Legal Investor Protection and Takeovers*

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Abstract

Does legal investor protection improve efficiency in the market for corporate control? To address this question, we incorporate financing constraints and legal investor protection into a standard takeover model. In the model, stronger legal investor protection increases a bidder's outside funding capacity. However, absent effective bidding competition, this does not improve efficiency, as the bid price—and thus the bidder's need for funds—increases in lockstep with his pledgeable income. In contrast, under effective bidding competition, the increased outside funding capacity improves efficiency by making it less likely that more efficient but less wealthy bidders are outbid by less efficient but wealthier rivals. Our model provides a novel rationale for the optimality of "one share-one vote," shows that margin requirements impair takeover efficiency while shadow costs of internal funds improve it, and makes empirical predictions relating the takeover outcome to, e.g., asset tangibility, financing frictions, firm-level governance, block ownership, cross-border M&A, and the security-voting structure.

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1 Introduction

Building on the work of La Porta et al. (1997, 1998), several empirical studies have shown that countries with stronger legal investor protection allocate resources more efficiently. For instance, Wurgler (2000) shows that these countries increase investment more in growing industries—and decrease it more in declining industries—relative to countries with weaker legal investor protection. Likewise, McLean, Zhang, and Zhao (2010) show that firms in these countries exhibit a higher sensitivity of investment to growth opportunities and, as a result, enjoy higher total factor productivity growth and higher profitability.

An important resource allocation mechanism is the takeover market. In that market, both assets and managerial talent are reallocated across firms and industries. Indeed, consistent with the evidence that countries with stronger legal investor protection allocate resources more efficiently, Rossi and Volpin (2004) find that these countries also have more active takeover markets.

Existing theory offers little guidance as to *why* the takeover outcome might be more efficient in countries with stronger legal investor protection. This is for two reasons. First, takeover models typically do not explicitly consider legal investor protection. Second, empirical research suggests that legal investor protection matters primarily because it relaxes financing constraints (e.g., La Porta et al., 1997; McLean, Zhang, and Zhao, 2010).[1] However—and in stark contrast to the "standard" corporate finance model of investment (e.g., Tirole, 2006)—existing takeover models typically assume that bidders are financially *unconstrained* (e.g., Grossman and Hart, 1980, 1988; Shleifer and Vishny, 1986; Hirshleifer and Titman, 1990; Burkart, Gromb, and Panunzi, 1998, 2000; Mueller and Panunzi, 2004).[2]

To address this issue, we incorporate both legal investor protection and financing con-

[1] La Porta et al. (1997) show that countries with stronger legal investor protection have larger external capital markets and more IPOs. McLean, Zhang, and Zhao (2010) show that firms in such countries exhibit both a lower sensitivity of investment to cash flow—meaning they are less financially constrained—and a higher sensitivity of either equity or debt issuance to q—meaning firms with better investment opportunities are better able to raise outside funds.

[2] All these papers build on Grossman and Hart's (1980) seminal analysis of the free-rider problem in takeovers. While Chowdhry and Nanda (1993)—in a model that assumes no free-rider problem—and Mueller and Panunzi (2004) examine the strategic role of debt financing in takeovers, neither of these two papers considers bidders' financing constraints. In particular, this implies that—in contrast to the standard corporate finance model of investment—bidders' own resources are immaterial for efficiency.

straints into a standard Grossman-Hart (1980) takeover model. In that model, no individual target shareholder perceives himself as pivotal for the outcome of a tender offer, leading to free-riding behavior. As a consequence, target shareholders tender only if the bid price reflects the full post-takeover share value (Bradley, 1980; Grossman and Hart, 1980).[3] However, as the bidder cannot make a profit on tendered shares, value-increasing takeovers may not take place. As Grossman and Hart argue, one way for the bidder to make a profit is by diverting corporate resources as private benefits after gaining control. Private benefits extraction lowers the post-takeover share value and thus the price which the bidder must offer target shareholders to induce them to tender.

In our model, legal investor protection limits the ease with which the bidder, once in control, can divert corporate resources as private benefits. This has two main implications. First, it reduces the bidder's profit from the takeover, thus making efficient takeovers less likely. Second, it raises the post-takeover share value, thus increasing the bidder's pledgeable income and, by implication, also his outside funding capacity. However, absent effective bidding competition, this increased outside funding capacity does not relax the bidder's budget constraint. As the bid price increases in lockstep with the post-takeover share value—to induce target shareholders to tender their shares—the bidder's need for funds increases one-for-one with his pledgeable income, offsetting any positive effect of legal investor protection on his outside funding capacity.

