. Buying more shares aggravates the unrecompensed effort problem (c.f., Burkart et al., 1998). The comparative statics that are key to our results would still hold, but tender offers would be less profitable than in the case without bidding competition.

[15] 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 prices, such that a self-fulfilling failure equilibrium always coexists with any success equilibrium (Burkart et al., 2006).

[16] If bids were unrestricted, any equilibrium in which the takeover succeeds would feature r_b (randomly chosen) shareholders tendering such that $p_b \geq E\left[V(e_b)\right]$ is exactly binding. Hence, allowing restricted bids does not change

the right-hand side increases with r_b, supply is upward-sloping: More acquired shares incentivize the bidder to provide more effort. The associated increase in post-takeover share value induces shareholders to hold on to their shares unless the bid price p_b increases as much.

Writing the stage-2 and stage-3 equilibrium strategies as constraints, the bidder's tender offer problem at stage 1 is

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

Constraints (3) to (6) are 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.

We begin by describing the equilibrium structure of a successful bid.

Lemma 2 (Burkart et al., 1998)**.** *In a successful takeover, the bidder acquires $r_b^* = 1/2 - t_b$ shares at a per-share price equal to the post-takeover share value $p_b^* = V^*(1/2, \theta)$.*

By Lemma 1, every tendered share raises 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, she fares best buying no more shares than needed to gain control, i.e., to reach $s_b = 1/2$. She consequently generates the post-takeover share value $V^*(1/2, \theta)$, which the bid price matches due to the free-rider condition.

Lemma 2 is the costly-effort version of the analogous result in Burkart et al. (1998) with inefficient diversion. We now turn to the parameters that determine the profitability of a bid in our model: the size of the toehold t_b and the productivity parameter θ. The comparative statics result on θ has no parallel in Burkart et al. (1998).

the equilibrium set, i.e., is unimportant for our results, but spares us assumptions on how shareholders coordinate to tender precisely r_b shares.

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 even though a bid with zero effort would be profitable. This is due to the interaction of constraints (3) to (5): *Ex ante* free-riding shareholders demand a price that reflects the value improvement but excludes private effort costs ((3)). Regardless of the price, the bidder must buy enough shares to attain a majority stake ((4)). At the same time, she cannot commit to exert *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 falls short of the latter. We refer to this manifestation of the free-rider problem as unrecompensed effort.

The crucial result (for the later comparison to activism) is the second part of Proposition 1, namely that bidder profits *decrease* in the productivity parameter θ when t_b is small ($t_b < \bar{\bar{t}}_b$). To understand this result, 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 to 0, the first term vanishes while the second term approaches $-\frac{\partial C^*(1/2,\theta)}{\partial e_b^*}\frac{de_b^*}{d\theta} < 0$. Intuitively, when the toehold gains shrink, the effect of θ on unrecompensed effort eventually dominates, which is that a higher marginal return to effort increases the *gap* between *ex post* optimal effort (for $s_b = 1/2$) and *ex ante* optimal effort (for $t_b < 1/2$).[18]

[17] The bidder's final stake being $1/2$ (i.e., Lemma 2) is unimportant for our results. In a richer framework, where the bidder buys more or all shares due to going-private or tax considerations that yield private benefits or due to competition (fn.14), the unrecompensed effort problem only gets worse. Given that the optimality of partial bids is not crucial, we have chosen the more parsimonious model without private benefits favoring a full acquisition.

[18] Unlike in other tender offer models, takeovers can fail even in the absence of fixed takeover costs ($C(0) = 0$) due to the unrecompensed effort problem.

The unrecompensed effort problem does not depend on the timing of effort. In particular, it arises even if all effort occurs before the bid, as long as effort is unobserved: In anticipation of a takeover, a bidder has incentives to exert effort $e(s_b, \theta)$ in accordance with her expected majority stake $s_b \geq 1/2$. Rational shareholders infer this and therefore retain their shares at any price below $p_b = V^*(s_b, \theta)$, thus creating the unrecompensed effort problem. To avoid it, the bidder would prefer to commit to effort $e(t_b, \theta)$ commensurate with her toehold instead, but is unable to do so since effort is unobservable.[19] This implies that in an extended model with effort incurred dynamically around the takeover, the bidder exerts unrecompensed effort at *all* points in time. Only in two cases does the unrecompensed effort problem vanish, neither of which relates to timing: if effort is (a) binary such that ex ante and ex post optimality cannot diverge for non-zero effort (as in Shleifer and Vishny, 1986), or (b) observable in which case the bidder can commit to her ex ante optimum.

The adverse effect of increases in θ for the bidder is surprising, since such increases would benefit her if she could improve value with just her toehold (Lemma 1). In a diversion model, such as Burkart et al. (1998), the analogous parameter change that would benefit a toehold owner is a decrease in the marginal cost of diversion. Contrary to our effort model, however, this would also raise her profit from a tender offer. Moreover, the higher profit would come at the expense of firm value, whereas higher θ increase firm value if the bid is still undertaken. These divergent comparative statics are due to the fact that in a diversion model, the bidder extracts private benefits that decrease firm value, while in an effort model, she incurs private costs that increase firm value. Our results are therefore relevant in governance contexts where free-riding frustrates valuable efforts, rather than enables self-dealing.

2.3 Activism

Now suppose the toehold owner seeks the influence for carrying out the value improvement through activism rather than a takeover. Activists use diverse tactics such as informal communications with management, media campaigns, shareholder proposals, and proxy contests. Instead of choosing one

[19] More precisely, consider a successful bid that raises the bidder's stake to $\hat{s} \geq 1/2$. At the time of the bid, shareholders form a conjecture $\hat{e}$ about exerted effort, under which the lower bound for the price is $\hat{p}_b = V(\hat{e})$. The bidder's pre-takeover effort problem is $\max_{e \geq 0} \hat{s}V(e, \theta) - C(e) - (\hat{s} - t_b)\hat{p}_b$. Crucially, for *any* conjecture $\hat{e}$, the solution is $e(\hat{s}, \theta)$—commensurate with the expected majority stake $\hat{s}$ instead of the toehold t_b. Rational shareholders correctly infer $\hat{e} = e(\hat{s}, \theta)$ so that $\hat{p}_b = V^*(\hat{s}, \theta)$. The resulting unrecompensed effort is minimized by buying as few shares as needed to reach $\hat{s} = 1/2$ (as in Lemma 2). This can be supported as an equilibrium outcome since, once her effort is sunk, the bidder is indifferent to the number of shares she buys.

tactic for the comparison with takeovers, we employ a reduced-form model and support it with three alternative micro-foundations in Appendix B. We clarify at the end of this subsection which properties of our reduced-form specification are critical to the results.

An activist 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 votes raise the chances of a successful campaign. This need not imply actual voting, as the mere threat can suffice for management to agree with the activist's demands.[20] 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 compares the timelines of tender offers and activism.

Figure 1 about here

We proceed again by backward induction. If a campaign is launched and succeeds, the activist solves in stage 2 the restructuring effort problem (1) with $s = t_a$. Her payoff from a successful campaign, gross of campaign costs, is hence $\Delta(t_a, \theta)$. In stage 1, if the activist has started a

[20] 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 led to a split-up of Imken. Fos (2017) provides more general evidence that incumbent managers are responsive to the mere threat of proxy contests.

campaign, she therefore chooses campaign effort a to maximize $q(a, \psi, t_a)\Delta(t_a, \theta) - K(a)$ subject to $q(a, \psi, t_a) \leq 1$. Assumptions 5 and 6 guarantee that a solution exists and is unique.

