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The Evolution of the Market for Corporate Control

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Abstract

In a canonical takeover model we let an informed large shareholder choose between making a bid or initiating a sale to another acquirer. Such takeover activism complements direct takeovers because the very choice mitigates the asymmetric information problem, thereby improving efficiency. As more investors enter the market for corporate control, takeover activism increasingly substitutes for direct takeovers and becomes the prevailing mode of effectuating control changes. Our theory thus proposes that investor activism has not superseded disciplinary acquisitions but instead brought about a new modus operandi: takeover activism, characterized by a symbiotic relationship between private equity and activist hedge funds.

Keywords: Tender offers, takeover activism, free-rider problem, asymmetric information, market for corporate control

JEL Classification: G34.

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> The lower the stock price, relative to what it could be with more efficient management, the more attractive the takeover becomes to those who believe that they can manage the company more efficiently. And the potential return from the successful takeover and revitalization of [a] poorly run company can be enormous. — Henry G. Manne (1965, p.118)

1 Introduction

The market for corporate control has come a long way since the above quote. First, professional control-oriented investors such as activist hedge funds and private equity funds have emerged and are now central players in this market.[1] The assets under management by hedge funds globally has seen a 50-fold increase from 1997 to 2022, and the global buyout deal value by private equity funds has undergone a more than 35-fold increase from \$30 billion in 1995 to \$1,121 billion in 2022.[2] Second, hostile tender offers were the prominent feature of the market in the 1980s, but the mode of control change has since shifted from such direct takeovers to takeover activism—large shareholders do not take over firms themselves but broker a sale to outside bidders.

In this paper, we argue that it is the growth (of capital at the disposal) of control-oriented investors that has led to this shift in the mode of control changes. Our explanation of this evolution builds on the role that large shareholders have in overcoming information and coordination problems in the market for corporate control. The novelty of our theory is to recognize that control-oriented investors need not have ex-ante designated roles on the buy- or the sell-side. Rather, they can choose to be large shareholders who acquire firms themselves, or who put firms in play, or be outside bidders for firms that are put in play. In our theory the optimal role choice depends on the total number of control-oriented investors in the market, and the equilibrium patterns match the major secular trend: the emergence and rise of takeover activism and the decline of direct takeovers (hostile tender offers).

In the first part of our analysis, we examine what determines at the single-firm level a large shareholder's choice between being on the buy- or the sell-side and how this choice impacts the efficiency of the control allocation. To this end, we add to the seminal framework of Shleifer & Vishny (1986) the option of *initiating a sale of the firm* in lieu of making a tender offer. More specifically, a large shareholder has private information about the

[1] As Coffee (1984) notes, Manne (1965) did not focus on hostile bids or financial acquirers, which were less prominent at the time, but rather on acquisitions in general. In fact, among those he considered most apt to identify managerial inefficiencies were competitors, customers, and suppliers of potential targets.

[2] For hedge funds, see https://www.statista.com/statistics/271771/assets-of-the-hedge-funds-worldwide/. The number of *activist* hedge fund campaigns nearly tripled between 1994 and 2016 (Barry et al. (2020)). For private equity, see Bain & Company's Global Private Equity Report (2014), https://www.bain.com/contentassets/19a87eaf7da54f4090613772d7c10cd1/report_global_private_equity_report_2014.pdf and Bain & Company's Global Private Equity Report (2022), https://www.bain.com/globalassets/noindex/2022/bain_report_global-private-equity-report-2022.pdf.

value improvement that can be realized through restructuring of the firm. Restructuring, however, requires control. The large shareholder can gain control through a direct takeover and implement the value improvement herself. Alternatively, she can invite an outside bidder to take control. In such an invited merger, the large shareholder negotiates on behalf of all shareholders a binding agreement with the bidder. (While the binding agreement by assumption precludes dispersed shareholders from free-riding, this is not crucial for our results as we discuss later in the introduction and show formally in Section 4.) Due to the lack of prior involvement with the firm, the outside bidder does not know the value improvement at the time of the merger negotiation. Once in control, the outside bidder has access to the same restructuring technology[3] as the large shareholder, learns the true value improvement, and implements it.

The equilibrium features a simple cut-off structure: For firms with substantial value improvements, the large shareholder makes a tender offer and takes the firm over herself, whereas she initiates a sale to the outside bidder for firms with modest value improvements. Her choice is driven by the information rents that accrue at opposite ends of the value improvement distribution. In equilibrium, all firms taken over directly by the large shareholder receive the same bid price. Consequently, a large shareholder buys a firm with large value improvements at a discount, whereas she buys a firm with moderately large value improvements at a premium. With redistribution from moderately large to large firm types, the information rents in tender offers accrue at the upper end of the value improvement distribution. For all firm types with modest value improvements, the outside bidder pays in equilibrium the same expected price. Therefore, large shareholders of firms with moderately small value improvements sell their stakes below their true value, while those of firms with small value improvements sell them above their true value. With redistribution from moderately small to small firm types, the information rents in invited mergers accrue at the lower end of the value improvement distribution. Large shareholders owning stakes in firms with intermediate value improvements thus earn negative information rents from either control change mode and are left with choosing the "lesser evil."

In the setting of Shleifer & Vishny (1986), in which direct takeovers are the sole mode of control change, the conjunction of free-riding behaviour and asymmetric information implies that control is not always efficiently allocated. Firms with modest value improvements are not taken over and restructured. The gains that a large shareholder makes on her initial stake are not sufficient to offset the premium at which she would have to acquire the dispersedly held shares. By contrast, we show that adding the option to be on the sell-side results in a fully efficient control allocation. All firms are taken over and restructured either by the large shareholder or by the outside bidder. The efficiency gains arise because the large shareholder can choose between being on the buy or sell side, combined with the fact that

[3]We show in an extension that our qualitative results hold when the value improvement has a common as well as a private (bidder-specific) component.

selling the stake at a positive (expected) price dominates staying passive irrespective of the value improvement. That is, informed control sales are a more effective mechanism to bring about value creating control changes than informed control acquisitions.

Furthermore, takeover activism does not only complement direct takeovers but also replaces the latter for some firms as the mode of control change. By raising the value of the large shareholder's outside option from remaining passive to selling her stake at a positive price, a tender offer becomes the more profitable option for a smaller set of firms with substantial value improvements.

To analyse the evolution of the *market* for corporate control, we embed the single-firm model into a market model. There is a continuum of firms, each with a potential value improvement, among which control investors look for targets. Each control investor chooses whether to be a large shareholder (e.g., hedge fund) and buy an initial stake or to be a potential outside bidder (e.g., private equity fund), putting in place human and financial capital, and is randomly matched with a particular firm.[4] Thus, there are search frictions but ex-ante no designated buyers or sellers in our framework.

We characterize the evolution of the market by comparing the market composition as the number of control investors grows. In the early stage, with relatively few control investors, all enter the market as large shareholders. Consequently, direct takeovers are the sole means to effectuate (hostile) control changes, matching the observed pattern from the 1980s. Intuitively, a large shareholder can implement a control change through a direct takeover herself, whereas an outside bidder has to rely on a large shareholder to initiate a sale to her. When the market for corporate control is thin, the likelihood of receiving a merger invitation is simply too small. Hence, all control investors become large shareholders.

Once a sufficient fraction of firms have a large shareholder, entering as a bidder becomes attractive. Furthermore, as more outside bidders are in the market, it becomes increasingly more profitable to enter as a large shareholder: A large shareholder cannot only acquire the firm with substantial value improvements, but she is also more likely to find an outside bidder to extend a merger invitation for modest value improvements. Similarly, as the fraction of firms with a large shareholder grows, it becomes increasingly more profitable to enter as an outside bidder since the likelihood of receiving a merger invitation increases. Because of this complementarity, the (expected) profits of both large shareholders and outside bidders do not erode but keep increasing as more control investors enter the market. In this transformation phase, control changes are also increasingly more often carried out through takeover activism relative to direct takeovers. Control investor profits and the relative frequency of takeover activism keep increasing until all firms are matched with one large shareholder and the market for corporate control reaches its mature stage. Depending on parameters, some

[4]One can interpret the entry decision also as a reduced form model of investors deciding to invest in either hedge funds or private equity funds since both decisions are ultimately determined by the profitability of the two strategies.

firms may in the mature stage be matched with two outside bidders who compete in case of a merger invitation. Alternatively, some firms may not be matched with an outside bidder.

The market for corporate control becomes overall more efficient as the number of control investors grows. These efficiency gains comprise two effects. In the early stage, in which control changes occur only through direct takeovers, the gains stem from a standard "scale" effect: a growing number of control investors identifies a growing number of potential targets. In the transformation stage, with the rise of takeover activism, an additional source of gains is the increase in the probability that identified potential targets are successfully restructured. This reflects that the growing market evolves toward a more efficient mode of control change, gradually capturing the efficiency gains from takeover activism that we identify in our single-firm model.

As is well documented, there has been a continuous decline in hostile tender offers since the late 1980 (e.g., Eckbo (2009)) with a contemporaneous rise in shareholder activism (e.g., Fos (2017)). In the extant literature, this shift is commonly attributed to the widespread adoption of takeover defenses and various legal changes that facilitate shareholder activism. We agree that these changes impact the market for corporate control but contend that they do not provide a comprehensive explanation. On a conceptual level, takeover defenses merely necessitate that a control change must be preceded by an activist campaign to remove these defenses and board resistance.[5] After their removal, the control change may equally well be implemented through a direct hostile takeover or through takeover activism.[6]

On a factual level, the rise in shareholder activism has not eliminated disciplinary control changes. Many activist campaigns and the most profitable ones result in outside bidders such as private equity funds acquiring the firm (Greenwood & Schor 2009, Boyson et al. 2017). Furthermore, control-oriented (going-private) LBOs have not declined but rather increased over this time period (Kaplan & Stromberg 2009, Renneboog & Vansteenkiste 2017). These empirical observations suggest that there is not a secular shift away from disciplinary takeovers but a change in how they are carried out. Within our theory, the growth of (funds under management of) control investors explains the rise of takeover activism characterized by a "symbiotic relationship between private equity funds and hedge funds."[7] (We discuss these empirical developments and proposed interpretations in more detail in Section 3.4.)

In Section 4 we revert to the firm-level analysis to unearth the causes of the efficiency gains brought about by takeover activism. We begin by showing that the assumption of the binding merger agreement is not crucial by replicating the firm-level restructuring outcome

[5] Levit & Corum (2019) argue that activists who do not want to take over the firm themselves have a higher chance of winning a merger vote. However, they do not consider the option of a direct takeover by the activist.

[6] Indeed, Carl Icahn launched an activist campaign in 2021 to "replace Southwest Gas Holdings' (SWX) entire board and to commence a tender offer for all common shares at $75 per share in cash." CNBC, 2021, https://www.cnbc.com/2021/10/23/carl-icahns-tender-offer-for-southwest-gas-sets-the-table-for-a-proxy-fight.html

[7] Financial Times 2007, https://www.ft.com/content/6a3e50b2-1070-11dc-96d3-000b5df10621

in a modified setting: Instead of extending a merger invitation, the large shareholder can now – under the same bargaining protocol as in the merger - negotiate a sale of her initial stake with the outside bidder who then subsequently makes a tender offer for the remaining dispersedly held shares. (As before, the outside bidder learns the value improvement only once she is in control.) Alternatively, the large shareholder has the option to make a bid for the firm herself. The equilibrium of this game has the same cut-off structure with an identical cut-off value, and the market for corporate control remains fully efficient. Firms with substantial value improvements are acquired by the large shareholder. Firms with modest value improvements are acquired in a tender offer by the outside bidder after she acquired the initial stake in a negotiated block trade. All value improvements are realized because this variant of takeover activism allows to fully separate the asymmetric information and the free-rider problem. In the block trade, the large shareholder has private information about the value improvement. Nonetheless, bilateral trade is efficient because there are known gains from trade. In the subsequent tender offer, the outside bidder faces free-riding by the dispersed shareholders but does not have an informational advantage, and efficient trade is again feasible.

Arguably, the outside bidder may learn the value improvement after the block trade but prior to the tender offer. Nonetheless takeover activism leads to more firms being taken over and restructured compared to a setting where only the large shareholder can make a tender offer. By trading the block instead of acquiring the firm, the large shareholder credibly reveals that the value improvement is not substantial. After the block trade, the dispersed shareholders expect a moderate value improvement, and the outside bidder makes a successful bid at a lower price. Hence, more control changes are realized. Still, firms with a sufficiently small value improvement are not taken over because the gains on the stake acquired in the block trade are not sufficient to offset the premium at which the outside bidder would have to acquire the dispersedly held shares.

We show that this remaining inefficiency can be completely eliminated if there are sufficiently many bidders *located in a "bidder chain"*. In this extension, each bidder can, after having acquired the block, either make a tender offer to the dispersed shareholders or sell the block to the next bidder in the chain.[8] Adding more bidders increases efficiency, and in the limit all value-increasing control changes are realized. Independent of how small the value improvement is, sufficiently many bidders can collectively signal through the sequence of block trades that the value improvement is small until one bidder can make a successful tender offer at a sufficiently low price.

Related literature We build on the canonical framework on large shareholders and corporate control by Shleifer & Vishny (1986) and expand it by letting the large shareholder

[8] Contrary to the typical intermediation chains in the literature following Glode & Opp (2016), each bidder becomes perfectly informed before making an offer.

choose between taking the firm over herself or initiating its sale to another party. Subsequent papers on takeovers with asymmetric information and free-riding by dispersed shareholders are Hirshleifer & Titman (1990), At et al. (2011), Burkart & Lee (2015, 2016), Marquez & Yılmaz (2008, 2012), Ekmekci & Kos (2016) and Voss & Kulms (2022). We show that asymmetric information and free-riding can be overcome when the large shareholder can choose between being on the buy-side or sell-side of the transaction. None of the above papers allows for this choice.

There is a large literature on shareholder activism as surveyed by e.g., Edmans & Holderness (2017). Only four papers in this literature allow the large shareholder to choose between intervention modes: Shleifer & Vishny (1986), Bebchuk & Hart (2001), Maug (1998), and Burkart & Lee (2022).[9] Shleifer & Vishny (1986) and Bebchuk & Hart (2001) compare takeovers and proxy fights as alternative ways for the large shareholder to gain control. Our focus is not on how a given party gains control, but on the decision of this party to carry out the control change herself or to invite another party to acquire control. In his comparison between takeovers and shareholder activism Maug (1998) emphasises how stock market liquidity affects the large shareholder's choice of intervention mode. Market liquidity plays no role in our analysis, whose distinct feature is that the large shareholder chooses which party ultimately acquires control and implements the restructuring. Burkart & Lee (2022) first contrast direct takeover and regular shareholder activism, and then introduce takeover activism as a third intervention mode. In their moral hazard framework takeover activism is typically superior because it provides stronger incentives than regular activism and avoids the free-rider problem which plagues direct takeovers. We study the free-rider problem within an asymmetric information setting and show how the choice between takeover activism and takeovers results in an efficient control allocation. Moreover, a binding merger agreement is not crucial to our results, as we show in Section 4. All these four papers consider governance interventions at the firm level and none examines the choice of governance interventions at the market level or the evolution of the market for corporate control. This also applies to Levit & Corum (2019), who show why activists have an inherent advantage to campaign for a merger compared to bidders because the latter as buyers have an inherent conflict of interest. Their model abstracts from the free-rider problem and only allows direct takeovers with some exogenous probability. Gorbenko & Malenko (2022) give a rationale for why control sales of common value assets are initiated by sellers and rarely by buyers. Finally, we also consider bidder chains to overcome asymmetric information and free-riding as a novel form of intermediation chain à la Glode & Opp (2016) in Section 4.3. In that section, we discuss papers related to this analysis.

[9] We abstract here from exit as an intervention mode. There is, of course, a literature on comparing voice and exit in a variety of settings, see e.g., Hirschman (1970), Edmans & Manso (2010), Dasgupta & Piacentino (2015), Edmans et al. (2018), Levit (2018), Broccardo et al. (2020) and Voss (2022).

2 Control Change in the Firm

Our model presupposes a large shareholder with sufficient influence to remove takeover defenses, respectively, to put pressure on the board to allow a control change. Crucially, irrespective of how the large shareholder overcomes potential barriers, she needs to decide whether to acquire the firm herself through a direct takeover or to put the firm in play and broker an acquisition by an outside bidder. Therefore, we focus our analysis on the large shareholder's choice of which side of the takeover she wants to be on and do not explicitly model the removal of potential takeover defenses or board resistance.

2.1 Model

Consider a firm with a one share - one vote structure and a mass 1 of shares. A large shareholder L owns a minority block $\alpha \in (0, \bar{\alpha})$, while the remaining $1 - \alpha$ shares are distributed among a continuum of shareholders whose individual holdings are equal and indivisible. For simplicity, the firm value under the incumbent management is normalized to 0.

The firm value can increase to V if the firm is taken over and restructured. The dispersed shareholders only know that V is drawn from $[0, 1]$ according to a continuously differentiable density function f with full support and cumulative distribution function F. By contrast, L knows the realized value of V and possesses the restructuring capability to implement the value improvement if she takes over the firm. For ease of exposition, we also refer to the value improvement V as L's type.