The conclusion that legal investor protection does not relax the bidder's budget constraint is disconcerting. After all, empirical research suggests that one of the main effects of legal investor protection is that it eases financing constraints. However, this conclusion follows naturally from any setting in which the bid price increases in lockstep with the post-takeover share value and thus with the bidder's pledgeable income. Turning this result on its head,

[3] Rossi and Volpin (2004) provide empirical support for the free-rider hypothesis by showing that bid premia in tender offers are higher than in other takeover modes. They conclude (p. 293): "We interpret the finding on tender offers as evidence of the free-rider hypothesis: that is, the bidder in a tender offer needs to pay a higher premium to induce shareholders to tender their shares." In a recent empirical study, Bodnaruk et al. (2011) provide more direct evidence in support of the free-rider hypothesis. Precisely, they show that: (i) takeover premia are higher when the target's share ownership is more widely dispersed, and (ii) firms with more widely dispersed share ownership are less likely to become takeover targets. Both findings are consistent with "finite-shareholder" versions of the free-rider model (e.g., Bagnoli and Lipman, 1988; Holmström and Nalebuff, 1992; Gromb, 1992).

if the bid price did *not* increase in lockstep with the bidder's pledgeable income, then the positive effect of legal investor protection on the bidder's outside funding capacity might have implications for efficiency.

While several factors might break this one-to-one relationship between the bid price and the bidder's pledgeable income, we focus here on one that we think is particularly relevant: bidding competition, where the bidders are forced to make offers *exceeding* the post-takeover share value. Given that private benefits are not pledgeable, offers exceeding the post-takeover share value must be partly funded out of the bidders' own funds. Consequently, the takeover outcome may not only depend on bidders' willingness to pay—i.e., their valuations of the target—but also on their *ability* to pay.

If bidders are arbitrarily wealthy, the takeover outcome depends exclusively on their willingness to pay. This is the situation analyzed in much of the theory of takeovers. As the most efficient bidder—i.e., the one who creates the most value—has the highest valuation of the target, he can always outbid less efficient rivals. Thus, absent financial constraints, the takeover outcome is always efficient.

By contrast, if bidders are financially constrained, the takeover outcome may be inefficient. To illustrate, suppose there are two bidders, bidder 1 and bidder 2. The target value is normalized to zero. If bidder 1 gains control, the target value increases to 100, while if bidder 2 gains control, it increases only to 90. Thus, bidder 1 is more efficient. Suppose next that both bidders can, once in control, divert the same fraction of firm value, say, 30 percent, as private benefits. Hence, if bidder 1 gains control, the post-takeover share value is 70, and his private benefits are 30. Similarly, if bidder 2 gains control, the post-takeover share value is 63, and his private benefits are 27. Thus, bidder 1 is not only more efficient, but he can also raise more outside funds: Bidder 1's outside funding capacity is 70, while bidder 2's outside funding capacity is only 63. (Recall that private benefits are not pledgeable.) And yet, bidder 2 may win the takeover contest. Specifically, assume bidder 1 has no private wealth, while bidder 2 has private wealth of 8. In this case, bidder 1 is able to pay 70 for the target, but bidder 2 is able to pay 71: He can raise 63 from outside investors and use 8 of his own wealth. Consequently, bidder 2 can outbid his more efficient rival, bidder 1, and win the takeover contest.[4]

Accordingly, if bidders are financially constrained, the takeover outcome may not only depend on their ability to create value but also on their private wealth. In particular, if the less efficient bidder—i.e., the one who creates less value—is wealthier, the takeover outcome may be inefficient. In this case, stronger legal investor protection may improve efficiency. To continue with the above example, suppose that legal investor protection is now such that bidders can divert only 10 percent of the firm value (versus 30 percent before). As a consequence, bidder 1's outside funding capacity is now 90, while bidder 2's outside funding capacity is only 81. If the bidders' private wealth is the same as before, this implies that bidder 1 can now pay 90 for the target, while bidder 2 can only pay $81 + 8 = 89$. Thus, bidder 1 can now outbid his less efficient rival, bidder 2.

We explore a number of implications of our analysis, both normative and positive. For instance, we show that firm-level governance—i.e., institutions that limit private benefits extraction—can improve the efficiency of the takeover outcome. Indeed, if the cost of setting up such institutions is sufficiently low, it may render both legal investor protection and bidders' private wealth irrelevant. Our model predicts the strenght of firm-level governance to be decreasing in its own cost, the bidder's wealth, and the strenght of legal investor protection, and increasing in the value created by the bidder.