Lemma 3. *If the activist starts a campaign, she exerts a uniquely optimal campaign effort a^* and succeeds with probability $q(a^*, \psi, t_a)$. If successful, she improves firm value to $V^*(t_a, \theta)$.*

A comparison with Lemma 2 shows that a takeover would always be socially more efficient than activism. In addition to bearing deadweight campaign costs $K(a^*)$, a successful activist creates less value, $V^*(t_a, \theta) < V^*(1/2, \theta)$, since the takeover results in a larger stake, $1/2 > t_a$. This is consistent with the notion that bidders, or controlling owners, are willing to immerse themselves into bringing about substantial changes in the long run, while activists may only find it worthwhile to pursue "quick fixes." Because intervention mode and restructuring effort are both endogenous in our framework, the reverse statement also holds: For small intended changes, activism is chosen, while plans for more substantial changes lead to takeovers.

This has the important implication that the advantage of activism cannot lie in improving firm value per se, as this is more effectively achieved through takeovers. Hence, its advantage *must* reside in its alternative approach to the free-rider problem—or else, it is dominated by a tender offer.

As in the case of tender offers, we turn our attention to the impacts of the toehold t_a and the productivity parameter θ.

Proposition 2. *In the activism game:*

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

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

Like bidders, activists require a sufficient toehold to make a profit, as the value improvement on the other shares accrues to free-riding shareholders. A smaller toehold reduces the payoff $\Delta(t_a, \theta)$, which in turn reduces incentives to invest in a 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 bidders, activists always benefit from an increase in the productivity parameter θ. While an activist's small stake limits her effort, the profit under this limited effort is larger when

the return to effort is higher.[21] The contrast between the second parts of Propositions 1 and 2 is our first main, and central, result. We restate it in a separate proposition, together with its crucial implication that activism can be more profitable than takeovers despite being less efficient.

Proposition 3. *A higher productivity parameter θ always increases activist profits, while it decreases bidder profits for small toeholds ($t_b < \bar{\bar{t}}_b$). As a result, although a takeover is more efficient, activism is more profitable when the toehold and campaign costs are small and the productivity parameter is large.*

Recall that there is no difference between a bidder and an activist in our model other than that one buys control and the other works for control. The conceptual insight of Proposition 3 is that buying control is more profitable in some circumstances and working for control in other circumstances *for the sole reason that they confront different variants of free-riding.* Working for control faces *ex post* free-riding, which generates a limited effort problem under which profits are smallest for low returns to effort. Buying control faces *ex ante* free-riding, which creates an unrecompensed effort problem that is worse for high returns to effort. Thus, activism and takeovers are profitable at opposite ends of the range of θ, even as both of them are subject to free-riding.

Figure 2 about here

However, takeovers are more efficient because unrecompensed effort involves a transfer of rents from bidder to target shareholders, whereas campaign costs and forgone value creation are deadweight losses. The reason private and social optimality diverge is that 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).

Proposition 3 entails distinct predictions: If one isolates variation in (a measure of) θ, bidder profits should be smaller in tender offers that increase firm value more, whereas activist profits should be larger in campaigns that increase firm value more. Further, campaigns can be more profitable than tender offers even when the associated effects on firm value exhibit the opposite

[21] 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.

ranking. The example in Figure 2 illustrates these predictions. Proposition 3 does *not* imply that activism is generally associated with larger value improvements. Even though takeovers emerge for lower θ, the resultant ownership concentration creates stronger incentives to improve value. Proposition 3 instead posits that activism is chosen for targets in which even small efforts have a large impact on value.

Let us now discuss which features of our reduced-form activism technology $q(a, \psi, s)$ and $K(a)$ are crucial for our results. Assumptions 5 and 6 ensure a unique and possibly interior solution for campaign effort. But even in settings with fixed, corner, or multiple solutions for campaign effort, activist profits increase with θ. The example in Figure 1, for instance, has a corner solution for all θ, and is thus isomorphic to models where activists succeed at a fixed cost. Assuming that restructuring efforts occur after (a control change and hence) campaign efforts is also not important. Proposition 3 holds even if a and e_a are chosen simultaneously or in the reverse order. Together with the analogous discussion for tender offers (at the end of Section 2.2), this implies that the timing of effort is irrelevant to our findings. Rather, the differences we find distinguish buying control from working for control, irrespective of when efforts are incurred relative to the control change.

The one important assumption is that neither q nor K depend directly on θ. Relaxing this assumption can strengthen or weaken our results. If valuable campaigns (higher θ) succeed more "easily" ($\partial q/\partial\theta > 0$), our main result is reinforced. The converse—if 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.

We conclude our baseline analysis by reiterating that we purposely assume a level playing field where bidders and activists are identical except in their mode of intervention. This is by no means to dispute the existence of other differences. For example, bidders and activists differ in 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. That said, many of these factors would modify q and K, or differentiate V and C across bidders and activists, without altering the signs of the comparative statics.

2.4 Post-disclosure share purchase

Activists often buy additional shares after their ownership crosses the disclosure threshold, though their stakes ultimately remain limited.[22] We extend the previous activism game by adding a stage 0 in which the activist can buy r_a shares in the open market at price p_a. Since these are post-disclosure trades, the activist's identity and intentions are publicly known. As in the tender offer game, all potential sellers are rational, homogeneous, and atomistic price-takers; there are no "noise traders." The subsequent stages remain unchanged.

The solutions to the restructuring effort problem (stage 2) and campaign effort problem (stage 1) remain as before, except the activist's stake in both instances is now $s_a = t_a + r_a$. For the share purchase problem (stage 0), we restrict the domain to $r_a \leq 1/2 - t$, which is where the problem is relevant. If the solution to the unrestricted problem is $r_a > 1/2 - t$, the tender offer analysis of Section 2.2 applies. Hence, the activist's share purchase problem can be written

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

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 the analogues of (3) and (5). The difference is that the minority constraint (9) replaces the majority contraint (4). This goes hand in hand with the assumption that purchasing additional shares raises the success probability $q(a, \psi, s_a)$. Under the majority constraint, additional shares are irrelevant to the control allocation: a successful bidder has control regardless of whether she owns 50 percent or more.

Proposition 4. *The solution to the activist's share-purchase problem may be interior.*

[22] In the sample of Brav et al. (2010), the median values for the activist's toehold and the maximum stake accumulated during a campaign are, respectively, 6.3 percent and 9.5 percent.

The possibility of an interior solution means that buying more shares comes with costs and benefits. The cost is unrecompensed effort given that the activist must buy the r_a shares at their expected post-restructuring value. Earning nothing on them, she only gains from the value improvement of her toehold t_a, while subsequently exerting campaign and restructuring efforts optimally for her ultimate stake $s_a = t_a + r_a$. The benefit is that owning more voting shares raises the chance of success for any campaign effort ($q_s > 0$). The solution to (7)-(11) balances 'greater influence' against 'unrecompensed effort.' Whether it is interior depends on the shapes of $K(.)$, $C(.)$, and $q(.)$, but clearly the activist never buys additional shares if the influence channel is absent ($q_s = 0$).[23]

The comparison between activism and takeovers in Section 2.3 carries over to this setting. Propositions 3 still applies since activism is weakly more profitable with post-disclosure share purchases than without: If the activist opts to buy more shares, she must be better off. Still, for low θ, this may not be a sufficient remedy for the limited incentives problem, in particular due to the countervailing cost of unrecompensed effort.