The two preceding paragraphs describe the basic setting of Shleifer & Vishny (1986) to which we add the option to sell the firm to an outside bidder B. Initially, B does not own a stake and due to a lack of prior involvement with the firm merely knows the distribution of V. However, she has access to the same restructuring technology as L. That is, if she takes over the firm, she learns the realized value of V and can also implement it. In practice, one can think of such outside bidders securing funds and accumulating human capital to be prepared for a possible acquisition. For simplicity, we do not model such preparatory efforts.

After observing V, the large shareholder can choose between making a tender offer or getting the firm taken over by the outside bidder. We refer to the latter strategy interchangeably as merger invitation or takeover activism. Figure 1 illustrates the sequence of events.

> **Tender offer**: The large shareholder makes a take-it-or-leave-it cash bid at a price P per share. The offer is conditional and therefore becomes void if fewer than $1/2 - \alpha$ shares are tendered, that is, if L fails to gain control. There are no takeover costs other than the bid price, and the incumbent management is by assumption unable

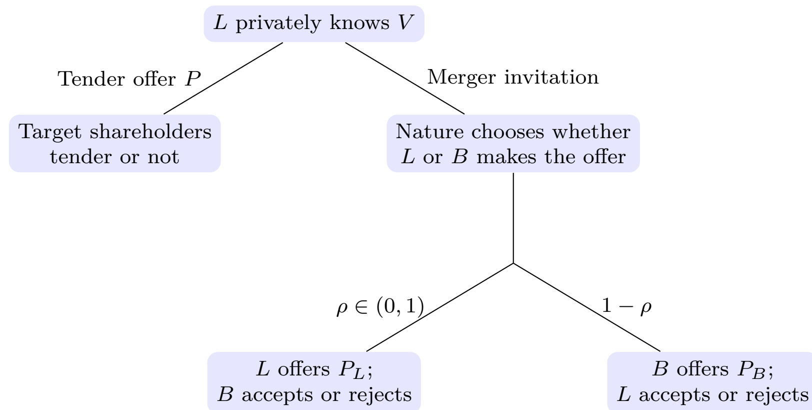


Figure 1: Sequence of events.

or unwilling to make a counter-bid, despite being opposed to the restructuring. If L makes a bid, target shareholders decide simultaneously and non-cooperatively whether to tender their shares. If the bid succeeds, L takes control and realizes the value improvement V. Otherwise, the incumbent management remains in control, and the firm value continues to be 0.

Merger invitation: The large shareholder negotiates on behalf of all target shareholders a sale of the firm to the outside bidder.[10] We model the negotiation over the merger price as a simple Nash bargaining game: With probability ρ, L makes a take-it-or-leave-it offer for all shares to be bought at price P_L, and B either accepts or rejects the offer. With the complementary probability $(1-\rho)$, B offers to buy all shares at price P_B, and L accepts or rejects the offer. If an offer is rejected, the incumbent management remains in control, and the firm value continues to be 0. If either of the offers is accepted, all shareholders must sell their shares at that price. Having acquired the firm, B gets to know the value improvement V and implements it. Since the merger agreement is binding, it circumvents the free-rider problem. As pointed out in the introduction and substantiated in Section 4, this is, however, not crucial for our results.

As in Shleifer & Vishny (1986), signaling by the large shareholder and coordination problems among dispersed shareholders give raise to multiple equilibria. To obtain a unique equilibrium outcome we impose the following three assumptions: (A1) Target shareholders

[10] In practice, boards have the prerogative powers to enter into merger negotiations. Therefore, a large shareholder or activist must either convince the incumbent board, or alternatively take control of the board, to initiate merger negotiations. We abstract from how L achieves this. We do not allow for L to negotiate a merger with herself. This is in accordance with Levit & Corum (2019) who argue that if L is on the buy-side, she cannot get board approval for the deal.

tender their shares to L if the price P weakly exceeds the expected post-takeover share value; (A2) the beliefs about off-equilibrium moves satisfy the credible beliefs criterion of Grossman & Perry (1986); and (A3) the type distribution has a log-concave density function. This is a common assumption in signaling games with threshold strategies (Bagnoli & Bergstrom 2005). We point out the role of each assumption where it is material.

2.2 Benchmark

To highlight how the option of extending a merger invitation affects the functioning of the market for corporate control, we first solve as a benchmark the model without the outside bidder. This corresponds to the basic setting in Shleifer & Vishny (1986) (Section II) and also to the left-hand side of Figure 1.

When the large shareholder makes a bid P, dispersed shareholders update their beliefs about the value improvement, respectively L's type, and condition their expectation on the offered price. Since no shareholder considers herself pivotal for the outcome, each shareholder tenders only if the offered price at least matches the expected post-takeover share value (Grossman & Hart 1980). Consequently, a successful tender offer must satisfy the free-rider condition $P \geq \mathbb{E}[V|P]$.

Assumption A1 ensures a unique outcome for any offered price P: When the free-rider condition is violated, the bid fails. Otherwise, success is the unique equilibrium outcome and all shareholders tender their shares. In any successful bid offered in equilibrium, L offers the same price since all L types would prefer the lowest successful bid if different bids were to succeed.[11]

Given a bid P, shareholders infer in equilibrium that such a bid must come from any L type for whom such a bid is profitable. Since all shareholders tender in a successful offer, L is willing to offer at most V for the $(1-\alpha)$ shares. Thus, her participation constraint is $V-(1-\alpha)P \geq 0$, and the shareholders' conditional expectation about the post-takeover share value is $\mathbb{E}[V|P] = \mathbb{E}[V|V \geq (1-\alpha)P]$. A tender offer is made in equilibrium if the above participation constraint of the large shareholder and the free-rider condition

$$P \geq \mathbb{E}[V|V \geq (1-\alpha)P] \tag{1}$$

are satisfied. There is a continuum of prices that satisfies these two conditions and can be supported as Perfect Bayesian Equilibria. The reason is that bids P for which (1) is slack can be supported as Perfect Bayesian Equilibria by attributing any deviation $P' < P$ to the highest type ($V = 1$). Under these beliefs, such deviations violate the free-rider condition and thus fail.

[11] Assumption A1 rules out (semi-)separating equilibria in which offers succeed at different prices. Allowing shareholders to play probabilistic tendering strategies generates separating equilibrium outcomes (Hirshleifer & Titman 1990).

Assumption A2 selects the minimum bid equilibrium $P^* = \mathbb{E}[V|V \geq (1-\alpha)P^*]$ as the unique equilibrium. The credible beliefs criterion (Grossman & Perry (1986)) imposes that a deviation from a Perfect Bayesian Equilibrium price is attributed, consistent with prior beliefs, to *all and only* types that would gain from this deviation. This eliminates all bids $P \in (P^*, 1]$ for which the free rider condition (1) is slack as equilibrium candidates.

Lemma 1. ***Shleifer & Vishny (1986)*** *In the unique Perfect Sequential Equilibrium, the large shareholder makes a bid for all* $V \geq V_0^*$ *offering the same price* $P^* = \mathbb{E}[V|V \geq V_0^*]$.

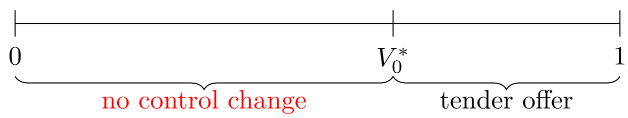


Figure 2: Cutoff equilibrium with only tender offers.

Because all successful types pay the same price $P^* = \mathbb{E}[V|V \geq V_0^*]$, L types with $V \in [V_0^*, P^*)$ pay more than the true value improvement whereas types with $V \in (P^*, 1]$ pay less. Such mispricing deters L types whose gain on their initial stake is too small to compensate for the loss at which they would have to buy the $(1-\alpha)$ shares. More specifically, since L's payoff from a successful bid

$$\alpha V + (1-\alpha)(V - P). \tag{2}$$

is monotonically increasing in V for a given P, the equilibrium features a simple cut-off structure as illustrated in Figure 2: All and only types above the cut-off V_0^* make a bid offering $P^* = \mathbb{E}[V|V \geq V_0^*]$, and the cut-off threshold V_0^* is the solution to

$$\alpha V_0^* + (1-\alpha)\big(V_0^* - \mathbb{E}[V|V \geq V_0^*]\big) = 0.$$

Asymmetric information has two consequences. First, it leads to redistribution among successful types: Types $V \in (P^*, 1]$ can extract information rents at the expense of types $V \in [V_0^*, P^*)$. Second, it exacerbates the free-rider problem: Types $V < V_0^*$ do not make a bid, that is, there is a cut-off "at the bottom." This reflects that L as a buyer has an incentive to *under*state V, which we refer to as a *smart buyer problem* (Burkart & Lee 2016). By contrast, under full information $P^* = V$ for each type, and all types would make a successful bid.

2.3 Modes of Control Change

Since we just have established the large shareholder's payoff from a tender offer, we merely need to work out her payoff from a merger invitation to determine how she chooses between the two control change modes (or remaining passive). When L extends a merger invitation, either she or B make a take-it-or-leave-it offer with probabilities ρ and $1-\rho$, respectively. Thus, L's expected profit from selling her initial stake α to the outside bidder is

$$\alpha[\rho P_L + (1-\rho)P_B]. \tag{3}$$

A failed negotiation leaves the incumbent management in control and firm value at 0. Hence, B's offer optimal offer is $P_B^* = 0$, and she extracts the full surplus. When it is L's turn to make an offer, she cannot ask for more than B's posterior expectation about the firm value $\mathbb{E}[V|invite]$. Given B either accepts or rejects an offer, there can only be one price P_L offered in equilibrium by L and accepted by B since all L types would prefer the highest accepted P_L otherwise.

Yet, any price P_L' strictly smaller than $\mathbb{E}[V|invite]$ being accepted by B can also be supported as a Perfect Bayesian Equilibrium by attributing any deviation from P_L' to the lowest type ($V = 0$). In parallel to the tender offer subgame, the credible beliefs criterion (Assumption A2) eliminates all Perfect Bayesian Equilibrium for which P_L is less than the posterior expectation of V. That is, the "maximum ask" offer $P_L^* = \mathbb{E}[V|invite]$ being accepted by B is the unique Perfect Sequential Equilibrium of the merger invitation subgame when L makes the offer.

Given the offers P_L^* and P_B^*, L's expected payoff from a merger invitation is $\alpha\rho\mathbb{E}[V|invite]$ which does not depend on her own type. Consequently, below average types among those who extend a merger invitation sell their stake (the firm) at a price above the true value, while above-average types sell at less than the true value. This reflects that L as an informed seller has an incentive to overstate V, that is, mergers are plagued by the *lemons problem* (Akerlof 1970). Thus, information rents accrue to the low types at the expense of the high types which is the opposite redistribution pattern than in the tender offer subgame.

The expected payoff to L from a merger invitation is a positive cash consideration. Hence, extending a merger invitation dominates remaining passive for any type. Unlike the merger payoff, L's tender offer payoff depends on her true type. For a given set of prices $\mathcal{P} = \{P, P_B, P_L\}$, her choice between the two control change modes therefore depends on her true type. Let $\Delta(V, \mathcal{P})$ denote the difference between her tender offer profit (2) and her expected merger profit (3):

$$\Delta(V, \mathcal{P}) = \underbrace{V - (1-\alpha)P}_{\text{Direct Takeover}} - \underbrace{\alpha[\rho P_L + (1-\rho)P_B]}_{\text{Merger Invitation}}. \tag{4}$$

Since $\Delta(V, \mathcal{P})$ is increasing in V for a given set of prices $\mathcal{P}$, there is a cut-off type above which all L types prefer to make a tender offer. Furthermore, the log-concave density function $f(V)$ (Assumption A3) ensures that there is a unique cut-off type.

Proposition 1. *In the unique Perfect Sequential Equilibrium, the large shareholder extends a merger invitation for all* $V \in [0, V_1^*)$ *and makes a bid for all* $V \in [V_1^*, 1]$*. The equilibrium prices are* $P^* = \mathbb{E}[V|V \geq V_1^*]$*,* $P_B^* = 0$*, and* $P_L^* = \mathbb{E}[V|V \leq V_1^*]$*.*

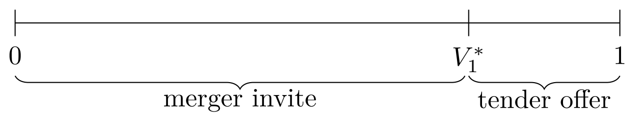


Figure 3: Cut-off equilibrium with tender offer and merger invitation.

High L types acquire the firm themselves, while low L types choose to invite the outside bidder to take the firm over. Intuitively, a tender offer allows the large shareholders to reap the full value improvement of her initial stake, whereas she sells it at some given price in a merger invitation. Clearly, the former is more attractive to high L types, whereas selling at a pooled price appeals to low L types.

The partial separation of types, which is absent in signaling theories of both external finance and takeovers, is rooted in the ability of the informed party to choose to be either a seller or buyer. This choice prevents pooling on one control change mode because an informed acquisition (smart buyer problem) and an informed sale (lemons problem) imply opposite distributions of information rents across types (see dashed line in Figure 4). Information rents accrue "at the top" in the tender offer but "at the bottom" in the merger invitation. Hence, high L types are drawn to the former and low L types to the latter, while intermediate types pick the "lesser evil." The option to choose between the smart buyer problem and the lemons problem is indeed instrumental for achieving separation. This can be seen by the fact that security design cannot achieve a finer type separation *within* the smart buyer problem (Burkart & Lee 2015) or the lemons problem (Myers & Majluf 1984, Nachman & Noe 1994).[12]

These information-theoretic arguments accord well with intuition. Wary of being short-changed, target shareholders demand a high price in a tender offer. Large shareholders with small(er) value improvements V may find these demands excessive and prefer to initiate a sale to a third party. Conversely, an outside bidder, concerned about overpaying, may refuse to pay a high price. Hence, large shareholders with large(r) value improvements V prefer to take over the firm themselves.

Merger invitations and tender offers appeal to L types at the opposite ends of the distribution. Still, the former does not merely complement the latter.

[12]Introducing restricted cash bids or cash-equity bids in our model does not alter the result that, within each intervention mode, there only exists a pooling outcome, nor the "direction" in which information rents shift payoffs across types. The only effect is that the magnitude of redistribution across types is reduced (At et al. 2011), which in our model has no efficiency implications, as all L types are taken over.

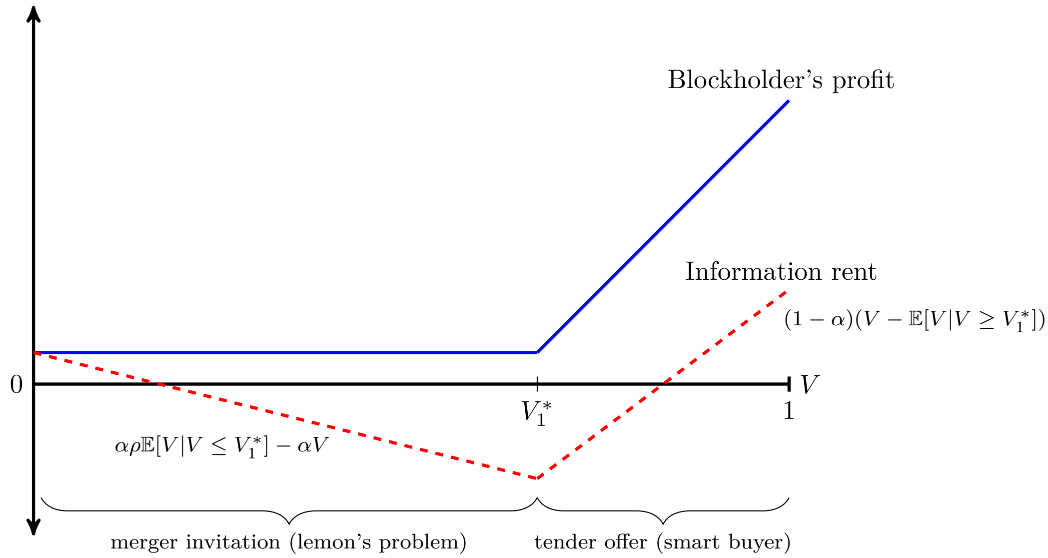


Figure 4: The large shareholder's profit and information rent as a function of her type. The graph is based on a numeric example in which V is uniformly distributed on $[0, 1]$ and α is 25%. The cut-off is $V_1^* \approx 0.67$. In the benchmark without an outside bidder, the cut-off is $V_0^* = 0.6$. Hence, merger invitations primarily complement rather than replace tender offers here. Last, if α is reduced to 10%, the cut-off increases to $V_1^* \approx 0.86$, illustrating that smaller initial stakes favor merger invitations.

Corollary 1. *For $V \in [V_0^*, V_1^*]$ takeover activism substitutes tender offers. For $V \in [0, V_0^*)$ takeover activism complements tender offers, thereby ensuring an efficient allocation of control.*

In the benchmark without an outside bidder, firm types $V \in [0, V_0^*)$ are not taken over and the value improvement is forgone. Once the large shareholder has the option to extend a merger invitation, all these firm types are taken over by the outside bidder. Thus, merger invitations complement tender offers, and the ability to choose the control change mode improves efficiency.

In addition, firm types $V \in [V_0^*, V_1^*)$ are now taken over by the outside bidder rather than by the large shareholder herself as in the benchmark. Fewer L types choose a tender offer, that is, $V_1^* > V_0^*$, because the expected payoff from a merger invitation is positive compared to zero when remaining passive. Hence, the marginal type V_0^* and some types above her now prefer a merger invitation to a tender offer.