Next, we explore the role of financing frictions, such as margin requirements ("haircuts") and shadow costs of internal funds. As we show, while margin requirements impair the efficiency of the takeover outcome, shadow costs of internal funds improve it. Intuitively, margin requirements reduce bidders' capacity to raise outside funds, which hurts more efficient (but less wealthy) bidders relatively more. In contrast, shadow costs of internal funds hurt less efficient (but wealthy) bidders relatively more by making it more costly for them to draw on their internal funds. Our model predicts that the beneficial effect of legal investor protection on the takeover outcome is weaker when margin requirements are high and internal funds have a high shadow cost.

Our model also sheds new light on the "one share–one vote" rule, which stipulates that

[4] Bidder 1 is *willing* to pay up to 100 for the target, while bidder 2 is *willing* to pay up to 90. Hence, if the bidders were financially unconstrained, bidder 1 would always win the takeover contest.

all shares have equal voting rights. The leading argument in support of this rule is that it minimizes the likelihood that more efficient bidders with low private benefits are outbid by less efficient rivals with high private benefits (Grossman and Hart, 1988; Harris and Raviv, 1988). Naturally, this argument does not apply in our model, as the most efficient bidder is also the one with the highest private benefits. Nonetheless, a "one share–one vote" rule is also optimal in our model, because it minimizes the likelihood that more efficient but less wealthy bidders are outbid by less efficient but wealthier rivals. Our model predicts that deviations from "one share–one vote" are more detrimental for the efficiency of takeover outcomes when legal investor protection is weak.

We next analyze situations in which a bidder seeks to acquire a majority of the target's shares from an incumbent blockholder. Effectively, the incumbent is like a rival bidder who is arbitrarily wealthy: He can always "afford" the controlling block by simply refusing to sell it. Our model predicts that efficient sales of control are more likely to succeed when legal investor protection is strong and the incumbent's controlling block is large. In a second step, we endogenize the size of the incumbent's controlling block and find it to be larger when legal investor protection is weak. This latter result is consistent with empirical evidence by La Porta et al. (1998, 1999) showing that ownership is more concentrated in countries with weaker legal investor protection.

Finally, we examine issues related to cross-border M&A. We show that if bidders from different countries compete for a target, those from countries with stronger legal investor protection enjoy a strategic advantage. Our model predicts that takeover premia in cross-border M&A deals are increasing in the quality of legal investor protection in the acquirer's country, consistent with empirical evidence by Bris and Cabolis (2008).

A recurrent theme in this paper is that legal investor protection helps efficient but less wealthy bidders. Almeida and Wolfenzon (2006, AW) obtain a related result. In their model, a penniless entrepreneur needs to fund a fixed setup cost to establish a firm. If the entrepreneur fails, the firm is set up by a wealthy but less efficient family. Stronger legal investor protection increases the entrepreneur's outside funding capacity and—since the funding needs are fixed—relaxes his budget constraint. This effect of legal investor protection also holds true in our model, *but only holding funding needs constant.* However, central to our analysis is the feature that not only funding capacity but also funding needs are endogenous to legal investor protection—i.e., legal investor protection affects both sides of the budget constraint. This is true both in the single-bidder case (because the bid price increases in lockstep with the bidder's pledgeable income) and in our competition model (because the rival's bid depends on legal investor protection).

To emphasize the importance of the latter feature, note that AW's model is akin to our *single-bidder* model but assuming a fixed bid price. (In AW, the family does not directly compete with the entrepreneur; it merely has a second pick on the project if the entrepreneur fails to fund it.) Because of this difference, the two models yield opposite results. In AW's model, stronger legal investor protection improves efficiency by making it more likely that the (more efficient) entrepreneur can finance the project's fixed cost. In contrast, in our single-bidder model, stronger legal investor protection does not improve efficiency, as the bid price—the equivalent of the project's cost—adjusts in lockstep.

The paper proceeds as follows. Section 2 lays out the basic model. Section 3 analyzes the single-bidder case, and Section 4 examines that of "effective" bidding competition. Section 5 studies the interplay between legal investor protection and firm-level governance. Section 6 considers financing frictions, such as margin requirements ("haircuts") and shadow costs of internal funds, as well as the role of asset tangibility. Section 7 examines the optimal security-voting structure, sales of controlling blocks, and cross-border M&A. Section 8 concludes. All remaining proofs are in the Appendix.