Proposition 4 differs from results on "pre-disclosure" purchases. In Kyle and Vila (1991), bidders 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. These gains come at the expense of noise traders but are limited by partial information revelation through the order flow. Our framework features neither noise traders nor asymmetric information. Share purchases are motivated by demand for influence rather than speculation, and curbed by unrecompensed effort rather than information revelation.[24]

While an analysis of endogenous pre-disclosure toeholds is beyond the scope of this paper, it seems to us that whether a bidder or an activist acquires a larger toehold is a priori unclear. A bidder attaches a larger "cash-flow" value to toehold shares since she will raise firm value more. However, an activist also places a "control" value on each vote because of the influence channel; whereas

[23]The result that activists buy shares to gain influence does not hinge on our assumption that the *marginal* impact of campaign effort increases with voting power. It suffices that the success probability for given effort increases in voting power ($q_s > 0$), irrespective of the cross-derivative with effort. This 'influence' motivation for buying shares 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.

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

conditional on making a bid, pre-takeover votes are irrelevant to a bidder. In addition, bidders face a less liquid market (higher price impact) to the extent that traders rationally anticipate which intervention will be chosen.

2.5 Incentive compensation contracts

Like much, if not all, of the literature on ownership and control allocation, we presume some underlying contractual incompleteness that makes the allocation of residual rights relevant. That being said, consider compensation contracts that could provide bidders or activists with incentives beyond those created through their ownership stakes. If dispersed shareholders can collectively negotiate such contracts without help from management, ownership structure no longer matters to firm value. But this is tantamount to assuming away the free-rider problem. It would negate the literatures on large shareholders and investor activism, where ownership stakes play a key role, as well as the tender offer literature, because shareholders should then be equally able to coordinate their tendering decisions.

Our analysis includes though one situation in which such contracts can be written without dispersed shareholders, namely a successful bid. Assuming control of the board, the bidder can "negotiate" a contract with herself. Suppose she has accumulated 50 percent of the shares. She could award herself compensation that incentivizes her to generate $V^*(1,\theta)$ instead of $V^*(1/2,\theta)$. One simple example is a "call option" that pays out everything above $V^*(1/2,\theta)$ to the bidder-manager. Note that this is payoff-equivalent to buying out the remaining minority shareholders at a price equal to $V^*(1/2,\theta)$—as in what is known as a freeze-out merger (which we analyze in Section 3.1)

The described contract ensures that the additional effort $e(1,\theta)-e(1/2,\theta)$ is recompensed. In fact, it allows the bidder to capture the full value increase $\Delta(1,\theta)-\Delta(1/2,\theta)$. But it does not address the unrecompensed effort induced by the takeover itself, $C^*(1/2,\theta)-C^*(t_b,\theta)$. It is the relative magnitude of these amounts that determines how much our results are affected, if such post-takeover compensation could be imposed. In practice, such compensation may well prove controversial due to its unequal treatment of shareholders and potentially astronomical size, especially when $\Delta(1,\theta)-\Delta(1/2,\theta)$ is large. Indeed, if it were easy to approve and seen as innocuous, one would be left to wonder why freeze-outs ever seem needed, and why they are subjected to legal scrutiny.

Such (legal) concerns are even more apparent in the case of post-takeover compensation the bidder pays herself for all or part of $C^*(1/2, \theta) - C^*(t_b, \theta)$. This is ex post *dilutive* in that, at the time of being awarded, the compensation harms shareholder value. The same applies to post-takeover compensation for *pre*-takeover effort, which is subject to the unrecompensed effort problem in equal degree (as noted in Section 2.2). Allowing such contracts amounts to allowing controlling owners to engage in self-dealing at the expense of minority shareholders. As emphasized already by Grossman and Hart (1980), the free-rider problem can be overcome if bidders can, by whatever means, dilute the value of minority shares after assuming control. But dilution—via compensation or otherwise—is in conflict with law and legal practice.[25]

3 Takeover activism

The previous section develops the idea that the value of activism lies not in restructuring per se, which is better done through a takeover, but in its alternative approach to the free-rider problem. What holds back an activist's restructuring effort—limiting herself to a minority stake—is in fact what allows her to seek control more cheaply. This suggests an interesting possibility: The tension between ex ante and ex post free-riding may be relaxed if the activist does not seek to restructure the firm herself, but uses campaigns (avoids ex ante free-riding in the 'control stage') to concentrate ownership in someone else's hands (to reduce ex post free-riding in the 'restructuring stage'). We refer to this as takeover activism, or as a brokered merger. Empirically, this is a prevalent and the most profitable activist strategy (Greenwood and Schor, 2009; Becht et al., 2017).[26]

Given that mergers are binding for all shareholders, we want to 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. Two additional features prevent this: First, controlling shareholders too can

[25] For a discussion of the law, see, e.g., Section IV of Müller and Panunzi (2004). In particular, they point out that self-dealing violates a controlling shareholder's duties towards minority shareholders even if it occurs as part of an action that overall creates value (p.1233).

[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 bidder from having to resort to a tender offer.

execute mergers. This allows bidders, once in control, to force remaining minority shareholders to sell their shares in a freeze-out. Second, all mergers are legally con-testable, freeze-outs and brokered ones included, allowing shareholders to challenge the terms imposed on them. Following Müller and Panunzi (2004), we model legal risk as the possibility of an upward price revision (*rescissory damages*).

In parallel to Section 2 we first analyze the tender offer game, now with two-tier offers, freeze-out, and a possible price revision due to shareholder litigation. We then examine the activism game in which the activist campaigns for the sale of the firm to the bidder. For clarity and as in Section 2, we derive the equilibrium of the two-tier tender offer game and of the takeover activism game assuming the other governance mechanism is unavailable. This allows us to cleanly explore how takeover activism works 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

Combining a tender offer with a freeze-out can resolve the free-rider problem (Yarrow, 1985; Amihud et al., 2004): If any remaining minority shareholder can be compelled to sell at the initial bid price, a shareholder's payoff is independent of her tendering decision. Subsequent work, however, has shown this to be a knife-edge result: Dalkir et al. (2018) establish that in a model with finite shareholders, as their number grows without bound, bidder profits vanish for any freeze-out threshold above simple majority.[27] Müller and Panunzi (2004) demonstrate that legal risk in a freeze-out, however small, also restores the free-rider problem. We extend the latter argument to a setting where firm value depends on effort and hence on the bidder's ultimate stake. In contrast to Müller and Panunzi (2004), the freeze-out option works to her *disadvantage* in this setting.

We extend the tender offer game from Section 2.2 as follows: 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 $f_b \in [0, 1 - r_b - t_b]$ of the remaining minority shareholders at p_b.[28] 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

[27] In many jurisdictions the freeze-out threshold is well above 50 percent, as discussed in Dalkir et al. (2018).

[28] 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 either $f_b = 0$ or $f_b = 1/2$.

value $V^*(e_b, \theta)$.[29]

Proceeding by backward induction, 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 problem is to choose a restructuring effort e_b to maximize $s_b V(e_b, \theta) - C(e_b, \theta) - \epsilon f_b [V(e_b, \theta) - p_b]^+$, which simplifies to $\widetilde{s}_b V(e_b, \theta) - C(e_b, \theta) + \epsilon f_b p_b$ where $\widetilde{s}_b \equiv t_b + r_b + f_b(1-\epsilon)$. Since $\epsilon f_b p_b$ is independent of e_b, Lemma 1 applies, and the bidder generates post-freeze-out value $V^*(\widetilde{s}_b, \theta)$ at cost $C^*(\widetilde{s}_b, \theta)$. The chance that the freeze-out price will be revised upwards means, intuitively, that ousted minority shareholders can still free-ride with some probability. Due to this probabilistic ex post free-riding, the bidder's effective or incentive-relevant stake is $\widetilde{s}_b$ rather than s_b. Legal risk thus undermines incentives. At the time of a freeze-out, the bidder's freeze-out payoff is

$$\widetilde{s}_b V^*(\widetilde{s}_b, \theta) - C^*(\widetilde{s}_b, \theta) + \epsilon f_b p_b - f_b p_b = \Delta(\widetilde{s}_b, \theta) - (1-\epsilon) f_b p_b. \tag{12}$$

The above turn out to be off-equilibrium considerations because, in equilibrium, a freeze-out does not materialize. The proof is straightforward: A bidder only executes a freeze-out if the price p_b is strictly below the post-freeze-out value $V^*(\widetilde{s}_b, \theta)$. Anticipating such a freeze-out, shareholders do not tender at p_b in the initial offer, considering the freeze-out price may be revised upwards due to a successful legal challenge. Consequently, in any equilibrium with a *successful* tender offer, the offer price must be such that a freeze-out is unattractive. This is the effect of legal risk identified in Müller and Panunzi (2004).