Strikingly, the control allocation is fully efficient, that is, all firms are taken over and restructured (Proposition 1), and this holds true for any initial stake size $\alpha > 0$ however small. By contrast, the inefficiency in the benchmark, respectively in Shleifer & Vishny

(1986), increases as the initial stake α becomes smaller. In Shleifer & Vishny (1986) and the ensuing literature, the inefficiency results from the interaction of the free-rider problem with asymmetric information about the post-takeover firm value: neither friction alone impairs efficiency (Burkart & Lee 2015). Without free-riding the large shareholder could succeed by offering a price equal to the share value under the current management plus ϵ, and without asymmetric information she would succeed by offering the true post-takeover share value.

At first glance, it may seem that the control alloation in Proposition 1 is fully efficient because the merger invitation option allows to circumvent the free-rider problem. This feature of the merger invitation is, however, not crucial for the efficiency result. In fact, full efficiency obtains even if one were to impose a merger price that satisfy the free-rider condition, that is, set $P_L = P_B = \mathbb{E}[V|invite]$. Furthermore, we show in Section 4 that Proposition 1 also holds under an alternative variation of takeover activism that does not impose a merger on the dispersed shareholders.

The key feature of takeover activism responsible for the efficiency result is that the large shareholders is an informed seller rather than an informed buyer. In a tender offer L's payoff is $V-(1-\alpha)P$ which is *negative* when the pooling price P is sufficiently larger than the actual value improvement V. Consequently, low L types prefer remaining passive to making a bid (which gives rise to the inefficiency in (Shleifer & Vishny 1986)). In contrast, L's expected payoff in a merger $\alpha[\rho P_L + (1-\rho)P_B]$ is independent of her type and in expectations a *strictly positive* cash consideration. Hence, the merger invitation dominates the option of remaining passive for all V. Indeed, even if L were restricted to only extending a merger invitation, all L types would be taken over by the outside bidder, and the outcome would be efficient. Fundamentally, when free-riding and asymmetric information problems impede value creating takeovers informed control sales (merger invitations) are a more effective mechanism than informed control acquisitions (tender offers).

This also explains why the market for corporate control in Proposition 1 is efficient irrespective of the size of L's stake. Smaller stakes α reduce the payoff from either control change mode. While this makes the tender offer unprofitable for more L types, the merger invitation remains profitable for all L types as long as $\alpha > 0$. Hence, smaller stakes α increase the cut-off V_1^*, making takeover activism more likely.

Since larger toeholds decrease the cut-off V_1^*, both "bid" price $P^* = \mathbb{E}[V|V \geq V_1^*]$ and merger "ask" price $P_L^* = \mathbb{E}[V|V \leq V_1^*]$ decrease with α. Note that from an ex ante perspective a smaller stake α thus leads to a decrease in tender offer profits due to the smaller stake and the increased bid price that L needs to pay. By contrast, the effect on merger profits is ambiguous: the smaller stake reduces profit, whereas the higher per share ask price that L receives increases profit. Hence, expected merger profits fall for some parameter values but increase for others. Overall, however, L's expected profits decrease as the toehold shrinks.

2.4 Discussion of Firm Modeling Assumptions

Value-decreasing control changes. Allowing also for value-decreasing control transfers, i.e., $V < 0$, does not undermine the efficient allocation of control in our framework. When the large shareholder learns that V is negative, she opts for a merger invitation as she does for small positive realizations of V. This lowers the ask price in the merger negotiation which, in turn, shifts down the cutoff V_1^*. Having acquired the firm, the bidder learns that restructuring decreases firm value and refrains from implementing it since she internalizes the full cost as the sole owner. If there are some private benefits from restructuring that exceed the value destruction, the bidder would restructure which would be efficient.

Counter-bids. When L opts for a tender offer, our model neither allows B to submit a counter-bid nor L to respond and revise her initial bid. One may suspect that this restriction affects the control change mode that L chooses in equilibrium. Yet, precluding B from competing after L made an initial bid is without loss of generality. The reason is that any winning bid by B would result in an expected loss due to the winner's curse. Suppose L bids P and B were to make a winning counter-bid P'. This bid must satisfy the free-rider condition $P' \geq \mathbb{E}[V|P]$. Unlike the dispersed shareholders, L tenders her block only if $V < P'$. Consequently, B acquires all shares if the bid is overpriced but merely $1 - \alpha$ shares if the bid is underpriced, therefore making an expected loss.

Bidding competition. While the bidder does not want to counter a tender offer by L, another bidder may want to compete with B after a merger invitation. In this case, the merger invitation transforms into letting the bidders compete in a standard second-price auction. In our common value framework, all bidders (and L) have the same restructuring capability. Hence, L's merger payoff with two bidders (or more) is the same as if she had full bargaining power in the bilateral negotiations ($\rho = 1$). Thus, competition results in a higher merger price, making takeover activism relatively more attractive, that is, increasing the cutoff V^*.

Heterogeneous restructuring capabilities. In our common value model, a merger invitation signals a lower value improvement and mergers are associated with lower prices and returns compared to tender offers. In practice, large shareholders and outside bidders differ in their ability to improve firm value. While some activist shareholders focus on governance-oriented strategies, outside bidders, such as specialized private equity funds or non-financial bidders, aim to exploit synergies. If one adds idiosyncratic restructuring abilities to our common value framework, merger invitations typically lead on average to higher prices and returns compared to tender offers. We provide a formal analysis in Appendix A.1.

By way of illustration, consider two hypothetical target firms. For target 1 there are multiple bidders who can exploit large synergies. Anticipating a high price due to competition among these bidders, the large shareholder is very likely to opt for a merger invitation, respectively, initiating a bidding competition. By contrast, bidders for firm 2 have no such synergies and L is therefore more likely to take over the firm herself. While in both firms tender offer prices are larger than merger prices, the average tender offer price is lower than that of the average merger. The reason is that when there are large value improvements due to synergies, they are more often implemented through a merger with an outside bidder.

Consistent with an extended framework with heterogeneous restructuring abilities, Boyson et al. (2017) find larger expected acquisition premia and returns if outside bidders take over a firm relative to incumbent shareholders. Boyson et al. (2017) hypothesize that "[t]he lower premia could reflect the lack of synergies available to hedge fund buyers."

3 Control Changes in the Market

In the previous section, we determined when the large shareholder opts for a direct takeover and when for a merger invitation. This allows us to now study the decision of control investors to assume the role of a large shareholder or of an outside bidder as the market for corporate control develops.

3.1 Model

Consider an economy with a continuum of ex ante identical firms of measure one. As in the firm-level model, each firm has a current (normalized) value of 0 and a potential value improvement $V \sim F[0,1]$, distributed identically and independently across firms. The value improvement is realized through restructuring, which requires a control change. At the outset, no firm is matched with a large shareholder or an outside bidder. Rather, there is a measure n of control investors. These investors are ex ante not designated large shareholders or outside bidders but choose in which role to enter the market.

> **Large Shareholder**: A control investor can buy an initial minority stake $\alpha \in (0, \overline{\alpha})$ in a firm. For simplicity, she can acquire the stake at the current share value of 0.[13] By virtue of becoming a large shareholder, she learns V privately. If there are multiple large shareholders in the same firm, we assume that a "lead" L is determined randomly. All other Ls sell their stakes to her or to the outside bidder. As a result, the expected payoff of L is independent of the number of Ls in the same firm, substantially simplifying things, and in particular allowing analytical solutions. (We discuss in Section 3.3 how multiple Ls may affect their profits and ultimately the chosen mode of control transfer.) Furthermore, $\overline{\alpha}$ is sufficiently small so that the combined stake of

[13] Clearly, rational investors would anticipate the possible value improvement due to restructuring, and consequently the price at which the control investor could acquire her stake would be above the current share value. We discuss this in more detail in Section 3.3.

multiple Ls never exceeds $1/2$. Hence, a control change requires either a direct takeover by the lead L or a sale to an outside bidder.

Outside bidder: Alternatively, a control investor can choose to become an outside bidder for a particular firm. We think of this as the investor setting aside financial and human capital to be prepared and ready to acquire the firm if invited by a L. If there are multiple Bs and at least one L in a firm, extending a merger invitation transforms into letting those Bs compete in a second price auction. As discussed in Section 2.4, competition between two or more bidders yields zero bidder profits in our common value setting and is isomorphic to L having all the bargaining power in merger negotiations ($\rho = 1$).

A control investor cannot perform her chosen role in any arbitrary firm due to, for example, search frictions, lack of industry expertise, or capital constraints. To capture such limitations, each control investor with her chosen role is randomly matched to a single firm according to the subsequent matching protocol: Let n_L (n_B) denote the measure of control investors entering the market as large shareholders (outside bidders) with $n = n_L + n_B$. For $n_L \leq 1$ each L is randomly assigned to a firm such that a fraction n_L of firms is matched with one L. In particular, there are no firms with multiple Ls if $n_L \leq 1$. For $n_L > 1$, each L is randomly allocated to a firm such that a measure $(n_L - \lfloor n_L \rfloor)$ has $\lceil n_L \rceil$ Ls and a measure $(\lceil n_L \rceil - n_L)$ has $\lfloor n_L \rfloor$ Ls.[14] Matching of Bs is independent and works analogously.

To portray the evolution of the market for corporate control we compare the market composition (n_L^*, n_B^*) as the measure n of control investors increases. We consider the following equilibrium.

Definition 1. *An equilibrium of the entry subgame for a given measure n of control investors is characterized by the measures (n_L^*, n_B^*) of L and B such that neither any L nor any B has an incentive to deviate given the chosen roles of all other investors and $n = n_L^* + n_B^*$.*

3.2 Choosing Roles in the Market for Corporate Control

Let $\Pi^L(V)$ and $\Pi^B(V)$ denote the equilibrium payoff of a large shareholder and an outside bidder, respectively. When the firm is not matched with a B, L's payoff is

$$\mathbb{E}[\Pi^L(V)|V^* = V_0^*] = \int_{V_0^*}^{1} V - (1-\alpha)\mathbb{E}[V|V \geq V_0^*] dF(V).$$

[14] $\lfloor n_L \rfloor$ gives the highest integer smaller than n_L and $\lceil n_L \rceil$ gives the smallest integer larger than n_L.

This is simply the expected profit from a direct takeover as in the benchmark (Section 2.2). Conditional on the firm being matched with one B, L's payoff is

$$\mathbb{E}[\Pi^L(V)|V^* = V_1^*] = \int_0^{V_1^*} \alpha\rho\mathbb{E}[V|V \leq V_1^*]dF(V) + \int_{V_1^*}^1 V - (1-\alpha)\mathbb{E}[V|V \geq V_1^*]dF(V).$$

This is the sum of the expected revenues from selling the stake in an invited merger and the expected profit from a direct takeover. As discussed in Section 2.3, a direct takeover is less likely than in the benchmark ($V_1^* > V_0^*$) because the expected sale price in a merger is strictly positive. When the firm is matched with two (or more) bidders, L's payoff is

$$\mathbb{E}[\Pi^L(V)|V^* = V_2^*] = \int_0^{V_2^*} \alpha\ \mathbb{E}[V|V \leq V_2^*]dF(V) + \int_{V_2^*}^1 V - (1-\alpha)\mathbb{E}[V|V \geq V_2^*]dF(V).$$

The cut-off value for a direct takeover, V_2^*, is in this case even higher because the price in the bidding competition is the expected post-merger share value. Recall that multiple Ls in the same firm do by assumption not affect $\Pi^L(V)$.

An outside bidder who is matched with a firm with at least one L receives the expected merger profit of

$$\mathbb{E}[\Pi^B(V)|V^* = V_1^*] = \int_0^{V_1^*} V - \rho\mathbb{E}[V|V \leq V_1^*]dF(V).$$

In any other constellation, her expected payoff is zero. Either there is no L, and she never receives a merger invitation, or competition with other Bs obliterates expected profits.

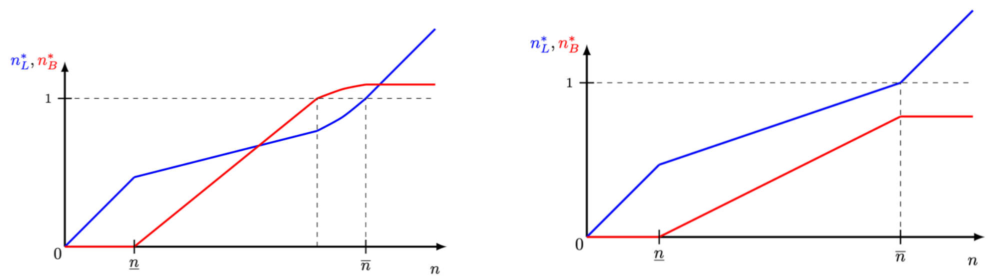
For some parameter values (α, ρ, and $f(V)$), $\mathbb{E}[\Pi^B(V)|V^* = V_1^*] < \mathbb{E}[\Pi^L(V)|V^* = V_0^*]$ such that no control investor ever enters the market as B. Clearly, if L's payoff when the firm is not matched with a B exceeds B's payoff when the firm is matched with a L, becoming a L is the dominant strategy for any measure n of control investors. To focus on the interesting case where both roles are viable we assume $\mathbb{E}[\Pi^B(V)|V^* = V_1^*] > \mathbb{E}[\Pi^L(V)|V^* = V_0^*]$ (Assumption A4).[15]

Proposition 2. *There are three stages in the evolution of the market for corporate control:*

- ***Early stage*** *($n < \underline{n}$)**:*** *All control investors enter as large shareholders and their profits are independent of n.*
- ***Transformation stage*** *($n \in [\underline{n}, \overline{n}]$)**:*** *Control investors enter as large shareholders and bidders. Both make the same expected profit which strictly increases in n.*
- ***Mature stage*** *($n > \overline{n}$)**:*** *Control investors beyond $\overline{n}$ enter only as large shareholders, and control investor profits attain their maximum and are constant in n.*

[15] Assumption 4 is more likely to hold when ρ and α are small. For instance, with $V \sim \mathcal{U}[0,1]$ and $\alpha = 0.1$, Assumption 4 is satisifed whenever $\rho < 0.958851$.

Figures 5a and 5b depict the entry decisions as the measure n of control investors increases. In a thin market ($n < \underline{n}$), all control investors enter as large shareholders. L acquires the firm herself whenever the value improvement is large ($V \geq V_0^*$), thereby generating a strictly positive expected payoff $\mathbb{E}[\Pi^L(V)|V^* = V_0^*]$. By contrast, a bidder makes zero profit unless there is a L in the firm who extends a merger invitation. With relatively few control investors the likelihood of receiving a merger invitation is too small, even if all others were to choose to be a L. Thus, the red n_B^* line in Figures 5a and 5b is flat for $n \leq \underline{n}$, whereas the blue n_L^* line increases one-to-one with n.



(a) $\mathbb{E}[\Pi^B(V)|V^* = V_1^*] > \mathbb{E}[\Pi^L(V)|V^* = V_1^*]$ (b) $\mathbb{E}[\Pi^B(V)|V^* = V_1^*] < \mathbb{E}[\Pi^L(V)|V^* = V_1^*]$

Figure 5: Equilibrium measures n_L^* and n_B^* as a function of the market size n.

Given $\mathbb{E}[\Pi^B(V)|V^* = V_1^*] > \mathbb{E}[\Pi^L(V)|V^* = V_0^*]$ (by Assumption A4), there exists a measure of control investors $\underline{n} < 1$ such that becoming an outside bidder becomes equally attractive as being a large shareholder, that is, $\mathbb{E}[\Pi^L(V)|V^* = V_0^*] = \underline{n}\mathbb{E}[\Pi^B(V)|V^* = V_1^*]$. Once n crosses this threshold the market enters its transformation stage in which control investors assume both roles. Importantly, a complementarity arises and either role becomes more profitable as more control investors enter the market. The expected payoff of B is strictly increasing in n_L^* because the probability of a merger invitation increases. Conversely, the expected payoff of L is increasing in n_B^* because it increases the likelihood of being able to extend a merger invitation when the value improvement is low and the direct takeover is not profitable.

For a given $n \in [\underline{n}, \overline{n}]$, control investors are indifferent between the two roles in equilibrium. As long as $n_B^* < 1$ and $n_L^* < 1$, the equilibrium entry condition is

$$(1 - n_B^*)\mathbb{E}[\Pi^L(V)|V^* = V_0^*] + n_B^*\mathbb{E}[\Pi^L(V)|V^* = V_1^*] = n_L^*\mathbb{E}[\Pi^B(V)|V^* = V_1^*] \quad (5)$$

There are two cases of relative entry rates that satisfy condition (5). For $\mathbb{E}[\Pi^B(V)|V^* = V_1^*] > \mathbb{E}[\Pi^L(V)|V^* = V_1^*]$ being an outside bidder in a firm with a large shareholder is more profitable than vice versa (Case a). Therefore, more control investors enter initially as Bs, and n_B^* reaches 1 before n_L^* does. That is, all firms are matched with a B before every firm has been matched with a L. Once $n_B \geq 1$, the equilibrium entry condition becomes

$$(n_B^* - 1)\mathbb{E}[\Pi^L(V)|V^* = V_2^*] + (2 - n_B^*)\mathbb{E}[\Pi^L(V)|V^* = V_1^*] = n_L^*(2 - n_B^*)\mathbb{E}[\Pi^B(V)|V^* = V_1^*] \quad (6)$$

When control investors now enter as B, some firms end up with two Bs who each makes zero profits either because of the bidding competition or because the firm does not (yet) have a L. At the same time, the payoff of L is increasing since the sale price may be determined in a bidding competition rather than in a merger negotiation. Consequently, more control investors enter as L than as B to meet condition (6). Still, the expected profits of Ls and Bs keep increasing because there are more Bs and Ls in the market. This holds true until the transformation stage ends and all firms have one L ($n_L^* = 1$). These are the reasons why the red n_B^* line in the interval $[\underline{n}, \overline{n}]$ is initially steeper than the blue n_L^* line until $n_B^* = 1$ and then flatter in Figure 5*a*.