2 The Model

We consider a model of takeovers in which potential acquirers are financially constrained. Suppose a firm ("target") faces a potential acquirer ("bidder"). The target has a measure one continuum of shares which are dispersed among many small shareholders. (Section 7.2 considers the case in which the target has a controlling shareholder.) All shares have equal voting rights. (Section 7.1 considers departures from "one share–one vote.") Shareholders are homogeneous, everybody is risk neutral, and there is no discounting.

The target value is normalized to zero. If the bidder gains control of the target, its value increases to $v > 0$.[5] To gain control, the bidder must make a tender offer to the target shareholders that attracts at least a majority of the shares. (The bidder has no initial stake in the target.) Target shareholders are atomistic in the sense that no individual shareholder perceives himself as pivotal for the outcome of the tender offer. Tender offers are conditional on acquiring at least a majority of the shares and unrestricted in the sense that the bidder must acquire any and all shares beyond this threshold.[6] If the tender offer is successful, the bidder incurs a monetary execution cost $c > 0$ that cannot be imposed on either the target or its shareholders—that is, unless the target is fully owned by the bidder, in which case the assumption becomes irrelevant.[7]

Even if a control transfer is efficient ($v > c$), it may not take place. As Bradley (1980) and Grossman and Hart (1980) point out, if no individual target shareholder perceives himself as pivotal for the outcome of the tender offer, efficient takeovers will not materialize unless the bidder can extract private benefits of control. Accordingly, we assume that after gaining control, the bidder can divert a fraction $(1 - \phi)$ of the target value as private benefits, where $\phi \in [\bar{\phi}, 1]$. For simplicity, we assume that the extraction of private benefits involves no deadweight loss. Thus, the bidder's private benefits are $(1 - \phi)v$, while the security benefits accruing to all shareholders are ϕv. Importantly, the extraction of private benefits cannot be contracted upon. This implies that the bidder cannot commit to a given level of private benefits, nor can he transfer or pledge these benefits to third parties (e.g., investors).[8] Instead, the legal environment—captured by the parameter $\bar{\phi}$—effectively limits diversion, with larger values of $\bar{\phi}$ corresponding to stronger legal investor protection.

Our assumption that private benefits are not pledgeable, while security benefits are fully

[5] We abstract from portfolio considerations in which the value creation at the target firm might affect other companies owned by the bidder.

[6] Introducing restricted bids into our framework would neither affect the takeover outcome nor the payoffs to the bidder and the target shareholders.

[7] With multiple bidders, it is important that the execution cost is only incurred by the winning bidder. Otherwise, at least when the bidding outcome is deterministic, there would never be any bidding competition, as the losing bidder would not break even.

[8] Our assumption that private benefits are not pledgeable rules out the possibility that the bidder can directly pledge target assets as collateral even if he does not fully own the target, as discussed in Mueller and Panunzi (2004). Such arrangements, which rely on second-step mergers between the target and a shell company owned by the bidder, are not available in all countries. Even in the United States, their role has diminished due to the widespread adoption of (anti-)business combination laws.

pledgeable, simplifies the exposition but is stronger than necessary. Indeed, it suffices to assume that private benefits are "less pledegable" than security benefits. This is plausible, especially if private benefits come (partly) in the form of consumption (e.g., perks) or are obtained in "semi-legal" ways.

In practice, there are different ways a controlling shareholder can extract private benefits at the expense of other investors. For instance, he can sell target assets or output below their market value to another company he owns. Alternatively, he can pay himself an artificially high salary or consume perks while declaring them as business expenses. Johnson et al. (2000) describe how—even in countries like France, Belgium, and Italy—controlling shareholders extract private benefits by transferring company resources to themselves ("tunneling"). Bertrand, Mehta, and Mullainathan (2002), Bae, Kang, and Kim (2002), Atanasov (2005), and Mironov (2012) provide further examples of tunneling from India, Korea, Bulgaria, and Russia, respectively.[9]

To study the financing of takeovers, we assume that the bidder has internal funds $A \geq 0$. In addition, the bidder can also raise outside funds $F \geq 0$ from competitive investors. Since private benefits are not pledgeable, the bidder's outside funding capacity is limited by the value of his security benefits. We impose no restriction on the types of financial claims that the bidder can issue against these security benefits.

The sequence of events is as follows.

In stage 1, the bidder decides whether to bid for the target. If he decides to bid, he can raise outside funds F in addition to his internal funds and make a take-it-or-leave-it, conditional, unrestricted cash tender offer with bid price b.