In our model with endogenous value creation, this equilibrium requirement has the novel implication that the bidder pays *strictly* more than what the shares will ultimately be worth.

Proposition 5. *In the two-tier tender offer game, the bidder acquires $r_b = 1/2 - t_b$ shares, with no subsequent freeze-out, at a per-share price strictly above the post-takeover share value*

$$\underline{p}_b = \frac{\Delta(1 - \epsilon/2, \theta) - \Delta(1/2, \theta)}{1/2 - \epsilon/2} > V^*(1/2, \theta).$$

[29] Although our results hold also for infinitesimal $\epsilon > 0$, it is worth noting that the legal issues surrounding a freeze-out are non-negligible because they involve a conflict between controlling and minority shareholders. For a detailed discussion, see Sections IV-V in Müller and Panunzi (2004). Also, assuming that a successful legal challenge causes the price to be adjusted all the way to the post-freeze-out value is not crucial. As long as there is a chance of some upward revision, however small, our results hold except that, in Proposition 5 below, the size of the commitment premium needs to be adjusted to the expected revision.

For the bidder to find buying additional shares after the takeover unattractive, the margin between post-freeze-out value and price must be insufficient for her to recoup the additional effort cost. So it remains optimal to acquire just enough shares to gain control, $r_b = 1/2 - t_b$. To derive the lowest bid for which a freeze-out is unattractive, consider deviations $f_b > 0$ at a given price p_b. Since the post-freeze-out value $V^*(1/2 + f_b, \theta)$ strictly increases in f_b, while the price is fixed, the best possible deviation is to buy all minority shares, $f_b = 1/2$. To deter this deviation, p_b must satisfy

$$\Delta(1/2, \theta) \geq \Delta(1 - \epsilon/2, \theta) - (1 - \epsilon)\tfrac{1}{2}p_b.$$

The left-hand side is the bidder's payoff without a freeze-out after having acquired $r_b = 1/2 - t_b$ shares, and the right-hand side is her payoff (12) from a freeze-out with $f_b = 1/2$. The price $\underline{p}_b$ at which this inequality is binding is the optimal bid, which turns out to be strictly above the post-takeover value $V^*(1/2, \theta)$. It follows from a comparison to Lemma 2 that the bidder is worse off with the freeze-out option.

In Müller and Panunzi (2004), the freeze-out option is merely irrelevant. In their model, the post-takeover value $\overline{V}$ is the same for all $s_b \in [1/2, 1]$. Once $p_b = \overline{V}$, the bidder is therefore *indifferent* with respect to s_b and a freeze-out. In our model with endogenous effort, $V^*(s_b, \theta)$ increases with $s_b \in [1/2, 1]$. At $p_b = V^*(1/2, \theta)$, the bidder will want to exercise the freeze-out option, which induces rational shareholders to hold out in the initial bid. This forces the bidder to offer a commitment premium to abstain from a freeze-out.

Higher legal risk reduces the firm value that the bidder would generate after a freeze-out. This lowers her off-equilibrium benefit from undertaking a freeze-out, which in turn lowers the commitment premium she must incorporate in the equilibrium initial bid. In the limit, the bidder's effective stake under the optimal bid converges to $\lim_{\epsilon \to 1} \widetilde{s}_b = 1/2$ for any freeze-out strategy f_b, as the price is almost surely revised to the post-freeze-out value. This undermines incentives so that the value improvement becomes $V^*(\widetilde{s}_b, \theta) = V^*(1/2, \theta)$—i.e., independent of the bidder's ultimate stake as in a setting with exogenous post-takeover values. In this limit, the temptation to execute a freeze-out 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 game ends. If not, the bidder pays $r_m p_m$ for r_m shares, gains control, and chooses her restructuring effort e_b.[31] Last, with probability ϵ, the merger price is ex post revised to the full post-merger firm value due to a successful legal challenge.[32] Figure 3 compares the timelines of two-tier tender offers and takeover activism.

Figure 3 about here

We proceed backwards again. In stage 3, following a merger, the bidder owns $s_b = t_b + r_m$ shares and sets her restructuring effort e_b to maximize $s_b V(e_b, \theta) - C(e_b) - \epsilon r_m \left[V(e_b, \theta) - p_m\right]^+$ where the last term represents the legal price revision risk. The objective function simplifies to $\hat{s}_b V(e_b, \theta) - C(e_b) + \epsilon r_m p_m$ with $\hat{s}_b \equiv t_b + (1 - \epsilon) r_m$. Since $\epsilon r_m p_m$ is independent of e_b, Lemma 1 applies, and the bidder generates the post-merger value $V^*(\hat{s}_b, \theta)$ at cost $C^*(\hat{s}_b, \theta)$. Like $\tilde{s}_b$ after a freeze-out, $\hat{s}_b$ is the bidder's effective stake, which accounts for the effect that legal risk weakens restructuring incentives. At the time of the merger, the bidder's expected payoff is $\Delta(\hat{s}_b, \theta) - (1 - \epsilon) r_m p_m$.

In stage 2, if in control, the activist negotiates the merger terms (r_m, p_m) to maximize the shareholders' expected merger payoff $R(r_m, p_m, s_b, \epsilon) \equiv r_m \left[(1 - \epsilon) p_m + \epsilon V^*(\hat{s}_b, \theta)\right] + (1 - r_m - t_b) V^*(\hat{s}_b, \theta)$

[30] For takeover activism to be profitable, activists must 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. It also 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 being said, our results hold as long as she has enough bargaining power. Moreover, we show in an earlier version of the paper that bidders can, and want to, balance the bargaining power allocation with the toehold allocation to ensure that takeover activism is (or remains) feasible.

[31] If $r_m < 1 - t_b$, the merger is pro-rated among target shareholders. The pro-rated offer can be a restricted cash bid or a cash-equity bid that pays cash plus $1 - t_b - r_m$ shares in the post-merger company.

[32] In general, the legal risk for brokered mergers should be smaller than for freeze-outs. The review standard for mergers of firms without controlling owners (*business judgement rule*) is more lenient than for mergers involving controlling owners (*entire fairness doctrine*). While a stricter review standard (*Revlon duties*) can be triggered for mergers initiated by management, the same does not apply to firms 'put in play' by activists (*Lyondell Chemical Co. v. Ryan*). Note, by the way, that we do not let the activist campaign for the sale of the target to *herself*. Related to the legal review (standard) this strategy would invoke, a bidder-activist's ability to garner support would be impaired by severe conflicts of interest. Corum and Levit (2015) develop a theory of takeover activism along these lines.

subject to the bidder's participation constraint $s_b V^*(\hat{s}_b,\theta) - C^*(\hat{s}_b,\theta) - r_m\left[(1-\epsilon)p_m + \epsilon V^*(\hat{s}_b,\theta)\right] \geq 0$. Decomposing $s_b V^*(\hat{s}_b,\theta)$ into $\hat{s}_b V^*(\hat{s}_b,\theta) + (s_b - \hat{s}_b)\, V^*(\hat{s}_b,\theta)$ and using the fact that $s_b - \hat{s}_b = \epsilon r_m$, the constraint simplifies to $\Delta(\hat{s}_b,\theta) - (1-\epsilon) r_m p_m \geq 0$. Given that the activist has all the bargaining power, this participation constraint is binding in equilibrium, and the entire surplus is extracted by target shareholders. Furthermore, as the surplus increases in the bidder's stake, the optimal merger involves selling the whole firm: $r_m = 1 - t_b$.[33] Under these optimality conditions, the shareholders' merger payoff is $R^*(t_b,\epsilon,\theta) \equiv \Delta(\hat{s}_b^*,\theta) + \epsilon(1-t_b)V^*(\hat{s}_b^*,\theta)$ where $\hat{s}_b^* = 1 - \epsilon(1-t_b)$. Per (acquired) share, this amounts to $\frac{R^*(t_b,\epsilon,\theta)}{1-t_b}$. The activist's merger payoff is $R_a^*(s_a,t_b,\epsilon,\theta) \equiv s_a \frac{R^*(t_b,\epsilon,\theta)}{1-t_b}$.