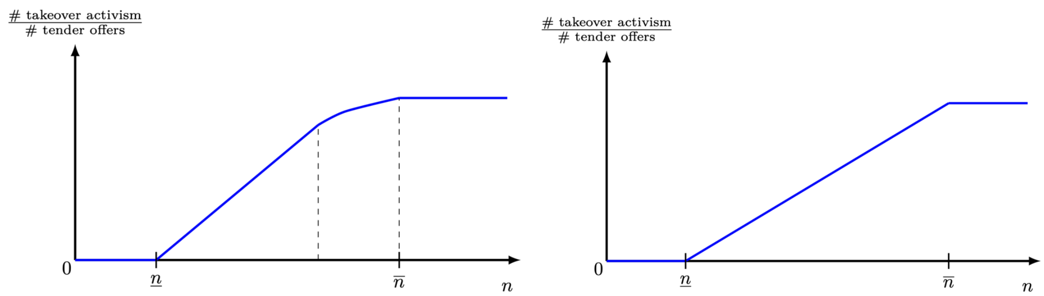
For $\mathbb{E}[\Pi^L(V)|V^* = V_1^*] > [\Pi^B(V)|V^* = V_1^*]$, being a large shareholder in a firm matched with a bidder is more profitable than vice versa (Case b). Entry condition (5) implies in this case that more control investors enter as Ls than as B until the transformation stage ends and each firm has one $L(n_L^* = 1)$ but not necessarily one B ($n_B^* < 1$). Accordingly, the blue n_L^* line is steeper in the interval $[\underline{n}, \overline{n}]$ and always above the red n_B^* line in Figure 5*b*.

Once each firm is matched with a large shareholder ($n_L^* = 1$), the market for corporate control has reached its mature stage ($n \geq \overline{n}$). The expected payoff of each B no longer depends on n_L. The reason is that in each firm a L already initiates for sure a merger negotiation or a bidding competition for low value improvements (unless the firm is not matched with one B). By contrast, the expected payoff of L still increases in n_B because it makes either a bidding competition (case a) or a merger invitation (case b) more likely for low value improvements. In either case, however, more Bs entering would violate equilibrium condition (6), respectively condition (5), so no more control investors enter as B. By Assumption A4, multiple Ls in a firm do not dilute the expected payoff of each L. Consequently, all control investors beyond $\overline{n}$ enter as Ls. Hence, the red n_B^* line is flat for $n \geq \overline{n}$ in Figures 5*a* and 5*b*, whereas the blue n_L^* line increases one-to-one with n. In this mature stage, the expected payoffs of Bs and of Ls are the same and reach their highest level.

The equilibrium market composition (n_L^*, n_B^*) as a function of the measure n of control investors determines which mode of control change is more prevalent as the market for corporate control matures.

Proposition 3. *Relative to direct takeovers, takeover activism becomes more likely as the measure n of control investor increases.*

Figures 6a and 6b depict the relative frequency of takeover activism and direct takeovers as more control investors enter the market. In a thin market for corporate control ($n < \underline{n}$), only large shareholders enter. Control changes are exclusively carried out through direct takeovers which matches the 1980s with the emergence of hostile takeovers and corporate raiders (Holmstrom & Kaplan (2001)). The ratio of takeover activism to direct takeovers remains constant at 0 in Figures 6a and 6b.



(a) $\mathbb{E}[\Pi^B(V)|V^* = V_1^*] > \mathbb{E}[\Pi^L(V)|V^* = V_1^*]$ (b) $\mathbb{E}[\Pi^B(V)|V^* = V_1^*] < \mathbb{E}[\Pi^L(V)|V^* = V_1^*]$

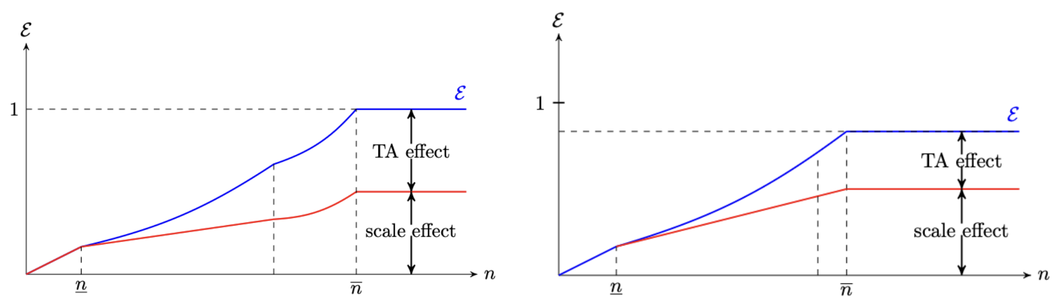
Figure 6: Equilibrium frequency of takeover activism relative to outright tender offers as a function of the market size n.

Once the market for corporate control is in the transformation stage ($n \geq \underline{n}$), some control investors start entering as outside bidders, giving rise to first incidences of takeover activism. As the market for corporate control expands further (larger n), takeover activism becomes more prevalent due to the asymmetric impact that more Ls and Bs have on the mode of control change. More Bs bring about more control changes because takeovers are realized also for low value improvements through takeover activism. At the same time direct takeovers are being replaced by takeover activism for value improvements $V \in [V_0^*, V_1^*]$. That is, an increase in n_B^* leads to more merger invitations in part at the expense of direct takeovers. By contrast, more Ls bring about more control changes but do not affect the relative frequency of direct takeovers and takeover activism. This is because Ls are necessary for either mode of control change. Hence, takeover activism becomes increasingly more frequent for $n \in [\underline{n}, \overline{n})$, as the ratio in Figures 6a and 6b shows.

For $\mathbb{E}[\Pi^B(V)|V^* = V_1^*] > \mathbb{E}[\Pi^L(V)|V^* = V_1^*]$ (case a) the relative frequency of takeover activism increases at a slower rate once n_B^* reaches 1. Given the firm has a L, a second B leads to a substitution of direct takeovers with takeover activism for $V \in [V_1^*, V_2^*]$ because bidding competition results in a higher sale price. The second B does, however, not alter the mode of control change for value improvements $V \in [0, V_1^*]$ since the first B already ensures that a control change takes place through takeover activism. At the same time, control investors enter now at a slower rate as Bs. Ceteris paribus, bidder competition increases Ls' profits and decreases Bs' profits. Hence, to keep control investors indifferent between the two roles, Ls need to enter at a faster rate to increase Bs' profits. This reinforces the slower increase in takeover activism.

Once every firm is matched with a L ($n_L^* = 1$), no control investors enters the market as a B anymore. Consequently, the relative frequency of takeover activism reaches a "steady state" and the line depicting the ratio of takeover activism to direct takeover in Figures 6a and 6b becomes horizontal.

As the market for corporate control evolves and more control investors enter, it becomes more efficient. Let $\mathcal{E}$ denote market efficiency measuring the percentage of potential value improvements realized in equilibrium. Figure 7 shows that $\mathcal{E}$ is a weakly increasing function of the measure of control investors n in both cases. While all potential value improvements are realized in Case (a), the market does not attain full efficiency in Case (b). In Case (b) being a L in a firm matched with a B is more profitable than vice versa. As a result not all firms are in equilibrium matched with a B ($n_B^* < 1$) for all values of n. This is due to our simplifying assumption that multiple Ls in one firm do not dilute each other's profits. As we discuss in Section 3.3, allowing for such dilution would lead to more control investors enter as B, thereby improving efficiency.



(a) $\mathbb{E}[\Pi^B(V)|V^* = V_1^*] > \mathbb{E}[\Pi^L(V)|V^* = V_1^*]$ (b) $\mathbb{E}[\Pi^B(V)|V^* = V_1^*] < \mathbb{E}[\Pi^L(V)|V^* = V_1^*]$

Figure 7: Equilibrium efficiency $\mathcal{E}$ of the market for corporate control as a function of the market size n.

With a firm population of mass one, the efficiency measure $\mathcal{E}$ can also be interpreted as the probability of each individual firm to be taken over and restructured. This in turn can be decomposed into first the probability of being matched with a L which is a prerequisite for a control change and second the probability of being restructured conditional on being matched with a L.

$$\mathcal{E} = \underbrace{min\{n_L^*, 1\}}_{\mathbb{P}[\text{matched } L]} \quad \underbrace{min\{n_B^* + (1 - n_B^*) \int_{V_0^*}^{1} V dF(V) \frac{1}{\mathbb{E}[V]}, 1\}}_{\approx \mathbb{P}[\text{control change} \mid \text{matched}]} \tag{7}$$

The probability that a firm is matched with a L is simply the equilibrium measure of large shareholders n_L^* or 1 once $n_L^* \geq 1$. Conditional on being matched with an L, a firm matched with a B is always restructured while – for $n_B^* < 1$ – a firm not matched with a B is restructured only if $V \geq V_0^*$.

The two components of the efficiency gain $\mathcal{E}$ capture two distinct effects. First, when control investors enter only as Ls in the early stage, the sole source of gains is that more control investors are able to identify more restructuring opportunities, that is, more firms. This is a common "scale" effect of more market entry. Second, an additional source of gains materializing in the transformation stage is the increase in the probability that a potential firm, once identified, is actually restructured. This is not a scale effect but reflects the evolution of the market toward a *more effective mode of control change*. It corresponds to the efficiency gains of takeover activism identified in the firm-level analysis.

Formally, we can decompose the increase in efficiency for $n_L^*, n_B^* \in (0, 1)$ as

$$\frac{\partial \mathcal{E}}{\partial n} = \underbrace{\frac{\partial n_L^*}{\partial n}\left(n_B^* + (1 - n_B^*)\int_{V_0^*}^{1} V dF(V)\frac{1}{\mathbb{E}[V]}\right)}_{>0,\text{ scale effect}} + \underbrace{\frac{\partial n_B^*}{\partial n} n_L^* \int_0^{V_0^*} V dF(V)\frac{1}{\mathbb{E}[V]}}_{>0,\text{ TA effect}} > 0. \qquad (8)$$

The additional "takeover-activism effect" arises from entry of outside bidders who allow to restructure also companies with value improvements below V_0^*. This effect becomes more dominant if many firms are already matched with a large shareholder as the likelihood that an outside bidder is matched to a firm, where she is needed to restructure the firm, increases.

3.3 Discussion of Market Modeling Assumptions

Prices of initial stakes. In a setting with rational investors and noise traders (e.g., Kyle (1985), Kyle & Vila (1991)), share prices should generally reflect that control investors buy shares in some firms and bring about value improvements. Hence, as more control investors enter the market, the price at which they can buy initial stakes should be increasing because each firm is more likely to experience a value improvement. This leads to the standard effect that increased entry reduces investor profits.

We intentionally abstract from this effect because it is orthogonal to our main result that takeover activism increasingly replaces direct takeovers as the prevalent mode of control change when more control investors enter the market. Moreover, it allows us to highlight a countervailing effect: In the transformation stage, more entry leads to *higher* control investor profits because of the complementarity between outside bidders and large shareholders.[16]

Multiple large shareholders. In our model multiple outside bidders compete in an auction while there is no competition among multiple large shareholders. Arguably, multiple Ls render the purchase of a stake more difficult and expensive. Such dilution of profits could

[16] In a model that allows for both of these countervailing effects, prices and profits would depend on the mass of control investors through multiple channels, preventing clear-cut closed-form solutions.

be captured for instance by assuming that $\Pi^L(V)$ drops by some fraction or amount with each integer n_B^* reaches. In such a setting, multiple Ls would not only erode each L's profits but also lead to more Bs entering since in equilibrium control investors must be indifferent between assuming either role. Overall, the expected profits to be made in the market for corporate control would be first increasing and then decreasing in the measure of control investors. Ultimately, the market for corporate control would become saturated, that is, expected profits would be so low that furthers investor would not want to enter. These effects are intuitive, but formalizing them would be rather cumbersome. In particular, capturing multiple Ls as a reduction in the stake size would introduce non-linearities and prevent an analytical solution.

Roles in multiple firms. To keep the analysis tractable we restrict control investors to a single role matched to a single firm. Alternatively, control investors could adopt different roles in different firms, in particular an investor could be a large shareholder in one firm and a potential outside bidder in (an)other firm(s). Clearly, such multiple roles would lead to higher expected profits, making entering the control market more attractive. The resulting larger influx of investors and capital would accelerate the evolution of the market for corporate control. That is, takeover activism would spring into existence "earlier", and the transition from direct takeovers to takeover activism as the prevalent mode of control change would occur faster. Still, as long as there are search frictions in finding a bidder for a particular firm, such a model would continue to generate a growth of takeover activism relative to takeovers as more control investors enter the market.

In practice, there seems to be a specialization to particular roles, at least in a sufficiently developed market: Activist hedge funds perform the role of Ls and private equity funds those of Bs focused on certain industries. Brown et al. (2023) present evidence that private equity funds specialize in specific industries and geographies, and that these funds can use their specialized expertise to generate higher returns. However, such specialization renders executing multiple roles unfeasible for many control investors, albeit not for all as the example of Carl Icahn shows.

Growth of control market. We capture the evolution of the market for corporate control by comparing the market composition (n_L^*, n_B^*) for exogenous increases in the measure of control investors n. A richer framework would allow investments in the control market and in an alternative market such that capital or number of investors in the control market are a function of (previous) profits. Still, our reduced form approach comprises this logic. Due to the complementarity between L and B profits increase as more control investors enter, thereby providing a rationale for the exogenous growth of the market.

An alternative way to model the growth of the control market would include entry cost where investors only enter once this cost drops below some threshold. Due to the complementarity, all investors would immediately enter once the threshold makes entry worthwhile for the first (few) investors. In practice, market entry and capital formation take time. Our reduced form model delivers the relevant dynamics and is, therefore, better equipped to speak to the evolution over time.

3.4 Disciplinary Ownership Changes: Empirical Patterns

Our theory posits that a growing influx (of funds at the disposal) of control-oriented investors causes a shift from direct takeovers toward takeover activism. This transition can be broken down into four trends that would unfold in parallel: First, the control-oriented investment sector grows; second, all the while the incidence of hostile tender offers declines; third, the decline in hostile tender offers is not tantamount to a drop in disciplinary ownership changes; fourth, takeover activism replaces tender offers as the main mode of effectuating disciplinary control changes in public firms.

These predictions match documented developments in the market for corporate control. The hedge fund and private equity sectors have experienced spectacular growth over the last 30 years. As already stated in the introduction, the assets under management by hedge funds globally grew by a factor of 50 between 1997 and 2022, and this has also led to an increase in the number of hedge funds that engage in activism, as shown for 1994-2018 in Figure 2 of Brav et al. (2022). In parallel, the global buyout deal value of private equity funds went from $30 billion in 1995 to $1,121 billion in 2022. For U.S. private equity funds, Kaplan & Stromberg (2009) report that nominal dollars of committed capital rose to over $200 billion in 2007 from about $200 million in 1980. For the private equity sector globally, Braun et al. (2023) estimate that assets under management multiplied nearly eight-fold from about $300 billion in 2000 to almost $2.4 trillion by 2020.

Clearly, these numbers considerably overstate the growth of the subset of funds that map into the "control-oriented investors" within our model because not all activist campaigns seek a sale of the target firm; nor do all private equity buyouts involve a public target. However, what the numbers show is a general increase in capital flow to investors who pursue *corporate governance* changes or *controlling ownership* stakes (in public or private firms). This inflow of control-oriented capital promoted active ownership strategies at large, and we would argue also takeover activism and public-to-private buyouts.

In terms of the market for corporate control, there has been a steady downward trend in hostile tender offers over the same time span. This has been pointed out by several scholars (e.g., Holmstrom & Kaplan 2001, Fos 2017). Figure 8 shows the number of hostile tender offers in the U.S. as reported by the Institute of Mergers, Acquisitions, and Alliances. There was a dramatic drop at the end of the 1980s (after the initial build-up earlier in that decade) and a sizable resurgence in the mid-1990s, followed thereafter by a fairly continuous decline.