In stage 2, the target shareholders simultaneously and non-cooperatively decide whether to tender their shares. The fraction of tendered shares is denoted by β. If $\beta < 0.5$, the takeover fails. Conversely, if $\beta \geq 0.5$, the takeover succeeds, tendering shareholders receive a cash payment equal to the bid price, and the bidder incurs the execution cost, c.

In stage 3, if the bidder gains control of the target, he diverts a fraction $(1 - \phi)$ of its value as private benefits subject to the constraint $\phi \geq \bar{\phi}$ imposed by the law.

[9] Barclay and Holderness (1989), Nenova (2003), and Dyck and Zingales (2004) are empirical studies documenting the value of private benefits of control.

To select among multiple equilibria, we apply the Pareto-dominance criterion, which selects the equilibrium outcome with the highest payoff for the target shareholders (e.g., Grossman and Hart, 1980; Burkart, Gromb, and Panunzi, 1998; Mueller and Panunzi, 2004). Among other things, this implies that our focus on value-increasing takeovers is without loss of generality. Indeed, any equilibrium of the tendering subgame in which a value-decreasing takeover succeeds is dominated by an equilibrium in which the takeover fails, where the latter always exists.[10] Thus, Pareto dominance rules out what is, by all means, an implausible scenario, namely, that target shareholders would tender at a bid price below the status quo value.[11]

The model is solved by backward induction. We first consider the bidder's diversion decision followed by the target shareholders' tendering decision and the bidder's offer and financing decisions. In general, a successful bid must win the target shareholders' approval and match any competing offer. We examine both the case in which shareholder approval is the binding constraint ("single-bidder case") and the case in which outbidding of rivals is the binding constraint ("bidding competition").

3 Single-Bidder Case

The single-bidder assumption does not literally rule out that other bidders are interested in the target. It merely presumes that competition is "ineffective," in the sense that no rival can create nearly as much value as the bidder under consideration. By implication, shareholder approval is then the binding constraint for a successful takeover.

Consider first stage 3, where the bidder must decide how much value to divert as private

[10] There always exists a Nash equilibrium—in fact, a continuum of Nash equilibria—in which the takeover fails. If it is anticipated that a majority of the target shareholders does not tender, any individual shareholder is indifferent between tendering and not tendering, implying that failure can always be supported as an equilibrium outcome. Note that while unconditional offers may avoid problems of multiple equilibria, they suffer from problems of nonexistence of equilibrium (e.g., Bagnoli and Lipman, 1988).

[11] Grossman and Hart (1980, p. 47) also argue that bids below the status quo value are implausible, for the same reason, namely, because they fail whenever they are expected to fail. Naturally, a value-decreasing takeover ($v < 0$) might succeed if the bidder were to make an offer above the status quo value: $b > 0$. However, making such an offer would violate the bidder's participation constraint.

benefits. If the bidder gains control, he chooses ϕ to maximize

$$\beta\phi v - F(\beta\phi v) + (1-\phi)v, \tag{1}$$

where $\beta\phi v$ is the value of the security benefits associated with the bidder's equity stake, $F(\beta\phi v)$ is the value of the outside claims issued against these security benefits, and $(1-\phi)v$ is the value of the bidder's private benefits. Given that the extraction of private benefits involves no deadweight loss, maximum diversion is always optimal: $\phi = \bar{\phi}$.[12] Thus, legal investor protection imposes a binding constraint on diversion, and the value of the security benefits increases with the quality of legal investor protection.

Consider next stage 2, where the target shareholders must decide whether to tender their shares. Being atomistic, target shareholders tender only if the bid price equals or exceeds the post-takeover value of the security benefits (Bradley, 1980; Grossman and Hart, 1980). Thus, a successful tender offer must satisfy the "free-rider condition"

$$b \geq \bar{\phi}v. \tag{2}$$

If this condition holds with equality, target shareholders are indifferent between tendering and not tendering. Without loss of generality, we break the indifference in favor of tendering.[13,14] Thus, if the takeover succeeds, it succeeds with $\beta = 1$.

Finally, consider stage 1, where the bidder must choose the offer price b and secure financing for the takeover. A successful offer must satisfy the free-rider condition (2) as well as two further conditions. First, the offer must satisfy the bidder's participation constraint.