In stage 1, the activist sets 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^* satisfies either the first-order condition or the boundary condition $q(a,\psi,s_a) = 1$. Finally, the stage-0 share-purchase problem 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 objective function and $\frac{R^*(t_b,\epsilon,\theta)}{1-t_b}$ replaces $V^*(s_a,\theta)$ in the free-rider condition:

$$\underset{r_a,p_a}{\text{maximize}} \quad q(a,\psi,s_a)R_a^*(s_a,t_b,\epsilon,\theta) - K(a) - r_a p_a \tag{13}$$

$$s.t. \quad p_a \geq q(a,\psi,s_a)\tfrac{R^*(t_b,\epsilon,\theta)}{1-t_b} \tag{14}$$

$$r_a \leq 1/2 - t_a \tag{15}$$

$$a = a^* \tag{16}$$

$$s_a = t_a + r_a. \tag{17}$$

Following the same steps as in the proof of Proposition 4 shows that a unique solution exists. We can now summarize the equilibrium path of a campaign:

Lemma 4. *If the takeover activist starts a campaign, she exerts a uniquely optimal campaign effort a^* and succeeds with probability $q(a^*,\psi,s_a)$. If successful, she negotiates a merger with a bidder, who acquires the whole firm and improves its value to $V^*(1-\epsilon(1-t_b),\theta)$.*

The key difference to regular activism is that, while the activist's source of gains is still the value improvement of her stake, the value is now generated by the bidder in a merger rather than by the activist herself. This has repercussions for all stages of the campaign: First, since the bidder

[33] This result would also hold under Nash bargaining, where for any distribution of bargaining power, bidder and target shareholders each receive a fraction of whatever expected post-merger surplus is generated.

acquires all shares in the merger, the value improvement conditional on a successful campaign approaches *first-best* for low legal risk. Second, the unrecompensed effort problem is avoided at the restructuring stage (thanks to the merger) and thus confined to campaign effort a. Hence, ceteris paribus, a takeover activist is inclined to acquire a larger (post-disclosure) stake than a regular activist. Third, a larger payoff from a successful campaign and a (weakly) larger stake lead to a higher campaign effort.

Due to these effects, takeover activism can outperform regular activism for low legal risk. Given that regular activism can be more profitable than tender offers (Proposition 3) and that the freeze-out option does not improve bidder profits (Proposition 5), this leads to our second main result:

Proposition 6. *For low legal risk,*

(i) takeover activism is more profitable, succeeds with higher probability, and leads to larger value improvements if successful than regular activism, for any $t_a > 0$ and $t_b \geq 0$.

(ii) takeover activism with $t_a + t_b = t$ is more profitable than (two-tier) tender offers with $t_b = t$ when the toehold t and campaign costs are small and the productivity parameter is large.

The dual free-rider problem is key to this result for two reasons. First, takeover activism can simultaneously outperform both tender offers and regular activism. Takeover activists limit *ex ante* free-riding in the 'control stage' by campaigning on minority stakes, keeping this advantage relative to bidders. Contrary to regular activists, they also limit *ex post* free-riding in the 'restructuring stage' by having the bidder acquire the entire firm in the merger.

Second, takeover activism prevails even when bidders can use the merger prerogative (for freeze-outs). For bidders and activists alike, using the prerogative eliminates free-riding in the 'restructuring stage,' save for the legal risk of a price revision. The difference is how its anticipated use impacts the 'control stage.' In the case of activism, any reduction in ex post free-riding improves all campaign stages, as explained in the discussion following Lemma 4. In the case of tender offers, the crux is that only those who retain their shares—and must be ousted through freeze-outs—can benefit from the legal risk. Hence, any bid for which a freeze-out is anticipated fails, so that *ex ante* free-riding remains in *full* effect. Thus, it is still crucial whether control (here, the merger prerogative) is "bought" or "worked for."

Empirically, the first part of Proposition 6 matches patterns found by Greenwood and Schor (2009) and Becht et al. (2017). The value improvements V conditional on a successful campaign being larger for takeover activism than for regular activism matches the empirical pattern of long-term abnormal returns being higher for activist targets that are ultimately acquired. Adding to this that takeover activists succeed with a higher probability q further implies higher unconditional expected returns qV for their campaigns, consistent with higher announcement returns observed in the data. Finally, takeover activism being more profitable accords with the evidence that the performance of activist hedge funds is strongly related to aggregate M&A activity, a point we revisit in Section 4.

Proposition 6 upends some common presumptions and views on shareholder governance. Potential benefits of hedge fund activists are often qualified by concerns about their outsize influence relative to their small equity stakes and short-term involvement. In contrast, our theory touts *limited* and *temporary* ownership as the source of their strength, namely as a more effective response to *ex ante* and *ex post* free-riding. Also, some commentators see takeover activism as necessary only insofar as institutional constraints impede takeovers (e.g., takeover defenses). Our results suggest that the combination of board prerogative over M&A and investor activism can be more effective in (re)allocating control than tender offers, even if the latter are unimpeded.

This last point relates to the proposal by Bebchuk and Hart (2001) that bidders should be allowed to call a binding shareholder vote on a merger bid, even if the target board opposes it. Under their proposed rule, mergers can circumvent the board and takeover activism is no longer necessary, as noted also by Corum and Levit (2018). Conversely, when mergers do require board approval as in practice, there is scope for takeover activism and it amounts to a proximate implementation of the Bebchuk-Hart proposal: it can effect mergers against the will of incumbent management and eliminates ex ante free-riding on takeover bids; but since a binding merger vote cannot be freely initiated by outsiders, it requires costly campaigns to pressure the board into pursuing a merger.[34]

Last, it is worth noting that the identified advantage of takeover activism does not depend on activist-bidder pairs accumulating larger *combined* toeholds than bidders in tender offers, nor does

[34]This comparison notwithstanding, we should note that Bebchuk and Hart (2001) construct their analysis, differently from us, on a combination of adverse selection and free-rider problems and without effort provision. Moreover, their analysis does not include tender offers with freeze-outs (which make use of the board's merger prerogative), which would be as effective as the proposed rule in their setting. By contrast, takeover activism and two-tier offers are not equivalent in our setting.

it involve "buying low and selling high." This is different from Cornelli and Li (2002) where merger arbitrageurs buy in "cheap" at the expense of noise traders, creating blocks that relax the free-rider problem. Our papers speak to different real-world strategies: Arbitrageurs trade to help an existing offer succeed, while takeover activists campaign to initiate a merger (or change its terms).[35]

Figure 4 about here

4 Choice of intervention mode

So far, we analyzed the various intervention modes in isolation and compared outcomes. In this section, we consider situations in which more than one intervention mode is feasible. For parameters under which tender offers are infeasible so that the only choice is which type of campaign to pursue, the first part of Proposition 6 applies. What remains is to consider settings in which tender offers and activism are feasible, and bidder and activist are separate parties.