However, there was no parallel decline of disciplinary ownership changes in public firms. As Kaplan & Stromberg (2009) report, the private equity sector grew steadily during 1994

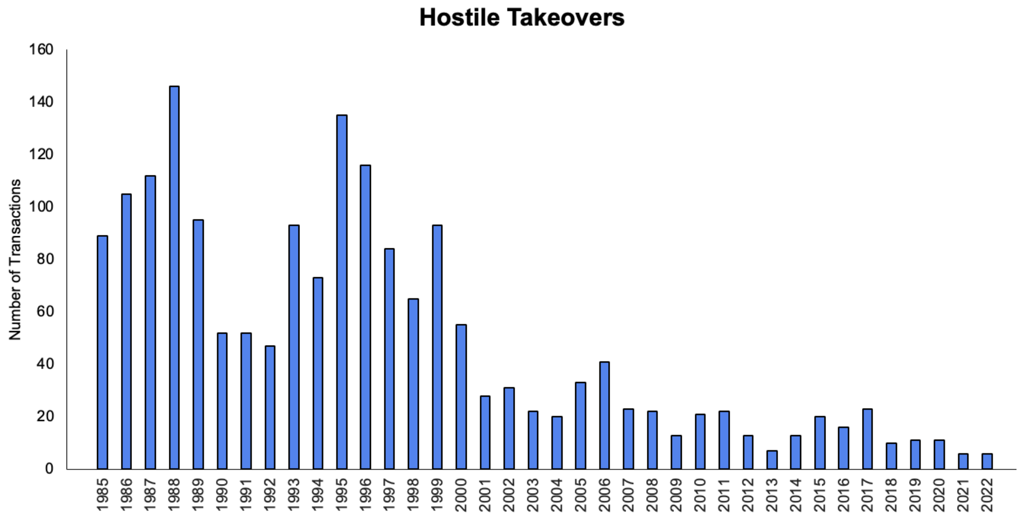


Figure 8: Decline of hostile takeover activity. Source: The figure has been downloaded from the Institute for Mergers, Acquisitions and Alliances https://imaa-institute.org/mergers-and-acquisitions-statistics/

to 2004 (except for a temporary dip in 2000-2001) and experienced a boom from 2005 to mid-2007. Across this period (of declining hostile tender offers), public company buyouts increased and in fact quite sharply so during the latter boom episode.[17] Extending the data to 2016, Figure 2 in Renneboog & Vansteenkiste (2017) shows cycles but no negative trend in public company buyouts, which is notable given that the number of public firms shrunk over this period.[18] Considering that private equity firms implement major financial, governance, and operational change through buyouts (Kaplan & Stromberg 2009), disciplinary ownership changes have not decreased, unlike hostile tender offers.

Meanwhile, the expansion of the activist hedge fund sector meant that more public firms became targets of activist campaigns, as depicted in Figure 2 in Brav et al. (2021). This too occurred against the backdrop of the decrease in the number of public firms; the referenced figure indeed shows that the percentage of public firms targeted by activism rose. Table 1 in Brav et al. (2021) lists "Sale of target company" and "Governance" as the initially reported objective for, respectively, about 18.5% and 35.5% of campaigns.[19] Several studies find that takeover activism is among the most profitable campaign categories and a primary source of the aggregate returns to hedge fund activism (Greenwood & Schor 2009, Becht et al. 2017, Boyson et al. 2017).

The notion that the public company buyouts by private equity funds are aided by activist

[17]This is notwithstanding the fact that much of overall private equity activity involves private targets.
[18]See, e.g., Kahle & Stulz (2017).
[19]Quite often governance-motivated campaigns ultimately lead to a sale of the target firm even when this outcome is not explicitly declared as the initial campaign objective (Greenwood & Schor 2009).

hedge funds who put the firms in play is widespread among practitioners.[20] The interactions and overlap of private equity and activism now characterize the market for corporate control to such a degree that the relationship is commonly referred to as a *symbiosis* or a *convergence* (e.g., Billings & Gump 2005, Sorkin 2007, Barker 2007, Klein et al. 2020, Goldfarb 2020) and are viewed to be the result of the growing capital flow into both control-oriented investment strategies.[21] By some, "activism has been dubbed 'the new M&A' " (Campbell 2014).

For a few of the above trends, in particular the decline of hostile tender offers, alternative explanations have been proposed. One often stated narrative is that the widespread adoption of takeover defenses, notably poison pills, caused the shift away from hostile takeovers (e.g., Bertrand & Mullainathan 2003, Cremers & Ferrell 2014, Fos 2017). This argument has two caveats. The first is conceptual. Takeover defenses render control changes more difficult as they must be removed—or incumbent management's resistance must be overcome—before a disciplinary ownership change. However, they do not require a shift from "tender offers" to "merger invites" because activists are not bound to one or the other mode of control change in conjunction with overcoming such resistance. Indeed, they can remove defenses and issue a tender offer afterwards.[22]

The second caveat is empirical. Suppose it were correct that takeover defenses undermine hostile takeover bids and thereby necessitate takeover activism. By 1990, most public firms—arguably those that needed it the most—had already two or more takeover defenses in place; for many well-known provisions (including classified boards, poison pills, and supermajority rules), adoption peaked and plateaued around 2000. Since then it has continuously declined, arguably in part due to activism (Karpoff & Wittry 2022). This does not align very well with the changes in tender offers, which dipped in the early 1990s, surged back in the latter half of the 1990s, and then continuously declined throughout the 2000s and 2010s.[23]

We would argue that, at the same time that the growth of the control-oriented investment

[20] Thomas H. Lee, a private equity pioneer, is quoted in a New York Times article as acknowledging, "I'd like to thank my friends Carl Icahn, Nelson Peltz, Jana Partners, Third Point... for teeing up deals because they're coming in there and shaking up the management and many times these companies are being driven into some form of auction" (Sorkin 2007).

[21] While such discussions typically focused on the overlap and complementarity of private equity and hedge fund activism, recently there have also been signs of conflict because the increased capital flow has intensified competition among the control-oriented investors in the now more "saturated" market for corporate control (e.g., Moeser 2019, Crawford & Gruenberg 2020). The emergence of such conflicts is interesting but they are not a focus of our paper.

[22] As the data in Boyson et al. (2017) and Brav et al. (2021) show, this does happen, albeit not very often. In Brav et al. (2021)'s sample, activists intend to make a takeover bid in 3.2% of all activist campaigns. In Boyson et al. (2017)'s sample, about 15% of takeover bids are made by an activist. One anecdotal example is Carl Icahn's campaign at Southwest Gas Holdings mentioned in footnote 6. These instances reflect Karpoff & Wittry (2022)'s verdict that "takeover defenses are not acquisition showstoppers that impose a corner solution of zero takeovers" (p.10).

[23] On a different note, in our theory, the evolution of the market makes being a control-oriented blockholder more profitable relative to a world with only hostile bids. Therefore, to deter control changes, firms would need to implement "takeover defenses" that more effectively reduce the gains from equity stakes that lead to takeover activism. The increased use of poison pills with low trigger thresholds, so-called anti-activism pills, as documented by Eldar et al. (2023), may precisely play this role in indirectly deterring takeovers.

sector reversed the proliferation of takeover defenses, it also led to a permanent structural shift in the market for corporate control that favors takeover activism over direct takeover bids. This matches the reduced adoption of takeover defenses and yet continued decline of hostile tender offers. Our explanation is also consistent with the observation that takeover processes have become more sell-side driven since the 1990s, perhaps because of takeover defenses, but nonetheless have remained competitive (Liu & Mulherin 2019, Brown et al. 2022).[24] While takeover defenses ceteris paribus dampen takeover activity, in our theory, both the returns to control-oriented investment and the efficiency of the market continue to improve over time. The reason is that strategic complementarities between activists and buyout funds promote entry and shift the market toward sell-side driven takeover activism as the more effective mode of control change.

Another proposed explanation for the decrease in hostile tender offers is that shareholder activism offers a "low-cost-low stakes" alternative that has made costlier interventions, such as takeovers, superfluous in many cases (Gilson & Gordon 2013). The scope of non-takeover activism is in fact evidenced by activist campaigns that do not seek a sale of the target firm. However, the prevalence of takeover activism suggests that there has not been a substitution away from disciplinary takeovers. Because companies are also acquired in takeover activism, the cumulative intervention costs and especially stakes are ultimately comparable to those in hostile tender offers. Rather than a low-cost-low-stakes substitute, activism in these cases is a mechanism that facilitates the market for corporate control (Denes et al. 2017).

4 On the Efficiency Gains from Takeover Activism

In our discussion of why the equilibrium outcome in Corollary 1 is fully efficient, we claim that bypassing the free-rider problem in the merger invitation is immaterial for this result. In this section, we corroborate this claim by analyzing a model variation in which the outside bidder also faces the free-rider problem. This additional analysis shows that the efficiency gains do not stem from avoiding the free-rider problem; rather, the choice between brokering and undertaking a takeover allows for a (partial) *separation* of the free-rider problem and the asymmetric information problem.

4.1 Block Trade and Bidder Tender Offer

We now consider a variation of the single-firm model in which "takeover activism" is carried out through a block trade between the large shareholder and the outside bidder who subsequently makes a tender offer for the dispersedly held shares. That is, L can make a tender

[24] The fact that many acquisitions of public firms are seller-initiated is explored in Masulis & Simsir (2018) and Eckbo et al. (2020). Gorbenko & Malenko (forthcoming) provide a theory of deal initiation. Concerning disciplinary buyouts (rather than synergistic mergers), our theory also analyzes the choice between a buy-side driven "tender offer" and a sell-side driven "merger invite."

offer τ_L herself or sell her stake α to B. Following a block trade, B can make a tender offer τ_B to dispersed shareholders, which exposes her to the free-rider problem. To keep a level playing field, we assume the same bargaining protocol for the block trade as we did for the merger invitation: With probability ρ, L makes a take-it-or-leave-it offer p_L for the α stake, and with probability $1 - \rho$, B makes a take-it-or-leave-it offer p_B.

The difference in L's payoff from making a tender offer herself and trading the α stake to B is

$$\underbrace{(1-\alpha)(V-\tau_L)+\alpha V}_{\text{Direct Takeover}} - \underbrace{\alpha[\rho p_B + (1-\rho)p_L]}_{\text{Takeover Activism}}. \tag{9}$$

As one can easily see, if $P = \tau_L$, $P_B = p_B$ and $P_L = p_L$, L's decision between a direct takeover and takeover activism is the same as in the baseline model (see Equation (4)).

After the block acquisition, the dispersed shareholders accept the tender offer from B only if her offer τ_B at least matches the conditonal expected share value $\mathbb{E}[V|invite]$. Since B and the dispersed shareholders share the common posterior $\mathbb{E}[V|invite]$, her bid τ_B does not affect their expectation of V. Consequently, they accept the offer $\tau_B = \mathbb{E}[V|invite]$.

Proposition 4. *The model with block trades and subsequent tender offers replicates the equilibrium outcome of Proposition 1: For all $V \in [V_1^*, 1]$, the large shareholder makes a bid herself. For all $V \in [0, V_1^*)$, she sells her block to the bidder, who subsequently makes a successful bid.*

As in Proposition 1, high L types prefer to acquire the firm themselves because it allows them to reap the full value improvement of their initial stake. By contrast, low L types prefer takeover activism, since selling the α stake at a pooled price is more attractive. Furthermore, Proposition 4 shows that the cut-off V_1^* remains unchanged and that all firms are taken over and restructured. Intuitively, L sells her entire stake in the block trade and in the merger negotiations, and both proceed under the same bargaining protocol. Therefore, the expected price and the cutoff are the same as in merger negotiations, since the firm is ultimately acquired by B. All firm types are taken over in this variant of takeover activism because asymmetric information and the free-rider problem are separated. In the block trade, there is an asymmetric information problem, but no free-riding. Since there are known gains from trade, asymmetric information itself does not prevent efficient trade. In the subsequent tender offer B has the same posterior as the dispersed shareholders. Thus, B is only exposed to free-riding which by itself does not preclude efficient trade. As a result, the control allocation is fully efficient.

The only difference from the baseline model is a redistribution of profits from B to dispersed shareholders. Under a negotiated block trade with subsequent tender offer, B's expected profit stems solely from the block trade. The bid price for the $(1 - \alpha)$ shares must be equal to their expected value $(1-\alpha)\mathbb{E}[V|V \leq V^*]$, because the dispersed shareholders do not tender at any lower price. By contrast, B makes an expected profit on all shares in a merger, since also the dispersed shareholders have to sell at the negotiated price.

4.2 Informed Bidder after Block Trade

The efficiency gains associated with takeover activism arise because block trade and subsequent tender offer permit a full separation of asymmetric information and the free-rider problem. One may wonder whether takeover activism still generates efficiency gains—in the arguably plausible scenario—when the bidder learns the true value improvement V after the block trade but prior to making the bid. In this case, B—like L—knows more than the dispersed shareholders. Thus, the tender offer is once again plagued by both the asymmetric information and the free-rider problem. Nevertheless, takeover activism still improves efficiency, albeit to a lesser extent.

Proposition 5. *When the bidder learns V after the block trade, the large shareholder makes a bid for $V \in [\overline{V}_1^*, 1]$ and otherwise sells her block. Subsequently, the bidder makes a bid for all $V \in [\underline{V}_1^*, \overline{V}_1^*)$ but does not bid for $V \in [0, \underline{V}_1^*)$ with $\underline{V}_1^* < V_0^*$.*

The equilibrium with an informed bidder is characterized by two cutoffs (see Figure 9). For all substantial value improvements ($V \geq \overline{V}_1^*$), the large shareholder makes a direct acquisition, offering the expected post-takeover share value $\tau_L^* = \mathbb{E}[V|V \geq \overline{V}_1^*]$. For all moderate value improvements ($V < \overline{V}_1^*$), L negotiates a block trade with the bidder.

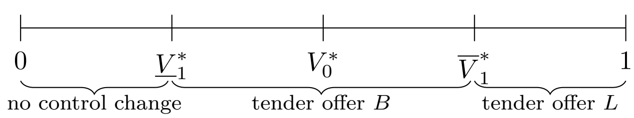


Figure 9: Equilibrium cutoffs with informed bidder.

Once the bidder learns the value improvement V, she is in a situation similar to the large shareholder in the Shleifer & Vishny (1986) setting, though with one crucial difference. The very fact that L abstained from making a tender offer credibly reveals that the possible value improvements are truncated to the subset $[0, \overline{V}_1^*]$ when B makes her bid. Consequently, B can succeed with a lower offer price than L. In parallel to the tender offers made by L, all successful B types pay the same price $\tau_B^* = \mathbb{E}[V|V \in [\underline{V}_1^*, \overline{V}_1^*]]$, and those types with a smaller (larger) value improvement acquire the firm at a premium (discount). Again, the mispricing deters B types with sufficiently small value improvements $V < \underline{V}_1^*$. Their gain on the α stake does not compensate for the loss at which they would buy the $(1-\alpha)$ shares in the tender offer.

Since the block trade only occurs if $V \in [0, \overline{V}_1^*]$, the bid price τ_B that the bidder has to pay and the cutoff type $\underline{V}_1^*$ above which a bid is profitable must be smaller than in the setting where only the large shareholder can acquire the firm (Section 2.2). Therefore, more firms are taken over and restructured than without takeover activism.

Finally, anticipating the outcome in the tender offer stage the bidder values the block at $\alpha\mathbb{E}[V\ \mathbb{1}_{V \geq \underline{V}_1^*}|V \leq \overline{V}_1^*] = \alpha\mathbb{P}[V \geq \underline{V}_1^*|V \leq \overline{V}_1^*] \times\ \mathbb{E}[V|\underline{V}_1^* \leq V \leq \overline{V}_1^*]$. Thus, the large shareholder cannot ask more than $p_L^* = \mathbb{E}[V\ \mathbb{1}_{V \geq \underline{V}_1^*}|V \leq \overline{V}_1^*]$ for her stake in the block trade negotiations. Since L's payoff is zero should the negotiations fail, B offers $p_B^* = 0$.

4.3 Bidder Chain

We now allow for the possibility of multiple block trades prior to the tender offer. To this end we introduce many bidders placed in a chain. More specifically, there are $i \in \{1, \dots, n\}$ outside bidders where the large shareholder is, for ease of notation, bidder 1. Bidder 1 owns α shares and learns the realization of V. Subsequently, he makes a tender offer τ_1 or negotiates a block trade with bidder 2. The negotiation protocol remains unchanged: with probability ρ, bidder 1 makes the offer p_1^{ask} and with $1-\rho$ bidder 2 can make an offer p_2^{bid}. If bidder 2 acquires the block, she in turn learns the realization of V and decides to either make a bid or negotiate a block trade with bidder 3. Generally speaking, if some bidder $i < n$ does not make a tender offer, she can sell the block to bidder $i+1$. Bidder n can make a tender offer but not sell on the block. The game ends as soon as some bidder $i \in \{1, \dots, n\}$ makes a tender offer and the dispersed shareholders decide whether to tender or when bidder n does not make a bid. Figure 10 displays the sequences of moves.

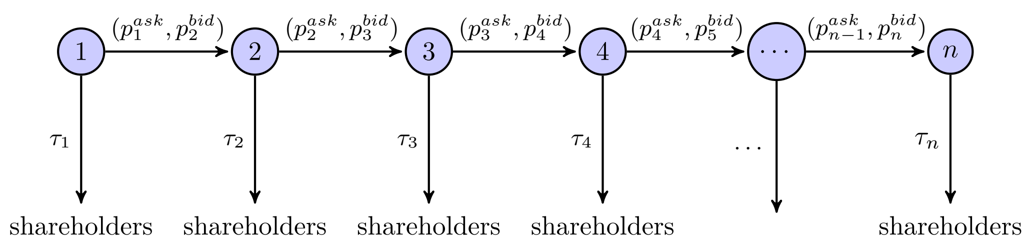


Figure 10: Bidder chain.

Proposition 6. *There is an equilibrium characterized by n cutoffs $1 > V_1 > V_2 > \dots > V_n > 0$. A bidder i conducts a tender offer if $V \in [V_i, V_{i-1})$ and otherwise negotiates a block with bidder $i+1$.*

Each bidder $i < n$ makes a tender offer $\tau_i = \mathbb{E}[V|V \in [V_i, V_{i-1})]$ if the value improvement V is in the interval $[V_i, V_{i-1})$ and enters block trade negotiations whenever the improvement is smaller ($V < V_i$). In the latter case, bidder $i+1$ offers with probability $(1-\rho)$ to buy the block at the bid price $p_{i+1}^{bid} = 0$ since bidder i's outside option is zero. With probability ρ, bidder i offers to sell the block at the ask price $p_i^{ask} = \sum_{j=i}^{n-1} \rho^{j-i}\, \mathbb{E}[V\ \mathbb{1}_{V \in [V_{j+1}, V_j)}\ |V \leq V_j]$. The price p_i^{ask} is the expected value of the block to bidder $i+1$ which comprises the expected profits from a takeover and a block trade. The block trade profits, in turn, are given by bidder $i+2$'s expected profits from a takeover and a block trade. Iterating until bidder n gives the formula above.

If bidder i buys the block at the ask price p_{i-1}^{ask} she realizes a profit only if she subsequently makes a bid. Otherwise, she makes a loss since $p_{i-1}^{ask} > p_i^{ask} > p_{i+1}^{bid}$. Trivially, if she pays her bid price p_i^{bid} she never makes a loss. Finally, if bidder n ends up buying the block she makes a bid $\tau_n = \mathbb{E}[V|V \in [V_n, V_{n-1})]$ if $V \in [V_n, V_{n-1})$. For smaller value improvements than V_n, the large shareholder does not acquire and restructure the firm. In other words, the control allocation is inefficient.

Proposition 7. *The set of firms that are not being taken over and restructured shrinks with the length of the bidder chain. As $n \longrightarrow \infty$, the control allocation becomes efficient.*

Proposition 7 shows that the control allocation becomes more efficient when the bidder chain increases in length. In the limit, the control allocation is fully efficient, notwithstanding the conjunction of free-rider and asymmetric information problem at every tender offer stage. Intuitively, for lower realizations of V more bidders must forgo the option to acquire the firm to *collectively* signal that the value improvement is indeed small. The dispersed shareholders are then willing to tender at a price such that the bid becomes profitable for small value improvements. If sufficiently many bidders signal by foregoing to acquire the firm themselves, a takeover becomes profitable for some bidder for any value improvement, however small.

Comparing this to our baseline model in Sections 2 and 3, this means that the efficiency gains from takeover activism there (i.e., from merger invitations) are equivalent to those from "intermediation" across the above chain of bidders, as the number of bidders goes to infinity.

Relation to "Intermediation Chains." Glode & Opp (2016) study a screening problem where an uninformed seller makes a take-it-or-leave-it offer to a buyer who has private information about her willingness to pay. Even for known gains from trade, bilateral trade is not efficient. Intermediation chains increase efficiency if intermediaries are increasingly better informed in a way that reduces the dispersion of the seller's belief about the "next buyer's" valuation. Less dispersed beliefs promote efficiency because a price increase is associated with a larger increment in the probability of a trade failure. This induces the seller to demand lower prices, resulting in more trade.

We consider a signalling model with known gains of trade in which the combination of asymmetric information and free-riding is the source of inefficiency. Similar to Glode & Opp

(2016), allowing for a chain of transactions improves efficiency. In our setting, each consecutive block trade further truncates the shareholders' posterior belief. This *endogenous* concentration of shareholder beliefs makes takeovers with smaller value improvements feasible. In contrast to Glode & Opp (2016), each intermediary (bidder) can become perfectly informed after the block trade while still increasing efficiency in our model.

More broadly, our paper contributes to the literature on trade under asymmetric information in financial markets. Information revelation through block trades allows for a subsequent trade with the dispersed shareholders. At a conceptual level, this is a variant of information-based trade à la Bond & Eraslan (2010).

5 Concluding Remarks

We provide a model of the market for corporate control that allows large shareholders to make a tender offer or to put the firm in play, that is, to broker a sale to an outside bidder. We show in a single-firm setting that the option to be on the sell side gives rise to an efficient allocation of control by overcoming two fundamental governance problems: free-riding and asymmetric information. We then embed our single-firm model into a market model to study the evolution of the market of corporate control. After an early phase with buy-side driven tender offers, the market shifts gradually towards sell-side driven mergers.

Our theory offers an explanation for secular changes in the market for corporate control: the decline of hostile takeover bids and the concurrent rise of takeover activism. This trend is typically attributed to legal changes. But as we show, it emerges endogenously as the capital available to investors who seek to implement control changes in underperforming firms grows. The reason is that the combination of asymmetric information and the free-rider problem is most effectively overcome when active investors begin to populate both sides of the market—as activist investors who acquire firms themselves or put them in play and as outside bidders who stand ready to acquire firms that have been put in play. The strategic complementarities between these control-oriented investment strategies are being increasingly exploited as the market matures, and drive the unique "industrial organization" of the market for corporate control.

This perspective can potentially explain other phenomena outside of our analysis, which reflect a continuing convergence of hedge fund activism and private equity. First, there are instances in which buyout firms sponsor activist campaigns in specific targets, as in the case of Valeant and Pershing Square (e.g., Gandel 2015), and conversely, instances in which activists sponsor a special purpose acquisition company (SPAC) and team up with a buyout firm to acquire a target, as in the case of Third Point and Silver Lake Partners (e.g., Beltran 2020). Second, some control-oriented investment firms, like Elliott Management, now combine both strategies by running activist hedge funds *and* buyout funds (e.g., Louch 2019).

Such cross-over activities raise the risk of collusion and insider trading, which warrant further scrutiny that is beyond the scope of this paper. That being said, the concerns about how the market of corporate control is “organized” should, in light of our theory, be paired with an understanding of the information and coordination problems that active investors need to overcome to efficiently reallocate control.

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A Appendix: Main Proofs

A.1 Proof of Lemma 1

Proof. See proof of Theorem 1 in Shleifer & Vishny (1986) and footnote 14. □

A.2 Proof of Proposition 1

Proof. **Step 1:** In any equilibrium, there is a cutoff $\hat{V} \in (0,1)$ such that all $V < \hat{V}$ extend a merger invitation and all $V \geq \hat{V}$ make a tender offer.

If all types were to pool on tender offer P_T, the free-rider condition would imply $P_T \geq \mathbb{E}[V]$ such that $V = 0$ (and, by continuity, slightly higher types) make a strict loss. Conversely, if all types extend a merger invitation, $\alpha[\rho P_L + (1-\rho)P_B] \leq \alpha P_B \leq \alpha\mathbb{E}[V]$. Hence, $V = 1$ (and, by continuity, slightly lower types) have a profitable deviation to a tender offer of $P = 1$. All shareholders would tender at $P_T = 1$ such that this deviation yields $\alpha 1 > \alpha\mathbb{E}[V]$.

In equilibrium, all successful tender offers need to have the same price. If offers P_T and P_T' with $P_T' > P_T$ were successful, it would be strictly profitable to deviate to P_T. The bargaining protocol for the merger invitations directly implies $P_B = 0$. Furthermore, all offers by L accepted in equilibrium must have the same price P_L. If offers P_L and P_L' with $P_L' < P_L$ were accepted, it would be strictly profitable to deviate to P_L.

For fixed (unique) prices (P_T, P_B, P_L) accepted in equilibrium, L's payoff difference is given by $\Delta(V, P_T, P_B, P_L) := (1-\alpha)(V - P_T) + \alpha V - \alpha[\rho P_L + (1-\rho)P_B]$ which is strictly and continuously increasing in V. Hence, there is unique $\hat{V}$ such that all $V \geq \hat{V}$ prefer a tender offer and all $V < \hat{V}$ prefer a merger invitation. In addition, type $V = 1$ makes a tender offer because $P = 1$ is accepted and $\Delta(V = 1, P_T = 1, P_B, P_L) = \alpha 1 - \alpha[\rho P_L + (1-\rho)P_B)] \geq \alpha 1 - \alpha\mathbb{E}[V] > 0$. Type $V = 0$ extends a merger invitation because $\Delta(V = 0, P_T, P_B, P_L) < 0$ and $\alpha[\rho P_L + (1-\rho)P_B] > 0$ provided $P_L > 0$. $P_L = 0$ can only hold if all types $V \in (0, \hat{V}]$ do nothing which is inconsistent with credible off-equilibrium beliefs by Grossman & Perry (1986). Any type $V \in (0, \hat{V}]$ would like to deviate to any $P_L > 0$ if it was accepted by B. Since such a deviation is profitable for all $V \in (0, \hat{V}]$, and possibly some $V \in (\hat{V}, 1]$, the bidder accepts any $P_L < \mathbb{E}[V|V \leq \hat{V}]$ under credible off-equilibrium beliefs by Grossman & Perry (1986). Hence, $\hat{V} \in (0,1)$.

Step 2: In any equilibrium, $P_T = \mathbb{E}[V|V \geq \hat{V}]$, $P_L = \mathbb{E}[V|V \leq \hat{V}]$ and $P_B = 0$.

Suppose $P_T > \mathbb{E}[V|V \geq \hat{V}]$ in an equilibrium with cutoff $\hat{V} \in (0,1)$. Deviating to $P_T' = \mathbb{E}[V|V \geq \hat{V}]$ is profitable for all $V \geq \hat{V}$ if shareholders tender at P_T'. By continuity and monotonicity, it is also profitable for some non-empty interval $[V', \hat{V})$ of types with $V' > 0$.

Hence, credible off-equilibrium beliefs imply $\mathbb{E}[V|P_T'] = \mathbb{E}[V|V \geq V'] < P_T' = \mathbb{E}[V|V \geq \hat{V}]$ and the tender offer P_T' succeeds. Hence, $P_T = \mathbb{E}[V|V \geq \hat{V}]$ in equilibrium.

Similarly, suppose $P_L < \mathbb{E}[V|V \leq \hat{V}]$ in an equilibrium with cutoff $\hat{V} \in (0,1)$. Deviating to $P_L' = \mathbb{E}[V|V \leq \hat{V}]$ is profitable for all $V \leq \hat{V}$. By continuity and monotonicity, it is also profitable for some interval $(\hat{V}, V']$ of types with $V' < 1$. Hence, credible off-equilibrium beliefs imply $\mathbb{E}[V|P'] = \mathbb{E}[V|V \leq V'] > P_L' = \mathbb{E}[V|V \leq \hat{V}]$ and B accepts P_L'. Hence, $P_L = \mathbb{E}[V|V \leq \hat{V}]$ in equilibrium. Obviously, L always accepts $P_B = 0$.

Step 3: There is a unique equilibrium with cutoff $V_1^* \in (0,1)$.

For a given $\hat{V}$, $\Delta(V;\hat{V}) = (1-\alpha)(V - \mathbb{E}[V|V \geq \hat{V}]) + \alpha V - \alpha\rho\mathbb{E}[V|V \leq \hat{V}]$ strictly increases in V. Since $\Delta(V = 0; \hat{V} = 0) = -(1-\alpha)\mathbb{E}[V] < 0$ and $\Delta(V = 1; \hat{V} = 1) = \alpha 1 - \alpha\rho\mathbb{E}[V] > 0$, there exists a cutoff $\hat{V}$ such that $\Delta(\hat{V};\hat{V}) = (1-\alpha)(\hat{V} - \mathbb{E}[V|V \geq \hat{V}]) + \alpha\hat{V} - \alpha\rho\mathbb{E}[V|V \leq \hat{V}] = 0$. This cutoff is also unique since $(\hat{V} - \mathbb{E}[V|V \geq \hat{V}]) = (-1)MRL(\hat{V})$, where $MRL(\hat{V}) = \mathbb{E}[V|V \geq \hat{V}] - \hat{V}$ is the mean residual life function which is monotonically decreasing if f is log-concave (Bagnoli & Bergstrom 2005). Since $\alpha(\hat{V} - \mathbb{E}[V|V \leq \hat{V}])$ is increasing due to log-concavity (Bagnoli & Bergstrom 2005), so is $\alpha\hat{V} - \alpha\rho\mathbb{E}[V|V \leq \hat{V}]$. Thus, there exists a unique cutoff V_1^* such that $\Delta(V_1^*, V_1^*) = 0$ and equilibrium prices are $P_T = \mathbb{E}[V|V \geq V_1^*]$, $P_B = 0$, and $P_L = \mathbb{E}[V|V \leq V_1^*]$.

Step 4: Given the conjectured cutoff equilibrium V_1^*, neither L nor B want to deviate from the conjectured equilibrium prices $P_T = \mathbb{E}[V|V \geq V_1^*]$, $P_B = 0$ and $P_L = \mathbb{E}[V|V \leq V_1^*]$.

Suppose L deviates to a lower tender offer $P_T' \in (0, \mathbb{E}[V|V \geq V_1^*])$ and it succeeds. Hence, all $V \geq V_1^*$ deviate to P_T'. By continuity, there is a $V' < V_1^*$ such that this deviation is also strictly profitable for all $V \in (V', V_1^*]$. Credible off-equilibrium beliefs imply that $\mathbb{E}[V|P_T'] = \mathbb{E}[V|V > V']$ such that the free-rider condition then requires that $P_T' \geq \mathbb{E}[V|V > V']$. Because P_T' is profitable for types $V \in (V', V_1^*]$, it has to hold that $V' \geq (1-\alpha)\mathbb{E}[V|V > V'] + \alpha\rho\mathbb{E}[V|V \leq V_1^*]$. Since $V' < V_1^*$ it must also hold that $V' > (1-\alpha)\mathbb{E}[V|V > V'] + \alpha\rho\mathbb{E}[V|V \leq V']$. Because $\Delta(0,0) < 0$ an $\Delta(V';V') > 0$, by continuity, there has to be a $V'' < V' < V_1^*$ such that $\Delta(V'', V'') = 0$. This is a contradiction because $\Delta(V,V) = 0$ can hold only at the unique cutoff V_1^*. Hence, there are no profitable deviations to $P_T' < P_T^*$. Obviously, L never wants to deviate to any higher tender offer since P_T^* succeeds.

Suppose L deviates to $P_L' > \mathbb{E}[V|V \leq V_1^*]$ and B accepts. By continuity, this deviation is profitable for all $V \in [0, V']$ where $V' > V_1^*$ Hence, credible off-equilibrium beliefs imply $\mathbb{E}[V|P_L'] = \mathbb{E}[V|V \leq V']$. Further, B's acceptance requires $P_L' \leq \mathbb{E}[V|V \leq V']$. Deviation is most profitable if $\rho = 1$ which we assume henceforth. Thus, for a profitable deviation there has to be a $V' > V_1^*$ such that $V' - (1-\alpha)\mathbb{E}[V|V > V_1^*] - \alpha\rho\mathbb{E}[V|V \leq V'] < 0$. Hence, $\Delta(V'; V') < 0$. Because $\Delta(1,1) > 0$ and $\Delta(V'; V') < 0$, by continuity, there has to be a $V'' > V' > V_1^*$ such that $\Delta(V'', V'') = 0$. Hence, there are no profitable deviations to $P_L' > P_L^*$. Obviously, L never wants to deviate to any lower merger offer since P_L^* is accepted.

□

A.3 Proof of Proposition 2

Proof. At $n = 0$, $\mathbb{E}[\Pi^L(V)] = \mathbb{E}[\Pi^L(V)|V^* = V_0^*] > 0 = n_L\mathbb{E}[\Pi^B(V)|V^* = V_1^*] = \mathbb{E}[\Pi^B(V)]$ such that the first entrant is a L. By continuity and $\mathbb{E}[\Pi^B(V)|V^* = V_1^*] > \mathbb{E}[\Pi^L(V)|V^* = V_0^*]$, there is a $\underline{n} > 0$ such that $\underline{n}\ \mathbb{E}[\Pi^B(V)|V^* = V_1^*] = \mathbb{E}[\Pi^L(V)|V^* = V_0^*]$. Hence, for all $n < \underline{n}$, only L's enter.