The bidder's outside option does not affect the terms of a tender offer, which are pinned down by the target shareholders' free-rider condition. However, the outside option of selling her stake in a tender offer affects the activist's choices and incentives. In fact, regular activism is no longer viable because in a tender offer the activist benefits from a larger post-takeover value improvement without bearing any costs. Formally, a tender offer with $r_b \geq 1/2 - t_b$ is prorated, so the activist can sell $t_a\gamma$ shares, where $\gamma^{-1} \equiv \frac{1-t_b}{r_b}$ measures how oversubscribed the offer is. From this sale, she earns $t_a v_a^f$ where $v_a^f \equiv \gamma p_b + (1-\gamma)\, V^*(s_b, \theta)$ and $p_b \geq V^*(s_b, \theta)$ by the free-rider condition. Thus, v_a^f is weakly larger than $V^*(1/2, \theta)$ since $s_b \geq 1/2$. By contrast, her expected profit from regular activism, $t_a q(a^*) V^*(s_a, \theta) - q(a^*) C^*(s_a, \theta) - K(a^*)$, is strictly smaller than $V^*(1/2, \theta)$, since $V^*(s_a, \theta) < V^*(1/2, \theta)$ given that $s_a < 1/2$.

Figure 5 about here

As regards takeover activism, the alternative of a tender offer impacts the negotiated merger terms, campaign effort, and incentives to start a campaign (see Figure 5). In the merger negotiation stage, the tender offer payoffs determine both parties' participation constraints, and thereby the merger price p_m. Under our assumption that the activist has all the bargaining power, the bidder's

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

participation constraint is strictly binding. Therefore, p_m is lowered by the fact that the bidder can now resort to a profitable tender offer.

In the campaign effort stage, the alternative of a tender offer implies that an activist's payoff following a failure is positive ($s_a v_a^f > 0$). Hence, the activist solves $\max_a q(a, \psi, s_a) s_a p_m + (1 - q(a, \psi, s_a)) s_a v_a^f - K(a)$. The marginal return to effort is $\frac{\partial q}{\partial a} s_a (p_m - v_a^f)$, which shows that the incentives to exert effort are reduced both by the lower merger price p_m and by the fact that failure is less unattractive. For the same reason, the activist purchases fewer shares prior to exerting campaign effort.

Last, a campaign is not started unless the activist's expected profit (including her revenue from the tender offer after a failed campaign), denoted by $\Pi_a^{ta}(t_a, t_b, \theta)$, exceeds the activist's tender offer revenue $t_a v_a^f$. So, the sale proceeeds the activist can earn in a tender offer raise the threshold payoff that make takeover activism attractive.

Proposition 7. *When tender offers are feasible, regular activism never emerges. Takeover activism*

(i) emerges only if the expected campaign profit $\Pi_a^{ta}(t_a, t_b, \theta)$ exceeds $t_a v_a^f > 0$, and

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

The example in Figure 6 shows that the threshold profit constraint $\Pi_a^{ta}(t_a, t_b, \theta) \geq t_a v_a^f$ imposed by the alternative of a tender offer eliminates takeover activism below a threshold $\hat{\theta}$ even when such campaigns would be profitable. Given that takeover 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 latent option of a tender offer thus raises the average return of campaigns that occur. This is consistent with the evidence that observed returns to activism are highest for targets that are ultimately acquired (Greenwood and Schor, 2009; Becht et al., 2017).[36]

Figure 6 about here

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,

[36] Note that the constraint $\Pi_a^{ta}(t_a, t_b, \theta) \geq t_a v_a^f$ pertains to the unconditional expected campaign profit, but implies that the same constraint must hold for the campaign profit conditional on success.

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 also 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.

Propositions 6 and 7 together imply that takeover activism improves control allocation along two dimensions. If tender offers are infeasible, it enables control changes that otherwise would not occur. If tender offers are feasible, it substitutes negotiated mergers for restricted bids, thereby increasing ownership concentration and hence restructuring incentives. Thus, changes in the effectiveness of campaigning affect the whole M&A market.

Proposition 8. *For low legal risk, larger ψ facilitate takeover activism, which in turn promotes overall takeover activity but reduces tender offers.*

Proposition 8 is in line 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 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 resulted from regulatory changes that made it easier for active shareholders to communicate and coordinate efforts. Anti-takeover practices offer alternative explanations for the substitution effect but cannot account for the increase in total M&A, nor the fact that takeover activists do more than simply remove takeover defenses.

A tacit premise of Proposition 8 is that some changes (ψ) ease coordination in activism, *but not in tender offers*. A possible reason is that the coordination problem in activism concerns *communication*: other shareholders must be persuaded to back the campaign, but once convinced, find it individually rational to do so (see, e.g., the micro-foundations in Appendix B). By contrast, the coordination failure in tender offers concerns *commitment*: individually, no shareholder accepts less than the expected post-takeover value. This difference in the nature of the coordination problem may be of empirical interest, and of importance for the evolution of these governance mechanisms in response to regulatory changes and progress in information technologies.

5 Conclusion

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 a key friction. We identify comparative advantages based on the fact that they face different manifestations of this behavior. This provides a deep-seated rationale for the coexistence of these mechanisms and relative predictions about returns to bidders and activists. It also provides a reason why takeover activism can outdo tender offers, on one hand, and regular activism, on the other. Last, it has implications for how institutional changes may affect the co-evolution of these mechanisms, which has seen a secular shift as of late (Solomon, 2013; Fujita and Barreto, 2017).

In a previous version, we also 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]

[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: 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 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 $t_b < s_b$. By constraint (3), the bid price is therefore $p_b = V^*(1/2,\theta)$. ■

Proof of Proposition 1

Using Lemma 2 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

Under 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, $a^* = \min\{a^+, \overline{a}\}$. The activist's expected profit from a campaign is $q(a^*, \psi, t_a)\Delta(t_a, \theta) - K(a^*)$. Now, 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 3

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, as the example in Figure 2 shows, activism can nevertheless be more profitable. To see that this requires that campaign costs and toeholds are sufficiently small but θ sufficiently large, consider the following limits: For $t_a, t_b \to 1/2$, tender offers are always more profitable than activism because the unrecompensed effort problem vanishes. For $t_a, t_b \leq \bar{\bar{t}}_b$, as $\theta \to \infty$, tender offers become unprofitable but activist profits increase and reach a positive level provided that campaign costs $K(a)$ are sufficiently small. For more concise conditions when one or the other is more profitable, we would need to resort to specific functional forms. ■

Proof of Proposition 4

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 $\max_{s_a \in [\underline{t}, 1/2]} q(a^*(s_a), \psi, s_a)[tV^*(s_a, \theta) - C^*(s_a, \theta)] - K(a^*(s_a))$ 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 Proposition 5

We first provide a formal proof that a freeze-out never occurs in equilibrium. Suppose to the contrary that there is a freeze-out. Anticipating this, rational 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 $(t_b+r_b)V^*(t_b+r_b,\theta) - C^*(t_b+r_b,\theta)$ without a freeze-out, it would be $(t_b+r_b)V^*(s_b,\theta) - C^*(s_b,\theta)$ with a freeze-out. By revealed preference, $(t_b+r_b)V^*(t_b+r_b,\theta) - C^*(t_b+r_b,\theta) > (t_b+r_b)V^*(s_b,\theta) - C^*(s_b,\theta)$. So, the bidder would refrain from the freeze-out, in contradiction to the shareholders' premised anticipation.

We next prove that the bidder buys no more than $1/2 - t_b$ shares. 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 2).

Last, we prove that the bidder must pay strictly more than the post-takeover share value. 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 $\Pi_b^F = \widetilde{s}_b V(e_b(\widetilde{s}_b,\theta),\theta) - C(e_b(\widetilde{s}_b,\theta),\theta)) - (1-\epsilon)f_b p_b$, 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 $\frac{d\Pi_b^F}{df_b} = (1-\epsilon)V(e_b(\widetilde{s}_b,\theta),\theta) + [\widetilde{s}_b V_e(e_b(\widetilde{s}_b,\theta),\theta) - C_e(e_b(\widetilde{s}_b,\theta))]\frac{\partial e_b(\widetilde{s}_b,\theta)}{\partial \widetilde{s}_b} - (1-\epsilon)p_b$. Using 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 $\frac{d\Pi_b^F}{df_b} = (1-\epsilon)V(e_b(\widetilde{s}_b,\theta),\theta) - (1-\epsilon)p_b > 0$. 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,

$$\Delta(1/2,\theta) \geq \Delta(1-\epsilon/2,\theta) - \frac{1-\epsilon}{2}p_b. \tag{18}$$

Imposing equality in (18) and solving for the price yields the price $\underline{p}_b$ in the proposition. To see that $\underline{p}_b > V^*(1/2,\theta)$, set $p_b = V^*(1/2,\theta)$ in (18), which then simplifies to $\left(1-\frac{\epsilon}{2}\right)V^*(1/2,\theta) - C^*(1/2,\theta) \geq \Delta(1-\epsilon/2,\theta)$, which is false by revealed preference. ■

Proof of Lemma 4

Recall that $\hat{s}_b \equiv t_b + (1-\epsilon)r_m$ is the bidder's effective stake given the legal risk. 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 allows us to rewrite the expected merger revenue as $\Delta(\hat{s}_b,\theta) + \epsilon r_m V^*(\hat{s}_b,\theta)$. 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 $R^*(t_b,\epsilon,\theta) \equiv V(e_b(\hat{s}_b^*,\theta),\theta) - C(e_b(\hat{s}_b^*,\theta))$ and, on a per-share basis, $\frac{R^*(t_b,\epsilon,\theta)}{1-t_b}$. To determine the campaign effort and post-disclosure share purchase, one simply needs to replicate the steps in Proposition 4, replacing $R_a^*(s_a,t_b,\epsilon,\theta)$ for $\Delta(s_a,\theta)$ in the objective function and $\frac{R^*(t_b,\epsilon,\theta)}{1-t_b}$ for $V^*(s_a,\theta)$ in the free-rider condition. ■

Proof of Proposition 6

We begin with the proof of part (ii). We show that Proposition 2 applies equally to takeover activism. Once the free-rider condition is incorporated in the objective function, (13)-(17) 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 $g_z(s_a^*,a^*,\theta) = 0$, the analogue of part (ii) of Proposition 2 applies: $\frac{\partial \mathcal{L}^*}{\partial \theta} > 0$. The analogue of part (i) of Proposition 2 also applies because $\lim_{t_a \to 0} A(s_a,\theta) = 0$. Now, given takeover activism has qualitatively the same comparative statics as regular activism, Proposition 3 also applies to the comparison between takeover activism and tender offers.

We now turn to part (i) of the current proposition. 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 (13)-(17) 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 above proof for part (ii) by relabeling z as θ. ■

Proof of Proposition 7

Most of the proof is contained in the text surrounding the proposition. What remains is to be shown is that the activist may prefer takeover activism than selling in a tender offer. For this, we need to show that there exist parameter constellations under which the activist's expected payoff from activism is higher than her payoff in a two-tier tender offer (and the latter is positive). To this end, we show that in the absence of campaign costs takeover activism is more profitable whenever legal risk ϵ is below $\frac{1}{2(1-t_b)}$, which is the level at which the bidder's effective post-merger stake $\hat{s}_b^*$ equals $1/2$ and hence the value generated in a brokered merger is the same as in a tender offer.[38] This

[38] If the bidder were to acquire 100 percent in a tender offer, if a tender offer is feasible, takeover activism would never emerge because the tender offer would create the same value improvement without campaign costs. However, depending on the bargaining power distribution in the merger, the bidder might still prefer takeover activism. In an earlier version of the paper, we show that in such cases the bidder has incentives to refrain from acquiring a toehold in order to make a tender offer infeasible and promote takeover activism.

implies that there exist $\epsilon < \frac{1}{2(1-t_b)}$ such that takeover activism is more profitable even for positive (but sufficiently small) campaign costs.

In the absence of campaign costs, $q^*(t_a, \psi, a) = 1$ and the activist can freely initiate merger negotiations. Since she has all the bargaining power, the merger price p_m is set such that the bidder's participation constraint $V^*(\hat{s}_b^*, \theta) - C^*(\hat{s}_b^*, \theta) - (1-\epsilon)(1-t_b)p_m - \epsilon(1-t_b)V^*(\hat{s}_b^*, \theta) \geq \Pi_b^{to}$ is binding. That is, the bidder's payoff in a brokered merger is the same as in a tender offer, namely Π_b^{to}. The target shareholders' payoff is equal to the total surplus net of the bidder's payoff. In takeover activism, this is $\Delta(\hat{s}_b^*, \theta) - \Pi_b^{to}$, and in a tender offer, it is $\Delta(1/2, \theta) - \Pi_b^{to}$. For $\epsilon = \frac{1}{2(1-t_b)}$, we have $\hat{s}_b^* = 1/2$ and so value created and all payoffs are identical. For $\epsilon < \frac{1}{2(1-t_b)}$, $\hat{s}_b^* > 1/2$ and hence $\Delta(\hat{s}_b^*, \theta) > \Delta(1/2, \theta)$. Consequently, the activist's payoff under takeover activism is then strictly larger than her payoff in a tender offer. Finally, we need to confirm that the bidder's tender offer payoff can be positive given $\epsilon = \frac{1}{2(1-t_b)}$. By means of illustration, this holds when using the functional specifications in our example of Figure 2 for $\theta < 2.89$. ■

Proof of Proposition 8

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 $\psi \to \infty$. ■

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.[39] 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 $V^*(s_a, \theta)$.[40] 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.[41] 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

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

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

[41] In BDM, the reputational benefit is more endogenous, as the strength of the signal depends on the unskilled shareholders' engagement decisions (see footnote 39 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).

shareholders due to strategic complementarities. To refine the equilibrium, they assume that 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.[42] If $\lambda V_G + (1-\lambda)V_B \geq 0$, 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."[43] 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.[44] 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

[42] 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).

[43] 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.

[44] 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.

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.[45]

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 $s \in \{k, k+1, \ldots n\}$.[46] 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 a_s, as they are compositions (specifically, sums of products) of continuous functions. Also, 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

[45] 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.

[46] 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.

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 $\max_{a_{n-1}} q_{n-1}(a_{n-1})\Delta\left(s_a, \theta\right) - K\left(a_{n-1}\right) + \left(1 - q_{n-1}(a_{n-1})\right) V_n$. Rearranging the objective function to $q_{n-1}(a_{n-1})\hat{\Delta}_{n-1}\left(s_a, \theta\right) - K\left(a_{n-1}\right) + V_n$ with $\hat{\Delta}_{n-1}\left(s_a, \theta\right) \equiv \Delta\left(s_a, \theta\right) - V_n$ 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 $\hat{\Delta}_{n-1}\left(s_a, \theta\right) < 0$, the solution is to skip stage $n-1$.) 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, $\frac{\partial V_{n-1}}{\partial \theta} = q_{n-1}(a^*_{n-1})\frac{\partial \Delta}{\partial \theta} + \left(1 - q_{n-1}(a^*_{n-1})\right)\frac{\partial V_n}{\partial \theta} > 0$, 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: 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

$$t_b V - C \tag{19}$$

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

$$1/2 V_e = C_e \tag{20}$$

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 (20) 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 (19) 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 (19). 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. Indeed, a setting with variation only in fixed costs ("endowments") would take 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.