For $n \geq \underline{n}$ and as long as $n_L \in [\underline{n}, 1)$ and $n_B < 1$, control investors must be indifferent between entering as a L or a B, i.e.,

$$\mathbb{E}[\Pi^L(V)|V^* = V_0^*] + n_B\ (\mathbb{E}[\Pi^L(V)|V^* = V_1^*] - \mathbb{E}[\Pi^L(V)|V^* = V_0^*]) = n_L\ \mathbb{E}[\Pi^B(V)|V^* = V_1^*] \tag{10}$$

From $n = n_L + n_B$, it follows that

$$n_B^* = \frac{n\ \mathbb{E}[\Pi^B(V)|V^* = V_1^*] - \mathbb{E}[\Pi^L(V)|V^* = V_0^*]}{\mathbb{E}[\Pi^L(V)|V^* = V_1^*] - \mathbb{E}[\Pi^L(V)|V^* = V_0^*] + \mathbb{E}[\Pi^B(V)|V^* = V_1^*]},$$

and

$$n_L^* = \frac{n\ (\mathbb{E}[\Pi^L(V)|V^* = V_1^*] - \mathbb{E}[\Pi^L(V)|V^* = V_0^*]) + \mathbb{E}[\Pi^L(V)|V^* = V_0^*]}{\mathbb{E}[\Pi^L(V)|V^* = V_1^*] - \mathbb{E}[\Pi^L(V)|V^* = V_0^*] + \mathbb{E}[\Pi^B(V)|V^* = V_1^*]}.$$

Case I**:** For $\mathbb{E}[\Pi^B(V)|V^* = V_1^*] < \mathbb{E}[\Pi^L(V)|V^* = V_1^*]$, indifference condition (10) implies that $n_B < 1$ and $n_B < n_L\ \forall n$. At $n_L^* = 1$, the total mass of control investors is $1 + \frac{\mathbb{E}[\Pi^B(V)|V^*=V_1^*] - \mathbb{E}[\Pi^L(V)|V^*=V_0^*]}{\mathbb{E}[\Pi^L(V)|V^*=V_1^*] - \mathbb{E}[\Pi^L(V)|V^*=V_0^*]} = n := \overline{n} < 2$. For all $n \geq \overline{n}$, the control investor's indifference condition is given by

$$\mathbb{E}[\Pi^L(V)|V^* = V_0^*] + n_B\ (\mathbb{E}[\Pi^L(V)|V^* = V_1^*] - \mathbb{E}[\Pi^L(V)|V^* = V_0^*]) = \mathbb{E}[\Pi^B(V)|V^* = V_1^*]. \tag{11}$$

As a result, all new entrants become Ls and

$$n_B^* = \frac{\mathbb{E}[\Pi^B(V)|V^* = V_1^*] - \mathbb{E}[\Pi^L(V)|V^* = V_0^*]}{\mathbb{E}[\Pi^L(V)|V^* = V_1^*] - \mathbb{E}[\Pi^L(V)|V^* = V_0^*]},$$

and

$$n_L^* = \frac{n\ (\mathbb{E}[\Pi^L(V)|V^* = V_1^*] - \mathbb{E}[\Pi^L(V)|V^* = V_0^*]) + \mathbb{E}[\Pi^L(V)|V^* = V_0^*] - \mathbb{E}[\Pi^B(V)|V^* = V_1^*]}{\mathbb{E}[\Pi^L(V)|V^* = V_1^*] - \mathbb{E}[\Pi^L(V)|V^* = V_0^*]}.$$

Case II**:** For $\mathbb{E}[\Pi^B(V)|V^* = V_1^*] > \mathbb{E}[\Pi^L(V)|V^* = V_1^*]$, indifference condition (10) implies that n_B must reach 1 before $n_L = 1$. Since B makes zero profit in bidding competition, her expected payoff is $n_L(2 - n_B)\mathbb{E}[\Pi^B(V)|V^* = V_1^*]$ once $n_B \geq 1$ and provided that $n_L < 1$. Since Ls payoff increases due to bidder competition from $\mathbb{E}[\Pi^L(V)|V^* = V_1^*]$ to $\mathbb{E}[\Pi^L(V)|V^* = V_2^*]$, an entrant's indifference condition is

$$\begin{aligned} &(2 - n_B)\mathbb{E}[\Pi^L(V)|V^* = V_1^*] + (n_B - 1)\left(\mathbb{E}[\Pi^L(V)|V^* = V_1^*] - \mathbb{E}[\Pi^L(V)|V^* = V_0^*]\right) \\ =& n_L(2 - n_B)\mathbb{E}[\Pi^B(V)|V^* = V_1^*]. \end{aligned} \tag{12}$$

Rearranging and plugging in $n_L = n - n_B$ yields the following quadratic equation

$$\begin{aligned} &\underbrace{\left[2\mathbb{E}[\Pi^L(V)|V^* = V_1^*] - \mathbb{E}[\Pi^L(V)|V^* = V_2^*] - 2n\mathbb{E}[\Pi^B(V)|V^* = V_1^*]\right]}_{=:a} \\ +& \underbrace{\left[\mathbb{E}[\Pi^L(V)|V^* = V_2^*] - \mathbb{E}[\Pi^L(V)|V^* = V_1^*] + (2 + n)\mathbb{E}[\Pi^B(V)|V^* = V_1^*]\right]}_{=:b}\ n_B \\ &\underbrace{-\mathbb{E}[\Pi^B(V)|V^* = V_1^*]}_{=:c}\, n_B^2 = 0 \end{aligned} \tag{13}$$

Note that since $n_L = n - n_B$, a non-linearity arises and we arrive at

$$\begin{aligned} n_B^* =& \frac{2\mathbb{E}[\Pi^B(V)|V^* = V_1^*] + n\mathbb{E}[\Pi^B(V)|V^* = V_1^*] - \mathbb{E}[\Pi^L(V)|V^* = V_1^*] + \mathbb{E}[\Pi^L(V)|V^* = V_2^*]}{2\mathbb{E}[\Pi^B(V)|V^* = V_1^*]} - \frac{\mathbb{E}[\Pi^B(V)|V^* = V_1^*]}{2\mathbb{E}[\Pi^B(V)|V^* = V_1^*]} \\ \times& \frac{\sqrt{\begin{aligned} &(n-2)^2\mathbb{E}[\Pi^B(V)|V^* = V_1^*]^2 - 2(n-2)\mathbb{E}[\Pi^B(V)|V^* = V_1^*]\mathbb{E}[\Pi^L(V)|V^* = V_1^*] \\ &\quad + (\mathbb{E}[\Pi^L_{LB}(V, \rho = 1) - \mathbb{E}[\Pi^L(V)|V^* = V_1^*])^2 + 2n\mathbb{E}[\Pi^B(V)|V^* = V_1^*]\mathbb{E}[\Pi^L(V)|V^* = V_2^*]\mathbb{E}[\Pi^B(V)|V^* = V_1^*]^2 \end{aligned}}}{2\mathbb{E}[\Pi^B(V)|V^* = V_1^*]} \end{aligned} \tag{14}$$

and

$$\begin{aligned} n_L^* =& \frac{\mathbb{E}[\Pi^L(V)|V^* = V_2^*] - \mathbb{E}[\Pi^L(V)|V^* = V_1^*]}{2\mathbb{E}[\Pi^B(V)|V^* = V_1^*]} \\ -& \frac{\mathbb{E}[\Pi^B(V)|V^* = V_1^*](n-2) + \sqrt{\begin{aligned} &(n-2)^2 + \tfrac{(\mathbb{E}[\Pi^L(V)|V^*=V_2^*] - \mathbb{E}[\Pi^L(V)|V^*=V_1^*])^2}{\mathbb{E}[\Pi^B(V)|V^*=V_1^*]^2} \\ &\quad + \tfrac{4\mathbb{E}[\Pi^L(V)|V^*=V_1^*] + 2n\mathbb{E}[\Pi^L(V)|V^*=V_2^*] - 2n\mathbb{E}[\Pi^L(V)|V^*=V_1^*]}{\mathbb{E}[\Pi^B(V)|V^*=V_1^*]} \end{aligned}}}{2\mathbb{E}[\Pi^B(V)|V^* = V_1^*]} \end{aligned} \tag{15}$$

as the unique admissible solutions. Both n_B^* and n_L^* strictly increase in n. As a result, there is a n' such that $n_L^*(n') = 1$ and $n_B^*(n') > 1$. For all $n' \geq n$, the equilibrium conditions are

$$(n_B - 1)\mathbb{E}[\Pi^L(V)|V^* = V_2^*] + (2 - n_B)\mathbb{E}[\Pi^L(V)|V^* = V_1^*] = (2 - n_B)\ \mathbb{E}[\Pi^B(V)|V^* = V_1^*] \tag{16}$$

and

$$n = n_L + n_B. \tag{17}$$

Together, these yield

$$n_B^* = \frac{2\ \mathbb{E}[\Pi^B(V)|V^* = V_1^*] - 2\mathbb{E}[\Pi^L(V)|V^* = V_1^*] + \mathbb{E}[\Pi^L(V)|V^* = V_2^*]}{\mathbb{E}[\Pi^B(V)|V^* = V_1^*] - \mathbb{E}[\Pi^L(V)|V^* = V_1^*] + \mathbb{E}[\Pi^L(V)|V^* = V_2^*]}, \tag{18}$$

and

$$n_L^* = n - \frac{2\ \mathbb{E}[\Pi^B(V)|V^* = V_1^*] - 2\mathbb{E}[\Pi^L(V)|V^* = V_1^*] + \mathbb{E}[\Pi^L(V)|V^* = V_2^*]}{\mathbb{E}[\Pi^B(V)|V^* = V_1^*] - \mathbb{E}[\Pi^L(V)|V^* = V_1^*] + \mathbb{E}[\Pi^L(V)|V^* = V_2^*]}. \tag{19}$$

where n_B^* is constant in n and n_L^* strictly increases in n.

□

A.4 Proof of Proposition 3

Proof. Obviously if $n_B^* = 0$ and $n_L^* > 0$,

$$\frac{\#\ \text{takeover activism}}{\#\ \text{tender offers}} = 0. \tag{20}$$

which corresponds to $n \leq \underline{n}$ for either case. If $n_B^* \in (0, 1]$ and $n_L^* \in (0, 1]$, a firm is matched with a B and L with probability $n_L^* n_B^*$. Conditional on such a match, the probability of a merger invite is $F(V_1^*)$. Conversely, conditional on a match of a firm with both a L and a B, the probability that an outright tender offer occurs is $1 - F(V_1^*)$. With probability $n_L^*(1 - n_B^*)$ a firm is only matched with a L such that a tender offer occurs with probability $1 - F(V_0^*)$. Taken together, the probability of a tender offer is $n_L^* n_B^*(1 - F(V_1^*)) + n_L^*(1 - n_B^*)(1 - F(V_0^*))$. Hence,

$$\begin{aligned}\frac{\#\ \text{takeover activism}}{\#\ \text{tender offers}} &= \frac{n_L^* n_B^* F(V_1^*)}{n_L^* n_B^*(1 - F(V_1^*)) + n_L^*(1 - n_B^*)(1 - F(V_0^*)} \\ &= \frac{n_B^* F(V_1^*)}{n_B^*(1 - F(V_1^*)) + (1 - n_B^*)(1 - F(V_0^*))}\end{aligned} \tag{21}$$

which increases in n_B^* and is constant in n_L^*. If $n_B^* \in (0, 1]$ and $n_L^* \geq 1$, every firm is matched with at least one L such that

$$\frac{\#\text{ takeover activism}}{\#\text{ tender offers}} = \frac{n_B^* F(V_1^*)}{n_B^*(1-F(V_1^*)) + (1-n_B^*)(1-F(V_0^*))} \tag{22}$$

which again increases in n_B^* and is constant in n_L^*.

If $n_B^* \geq 1$ and $n_L^* \in (0,1]$, every firm is matched with at least one B such that

$$\begin{aligned}\frac{\#\text{ takeover activism}}{\#\text{ tender offers}} &= \frac{n_L^*(n_B^*-1)F(V_2^*) + n_L^*(2-n_B^*)F(V_1^*)}{n_L^*(n_B^*-1)(1-F(V_2^*)) + n_L^*(2-n_B^*)(1-F(V_1^*))} \\ &= \frac{(n_B^*-1)F(V_2^*) + (2-n_B^*)F(V_1^*)}{(n_B^*-1)(1-F(V_2^*)) + (2-n_B^*)(1-F(V_1^*))}\end{aligned} \tag{23}$$

If $n_B^* \geq 1$ and $n_L^* \geq 1$, every firm is matched with at least one L and one B such that

$$\frac{\#\text{ takeover activism}}{\#\text{ tender offers}} = \frac{(n_B^*-1)F(V_2^*) + (2-n_B^*)F(V_1^*)}{(n_B^*-1)(1-F(V_2^*)) + (2-n_B^*)(1-F(V_1^*))}. \tag{24}$$

All expressions are constant in n_L^* and increase in n_B^* because $V_2^* > V_1^* > V_0^*$. Since n weakly increases in n across all cases, takeover activism becomes more likely relative to tender offers if n increases.

□

A.5 Proof of Proposition 4

Proof. Suppose $\mathbb{E}[V|\text{invite}] > 0$. If B has acquired the block of L and holds the common posterior $\mathbb{E}[V|\text{invite}]$ with the dispersed shareholders, she can acquire the remaining $1-\alpha$ shares at $\mathbb{E}[V|\text{invite}]$ (by $A1$) yielding an expected profit of 0 on each of these shares. Since the price paid for the α-block is sunk at the stage of the tender offer, B obtains an expected profit $\alpha\mathbb{E}[V|\text{invite}] > 0$ and, thus, it is a unique best response to take over the firm.

When L decides between a direct takeover and a block trade, her payoff difference is given by

$$(1-\alpha)(V-\tau_L) + \alpha V - \alpha[\rho p_B + (1-\rho)p_L]. \tag{25}$$

As one can easily see, if $P = \tau_L$, $P_B = p_B$ and $P_L = p_L$, L's decision between a direct takeover and takeover activism is the same as in the baseline model (see Equation (4)). By steps $1-4$ of the proof of Proposition 1, there exists a unique equilibrium characterized by exactly the cutoff V_1^* from Proposition 1 and, indeed, $\mathbb{E}[V|\text{invite}] = \mathbb{E}[V|V \leq V_1^*] > 0$. □

A.6 Proof of Proposition 5

Proof. Suppose L issues a tender offer whenever $V \geq \overline{V}_1^*$ and sells her block to B otherwise. Given the conjectured equilibrium cutoff $\overline{V}_1^*$, the free-rider condition B faces becomes $\tau_B \geq \mathbb{E}[V|\tau_B, V \leq \overline{V}_1^*]$. If B has acquired the α-block, B's profits from a tender offer are $V - (1-\alpha)\tau_B$. Hence, for a fixed τ_B, B's payoff is monotonically increasing in V such that all and only types above some cutoff $\underline{V}_1^*$ conduct a tender offer. By credible off-equilibrium beliefs and the same arguments as in the proof of Proposition 1, $\tau_B = \mathbb{E}[V|V \in [\underline{V}_1^*, \overline{V}_1^*]]$. Denote $\Delta_B(\underline{V}_1^*) = \underline{V}_1^* - (1-\alpha)\mathbb{E}[V|V \in [\underline{V}_1^*, \overline{V}_1^*]] = 0$, then there is a unique $\underline{V}_1^* \in (0, \overline{V}_1^*)$ since $\Delta_B(0) < 0$, $\Delta_B(\overline{V}_1^*) > 0$ and $\Delta_B(\underline{V}_1^*)$ strictly increases by log concavity (because truncations preserve log-concavity).

Now consider L's initial decision. Since, by Proposition 1 (step 2), all L types conduct a takeover (block-sale) need to pool on the same τ_L (p_L). Further, because L's outside option of the block trade is 0, $p_B = 0$. Thus, L's payoff difference is $V - (1-\alpha)\tau_L - \alpha\rho p_L$ and, thus, is strictly increasing in V for fixed prices, verifying our conjecture that L's decision is characterized by a cutoff $\overline{V}_1^*$. By credible off-equilibrium beliefs, $p_L = \mathbb{E}[V \ \mathbb{1}_{V \in [[\underline{V}^*, \overline{V}_1^*)} | V \leq \overline{V}_1^*]$ which is B's expected profit from owning the block. L's cutoff $\overline{V}_1^*$ is the solution to her payoff difference from a tender offer and a block sale, i.e.,

$$\underbrace{(1-\alpha)(\overline{V}_1^* - \mathbb{E}[V|V \geq \overline{V}_1^*]) + \alpha\overline{V}_1^*}_{takeover} - \underbrace{\alpha\big(\rho\mathbb{E}[V \ \mathbb{1}_{V \geq \underline{V}_1^*(\overline{V}_1^*)} | V \leq \overline{V}_1^*]\big)}_{block\ trade} = 0. \tag{26}$$

Note that $\underline{V}_1^*(\overline{V}_1^*)$ is a strictly increasing function in $\overline{V}_1^*$. As a result, by log-concavity, $\alpha[\overline{V}_1^* - \rho\mathbb{E}[V \ \mathbb{1}_{V \in [\underline{V}_1^*, \overline{V}_1^*)} | V \leq \overline{V}_1^*]]$ strictly increases in $\overline{V}_1^*$ such that, by the arguments in Proposition 1, there is a unique cutoff $\overline{V}_1^* \in (0,1)$ which concludes the proof. Last, $\overline{V}_1^* > V_0^* > \underline{V}_1^*$ follows by log-concavity and a simple comparison of the following (implicit) equations

$$(1-\alpha)(\overline{V}_1^* - \mathbb{E}[V|V \geq \overline{V}_1^*]) + \alpha\overline{V}_1^* - \alpha\rho\mathbb{E}[V \ \mathbb{1}_{V \geq \underline{V}_1^*(\overline{V}_1^*)} | V \leq \overline{V}_1^*] = 0$$
$$(1-\alpha)(V_0^* - \mathbb{E}[V|V \geq V_0^*]) + \alpha V_0^* = 0$$
$$(1-\alpha)(\underline{V}_1^* - \mathbb{E}[V|V \in [\underline{V}_1^*, \overline{V}_1^*)]) + \alpha\underline{V}_1^* = 0.$$

□

A.7 Proof of Proposition 6

Proof. Consider a typical outside bidder $i \in \{1, \ldots, n-1\}$. Her payoff difference between a takeover and selling the block to the next bidder is

$$\underbrace{(1-\alpha)(V-\tau_i)+\alpha V}_{\text{takeover}} - \underbrace{\alpha[\rho p_i^{ask}]}_{\text{block trade}} . \tag{27}$$

Hence, by monotonicity and because tender offer and block price will be type-independent by previous arguments from Proposition 1, i's decision can again be characterized by a cutoff V_i. For larger types, i opts for a tender offer, whereas she negotiates a block trade for lower ones. Given the cutoff structure, by credible off-equilibrium beliefs, $\tau_i = \mathbb{E}[V|V \in [\underline{V}_i, \underline{V}_{i-1})]$ and p_i^{ask} is the expected value of the block to the next bidder $i+1$ whereas $p_{i+1}^{bid} = 0$ as i's outside option is 0.

Consider the last bidder n in the chain. Given that bidder n is offered the block by bidder $n-1$, she faces the same problem as L in Shleifer & Vishny (1986) with V distributed according to the truncation of F at V_{n-1}. Hence, n values the block at $\alpha\mathbb{E}[V\ \mathbb{1}_{V\in[V_n,V_{n-1})}\ |V \leq V_{n-1}]$ because she realizes a takeover if and only if V is larger than some cutoff $V_n \in (0, V_{n-1})$ at tender offer $\tau_i = \mathbb{E}[V|V \in [V_n, V_{n-1})]$ (by credible off-equilibrium beliefs). Bidder $n-1$ then, in turn, values the block offered to her by bidder $n-2$ at

$$\alpha\mathbb{E}[V\mathbb{1}_{V\in[V_{n-1},V_{n-2})}|V \leq V_{n-2}] + \rho\alpha\mathbb{E}[V\ \mathbb{1}_{V\in[V_n,V_{n-1})}\ |V \leq V_{n-2}]. \tag{28}$$

Hence, in the conjectured equilibrium, some arbitrary bidder $(i+1) \in \{1, \ldots, n-1\}$, who is offered the block by bidder i, values the block at

$$\alpha\mathbb{E}[V\mathbb{1}_{V\in[V_{i+1},V_i)}|V \leq V_i] + \rho\alpha\mathbb{E}[V\ \mathbb{1}_{V\in[V_{i+2},V_{i+1})}\ |V \leq V_i] + \rho^2\alpha\mathbb{E}[V\ \mathbb{1}_{V\in[V_{i+3},V_{i+2})}\ |V \leq V_i]$$
$$+ \cdots + \alpha\rho^{n-1-i}\mathbb{E}[V\mathbb{1}_{V\in[V_{n-1},V_{n-2})}|V \leq V_i] = \sum_{j=i}^{n-1} \rho^{j-i}\ \mathbb{E}[V\ \mathbb{1}_{V\in[V_{j+1},V_j)}\ |V \leq V_i] \tag{29}$$

which is the maximal price i can ask L for such that, by credible off-equilibrium beliefs, $p_i^{ask} = \sum_{j=i}^{n-1} \rho^{j-i}\ \mathbb{E}[V\ \mathbb{1}_{V\in[V_{j+1},V_j)}\ |V \leq V_i]$. Hence, plugging in block prices and tender offers, the cutoffs are implicitly defined by

$$\begin{cases} (1-\alpha)(V_1 - \mathbb{E}[V|V \geq V_1]) + \alpha V_1 - \alpha\rho \sum_{j=1}^{n-1} \rho^{j-1}\ \mathbb{E}[V\ \mathbb{1}_{V \in [V_{j+1}, V_j)}\ |V \leq V_1] = 0 \\ (1-\alpha)(V_2 - \mathbb{E}[V|V \in [V_2, V_1]]) + \alpha V_2 - \alpha\rho \sum_{j=2}^{n-1} \rho^{j-2}\ \mathbb{E}[V\ \mathbb{1}_{V \in [V_{j+1}, V_j)}\ |V \leq V_2] = 0 \\ \vdots \\ (1-\alpha)(V_i - \mathbb{E}[V|V \in [V_i, V_{i-1}]]) + \alpha V_i - \alpha\rho \sum_{j=i}^{n-1} \rho^{j-i}\ \mathbb{E}[V\ \mathbb{1}_{V \in [V_{j+1}, V_j)}\ |V \leq V_i] = 0 \\ \vdots \\ (1-\alpha)(V_{n-1} - \mathbb{E}[V|V \in [V_{n-1}, V_{n-2}]]) + \alpha V_{n-1} - \alpha\rho\ \mathbb{E}[V\ \mathbb{1}_{V \in [V_n, V_{n-1})}\ |V \leq V_{n-1}] = 0 \\ (1-\alpha)(V_n - \mathbb{E}[V|V \in [V_n, V_{n-1}]]) + \alpha V_n = 0. \end{cases}$$

By log concavity of $f(V)$ and the arguments of Proposition 1, each equation i has a unique solution $V_i \in (0,1)$ for a given vector of $(V_1, \ldots, V_{i-1}, V_{i+1}, \ldots, V_n) \in [0,1]^{n-1}$. We now argue that the system of n equations has a unique solution vector $(V_1, V_2, \ldots, V_n) \in (0,1)^n$. Consider the last of the n equations ($(1-\alpha)(V_n - \mathbb{E}[V|V \in [V_n, V_{n-1}]]) + \alpha V_n = 0$). By log-concavity of $f(V)$ and the arguments of Proposition 1, this equation has a unique, interior solution for any V_{n-1}. Then, by the same arguements, for any value of $V_{n-2} \in (0,1)$, the next to last equation $(n-1)$ has a unique, interior solution. Iterating forward, the first equation has a unique solution given the boundary condition of $V_0 = 1$. Last, we need to establish that $1 > V_1 > V_2 > \cdots > V_n > 0$. Observe that for any $V_{n-1} \in (0,1)$, the last equation implies that $V_n = (1-\alpha)\mathbb{E}[V|V \in [V_n, V_{n-1}]] < V_{n-1}$. Again, iterating forward shows for any i that $V_i = (1-\alpha)\mathbb{E}[V|V \in [V_i, V_{i-1}]]) + \alpha\rho \sum_{j=i}^{n-1} \rho^{j-i}\ \mathbb{E}[V\ \mathbb{1}_{V \in [V_{j+1}, V_j)}\ |V \leq V_i] < V_{i-1}$, which concludes the proof. □

A.8 Proof of Proposition 7

Proof. We start by establishing that $\left(V_n\right)_{n \in \mathbb{N}}$ strictly decreases in n. Suppose this was not the case, then for some $n \in \mathbb{N}$ it has told that $V_n^n \leq V_{n+1}^{n+1}$, where the superscript ℓ in V_n^ℓ denotes the length of the bidder chain, whereas the subscript denotes, as before, the particular element. Because the cutoff for the last bidder in the chain is determined by

$$(1-\alpha)(V_n - \mathbb{E}[V|V \in [V_\ell^\ell, V_{\ell-1}^\ell]]) + \alpha V_\ell^\ell = 0,$$

$V_n^n \leq V_{n+1}^{n+1}$ implies that $V_{n-1}^n \leq V_n^{n+1}$. Furthermore, because the next to last bidder in the chain is determined by

$$h_{\ell-1}^\ell \equiv (1-\alpha)(V_{\ell-1}^\ell - \mathbb{E}[V|V \in [V_{\ell-1}^\ell, V_{\ell-2}^\ell]]) + \alpha V_{\ell-1}^\ell - \alpha\rho\ \mathbb{E}[V\ \mathbb{1}_{V \in [V_\ell^\ell, V_{\ell-1}^\ell)}\ |V \leq V_{\ell-1}^\ell] = 0,$$

and because $h^\ell_{\ell-1}$ strictly increases in $V^\ell_{\ell-1}$ (by log-concavity) and strictly decreases in $V^\ell_{\ell-2}$,

$$\frac{\partial V^\ell_{\ell-1}}{\partial V^\ell_{\ell-2}} = -\frac{\frac{\partial h^\ell_{\ell-1}}{\partial V^\ell_{\ell-2}}}{\frac{\partial h^\ell_{\ell-1}}{\partial V^\ell_{\ell-1}}} > 0$$

so that $V^n_{n-1} \leq V^{n+1}_n$ can only hold if $V^n_{n-2} \leq V^{n+1}_{n-1}$. Iterating forward yields that $V^n_1 \leq V^{n+1}_2$ can only hold if $1 = V^n_0 \leq V^{n+1}_1$ which yields a contradiction as $V^{n+1}_1 < 1$ for all $\rho < 1$.

Because $\left(V_n\right)_{n\in\mathbb{N}}$ decreases monotonically in n and is bounded below by 0, it converges. On the way to a contradiction, suppose $\lim_{n\to\infty} V_n = b > 0$. Now consider the sequence of $\left(V_{n-1}\right)_{n\in\mathbb{N}}$ which also decreases monotonically in n and is bounded below by b so that it has to converge to some $B_1 \geq b$. If $\lim_{n\to\infty} V_{n-1} = b$, then $\lim_{n\to\infty} V_n = (1-\alpha)\mathbb{E}[V|V \in [V_n, b]] < b$ which yields a contradiction. Thus, it has to hold that $B_1 > b$. Now consider two sequences $\left(V_{n-k}\right)_{n\in\mathbb{N}}$ and $\left(V_{n-k-1}\right)_{n\in\mathbb{N}}$ for some arbitrary $k \in \{2, \ldots, n-2\}$. Both sequences decrease monotonically in n and are bounded below by b so that they have to converge to some $B_k > b$ and $B_{k-1} \geq B_k$, respectively. $|V_{n-k-1} - V_{n-k}|$ has to converge to zero as otherwise, in the limit, $\sum_{i=1}^\infty |V_{i-1} - V_i| > 1$ (we define $V_0 = 1$), yielding a contradiction. However, if $\lim_{n\to\infty} V_{n-k} = \lim_{n\to\infty} V_{n-k-1} = B_k$, it follows that

$$\begin{aligned} V_{n-k} &= (1-\alpha)\mathbb{E}[V|V \in [V_{n-k}, V_{n-k-1}]] + \alpha\rho \sum_{j=i}^{n-1} \rho^{j-(n-k)}\ \mathbb{E}[V\ \mathbb{1}_{V\in[V_{j+1},V_j)}\ |V \leq V_{(n-k)}] \\ &< (1-\alpha)\mathbb{E}[V|V \in [V_{n-k}, V_{n-k-1}]] + \alpha\mathbb{E}[V|V \leq V_{(n-k-1)}] \overset{n\to\infty}{=} (1-\alpha)B_k + \alpha B_k < B_k \end{aligned}$$

which yields a contradiction so that we can conclude that $\lim_{n\to\infty} V_n = 0$.

□

A Online Appendix

A.1 Bidder Heterogenity

Suppose again that there are $n \geq 2$ potential outside bidders and one large shareholder L. We now add to the common value improvement $V \sim F[0,1]$ an idiosyncratic, bidder-specific component θ_i, privately observed by each outside bidder $i \in \{1, \ldots, n\}$. Due to her experience with the target company, V is still the large shareholder's private information. We assume that θ_i are independently (also from V) distributed according to some cdf $G[0,1]$. The bidder specific component may stem from the fact that, in contrast to L, the outside bidders are often non-financial bidders who have the potential to realize additional synergies or private equity funds with specific expertise. If invited, outside bidders again compete in a second price auction. By standard arguments, i's optimal bid is given by $b_i = \mathbb{E}[V|invite] + \theta_i$. Hence, L's choice between a tender offer and merger invite becomes

$$\Delta(V^*, \mathcal{P}^*(V^*)) = V^* - (1-\alpha)\mathbb{E}[V|V \geq V^*] - \alpha\mathbb{E}[V|V \leq V^*] - \alpha\mathbb{E}[\theta_2^{(n)}], \tag{30}$$

where $\mathbb{E}[\theta_2^{(n)}]$ is the expected second order statistic of n independent draws from $G[0,1]$. Since $\mathbb{E}[\theta_2^{(n)}]$ is fixed from L's perspective, the cutoff structure of the equilibrium prevails.

Lemma 2. *When bidders are heterogeneous, the likelihood of takeover activism increases in the number of bidders.*

Proof. Let

$$\xi(n, V^*) := V^* - (1-\alpha)\mathbb{E}[V|V \geq V^*] - \alpha\mathbb{E}[V|V \leq V^*] - \alpha\mathbb{E}[\theta_2^{(n)}] = 0.$$

Because $\mathbb{E}[\theta_2^{(n)}]$ is independent of V and $\xi(n, V^*)$ strictly increases in V^* by log-concavity, there is an implicit function $V^*(n)$ such that $\frac{\partial V^*(n)}{\partial n} > 0$. Note that $\lim_{n\to\infty} \mathbb{E}[\theta_2^{(n)}] = 1$ such that $V^*(n = \infty) > 1$ since $\xi(\infty, 1) = \alpha(1 - \mathbb{E}[V] - 1) < 0$, and by log-concavity. By continuity, we can conclude that there is a $\overline{n} < \infty$ such that $V^* \geq 1$ for all $n \geq \overline{n}$ and no direct tender offers ever take place. □

Example. Suppose we a sample of 2 transactions, $F = G = \mathcal{U}[0,1]$, $\alpha = 0.1$. The first firm has one L and $n = 2$ outside bidders. One can easily see that in this case $V^* = 1$ and, even for only 2 outside bidders, no direct tender offer ever occurs. The expected merger price P^*_{merger} is $\mathbb{E}[V] + \mathbb{E}[\theta_2^{(n)}] = 1$. The second firm has one L and no outside bidder. One can easily see that in this case $V^* = \frac{1-\alpha}{1+\alpha} = \frac{0.9}{1.1}$ such that tender offer is $P^* = \frac{1}{1.1} < 1$.

Hence, the tender offer is smaller than the expected merger price, i.e., $P* = \frac{1}{1.1} < 1 = P^*_{merger}$. Further, the expected increase in firm value is also larger for takeover activism since $\mathbb{E}[V|V \geq V^*] = \frac{1}{1.1} < 1$ is smaller than the expected value improvement for a merger is $\mathbb{E}[V] + \mathbb{E}[\theta_1^{(n)}] > 1$.

A.2 Expected Profits

Expected Profits as a function of n

- If $n \leq \overline{n}$, only Ls enter such that profits are given by $\mathbb{E}[\Pi^L(V)|V^* = V_0^*] > 0$ and are, thus, independent of n.

- If $n \in (\underline{n}, \overline{n})$ and Case I prevails, we know $n_L^* < 1$ and $n_B^* < 1$. Hence, profits are given by

$$\underbrace{\mathbb{E}[\Pi^L(V)|V^* = V_0^*] + n_B \left(\mathbb{E}[\Pi^L(V)|V^* = V_1^*] - \mathbb{E}[\Pi^L(V)|V^* = V_0^*]\right)}_{L's \text{expected profit}} = \underbrace{n_L \ \mathbb{E}[\Pi^B(V)|V^* = V_1^*]}_{B's \text{expected profit}}$$

  Clearly, LHS is increasing in n_B and RHS is increasing in n_L. As n increases, either n_B or n_L needs to increase strictly. To keep indifference, both L**'s and** B**'s expected profit must increase.**

- For Case I, if $n \geq \overline{n}$, then, we know $n_L^* \geq 1$ and $n_B^* < 1$. Hence, profits are given by

$$\underbrace{\mathbb{E}[\Pi^L(V)|V^* = V_0^*] + n_B \left(\mathbb{E}[\Pi^L(V)|V^* = V_1^*] - \mathbb{E}[\Pi^L(V)|V^* = V_0^*]\right)}_{L's \text{expected profit}} = \underbrace{\mathbb{E}[\Pi^B(V)|V^* = V_1^*]}_{B's \text{expected profit}}$$

  Clearly, LHS is increasing in n_B and RHS is constant in n_L. To keep indifference, both L**'s and** B**'s expected profit must remain constant**. This also implies that only n_L can increase.

- Case II: n_B^* hits one first. If $n_L^* < 1$ still, entry profits are

$$\underbrace{\mathbb{E}[\Pi^L(V)|V^* = V_1^*] + n_B \left(\mathbb{E}[\Pi^L(V)|V^* = V_2^*] - \mathbb{E}[\Pi^L(V)|V^* = V_1^*]\right)}_{L's \text{expected profit}} = \underbrace{n_L(2 - n_B)\mathbb{E}[\Pi^B(V)|V^* = V_1^*]}_{B's \text{expected profit}}$$

  As n increases, either n_B, or n_L (or both) must increase. If n_B increases, LHS increases which means that RHS also increases, which can only be accomplished through an increase in n_L. If n_L increases, RHS increases (for fixed) n_B such that n_B must increase as well so both sides increase. As a result, in either case, LHS and RHS increase such that both expected profits still increase.

- Case II: n_B^* hits one first. If $n_L^* \geq 1$ as well, entry profits are

$$\underbrace{\mathbb{E}[\Pi^L(V)|V^* = V_1^*] + n_B \left(\mathbb{E}[\Pi^L(V)|V^* = V_2^*] - \mathbb{E}[\Pi^L(V)|V^* = V_1^*]\right)}_{L's \text{expected profit}} = \underbrace{(2 - n_B)\mathbb{E}[\Pi^B(V)|V^* = V_1^*]}_{B's \text{expected profit}}$$

  Here, expected profits do not depend on n_L anymore. Further n_B is constant. Hence, profits are flat.