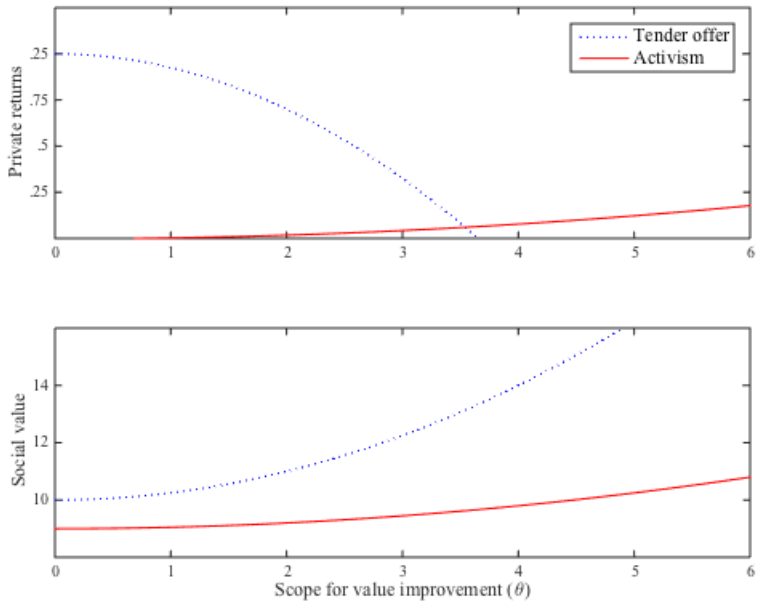

Figure 2: This graph assumes $V(e,\theta) \equiv \theta e + 10$, $C(e) \equiv \frac{e^2}{2}$, $q(a,t_a) \equiv 20t_a a$, $K(a) \equiv \frac{a^2}{4} + .94$, and $t_a = t_b = .1$. As the scope for value improvement increases, bidder returns decrease, whereas the returns to activism increase; above some 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).

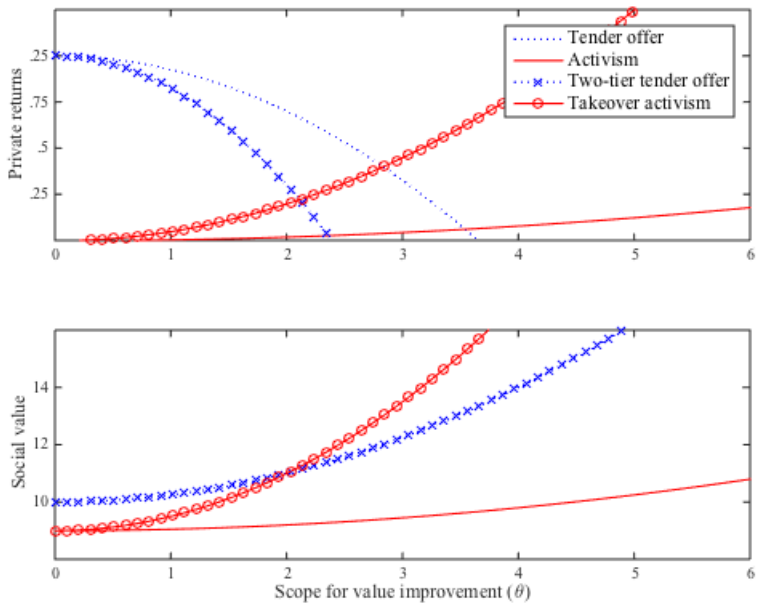

Figure 4: This graph is based on the same assumptions as Figure 2, and in addition, $\epsilon \to 0$ (low legal risk). For takeover activism, it assumes the toeholds $(t_a, t_b) = (.1, 0)$. Tender offers with a freeze-out option (two-tier offers) are as efficient as those without, but less profitable. 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.

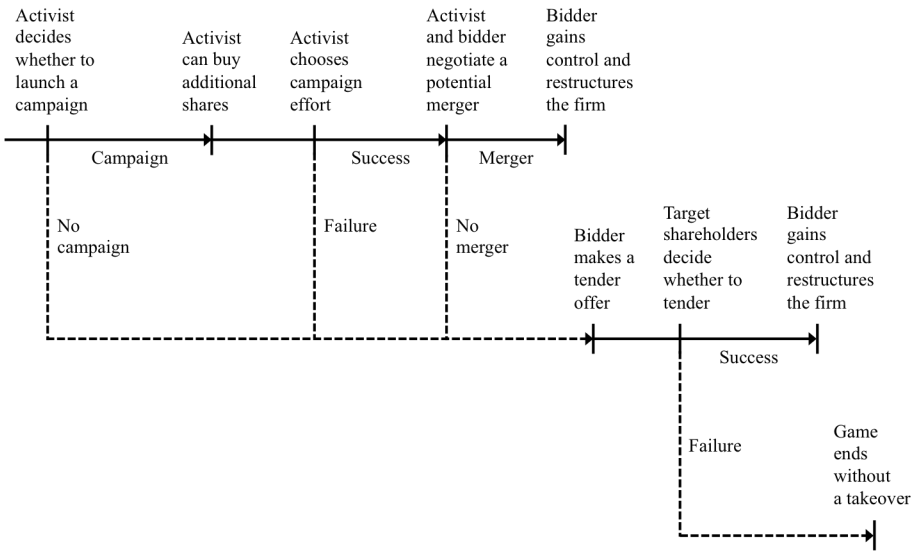

Figure 5: In takeover activism with a tender offer as fallback, payoffs from the potential tender offer matter as outside options when (1) deciding whether to start a campaign, (2) choosing the campaign effort, and (3) negotiating a merger.

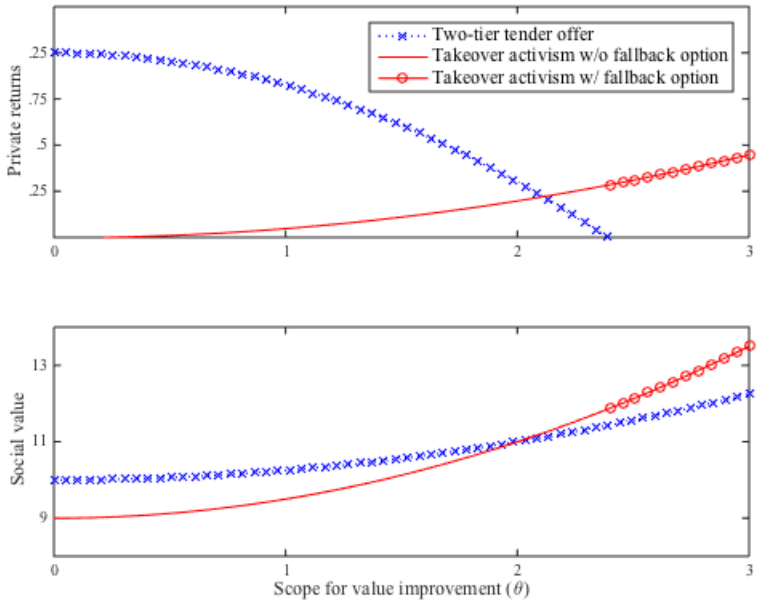

Figure 6: This graph is based on the same assumptions as Figure 4, except that it assumes the toeholds $(t_a, t_b) = (.1, .1)$ for takeover activism. The solid red lines show payoffs from takeover activism in the absence of tender offers. The red circles show where takeover activism emerges if tender 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.

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