[12] Maximum diversion is strictly optimal if either $\beta < 1$ or $F(\phi v) > \bar{\phi}v$ for some $\phi > \bar{\phi}$ on a set of positive measure. In contrast, the bidder is indifferent between diverting and not diverting if both $\beta = 1$ and $F(\phi v) \leq \bar{\phi}v$ for all $\phi > \bar{\phi}$, i.e., if the value of the outside claims is unaffected by the bidder's diversion decision.

[13] See also Grossman and Hart (1980, pp. 45-47). A common motivation for this assumption is that the bidder could always break the indifference by raising the bid price infinitesimally.

[14] A small (technical) caveat: We break the indifference in favor of tendering only if the outcome is such that the takeover succeeds. This means failure can still be supported as an equilibrium outcome.

Given that $\beta = 1$, this constraint can be written as

$$v - b - c \geq 0. \tag{3}$$

Note that the claims issued to outside investors and the funds provided by them do not appear in the participation constraint. They cancel out as investors are competitive.

Second, the offer must satisfy the bidder's budget constraint. Given that $\beta = 1$, this constraint can be written as

$$A + \bar{\phi} v \geq b + c. \tag{4}$$

The LHS is the bidder's total budget. Indeed, the bidder can pledge to outside investors no more than the value of his security benefits, implying that his outside funding capacity is limited to $\bar{\phi} v$. The RHS represents the bidder's need for funds, which includes both the bid price and the execution cost, c.

Lowering the bid price increases the bidder's objective—i.e., the LHS of (3)—while relaxing both his budget constraint and his participation constraint. Therefore, the optimal bid is such that the free-rider condition holds with equality:

$$b = \bar{\phi} v. \tag{5}$$

Consequently, the bidder's budget constraint becomes

$$A \geq c, \tag{6}$$

while his participation constraint becomes

$$(1 - \overline{\phi}) v \geq c. \tag{7}$$

Importantly, the bidder's budget constraint (6) does not depend on the strenght of legal investor protection. In the original budget constraint (4)—i.e., before inserting the free-rider condition—the bidder's outside funding capacity increases with $\overline{\phi}$. Indeed, stronger legal investor protection limits the bidder's ability to extract private benefits at the expense of other investors. This increases his pledgeable income, thereby increasing his outside funding capacity. However, once the free-rider condition is accounted for, the increased outside funding capacity does not relax the bidder's budget constraint, as the bid price—and thus the bidder's need for funds—increases in lockstep: $b = \bar{\phi}v$. Ultimately, the budget constraint is thus independent of legal investor protection. Also, with all pledgeable value being captured by the target shareholders, none of this value can be used to raise funds to cover the execution cost, c. Accordingly, that cost must be funded entirely out of the bidder's internal funds: $A \geq c$.

The more familiar participation constraint (7) reflects the fact that free-riding by target shareholders limits the bidder's profits to his private benefits net of the execution cost. Stronger legal investor protection reduces the bidder's private benefits, thereby tightening his participation constraint.

Combining (6) and (7), we obtain the following result.

Lemma 1. *The bidder takes over the target if and only if*

$$\min\{(1-\overline{\phi})v, A\} \geq c. \tag{8}$$

In sum, legal investor protection affects the takeover outcome in two ways. On the one hand, stronger legal investor protection reduces the bidder's profits, making efficient takeovers less likely. On the other hand, stronger legal investor protection increases the bidder's pledgeable income and therefore his outside funding capacity. The latter effect is immaterial, however, as the bid price—and thus the bidder's need for funds—increases in lockstep with his pledgeable income.

Let us briefly contrast our single-bidder model with the "standard" corporate finance model of investment (e.g., Tirole, 2006, Chapters 3 and 4). In the standard model, increasing the entrepreneur's pledgeable income relaxes his budget constraint and improves efficiency. In contrast, here, it does not relax the entrepreneur's budget constraint, because the "investment cost" (i.e., the bid price) increases one-for-one with his pledgeable income due to free-riding by the target shareholders.

We conclude this section by examining the effect of legal investor protection on the likelihood that efficient takeovers succeed. In condition (8), the LHS decreases with $\overline{\phi}$. Therefore, as legal investor protection improves, it becomes less likely that the bidder acquires the target.[15]

Proposition 1. *Absent effective competition for the target, stronger legal investor protection makes it less likely that efficient takeovers succeed.*

Note that, conditional on the takeover succeeding, target shareholders benefit from stronger legal investor protection through a higher bid price. However, this has no implications for efficiency: It merely constitutes a wealth transfer from the bidder to the target shareholders. In contrast, the negative effect of legal investor protection on the bidder's participation constraint has implications for efficiency, as it makes it less likely that efficient takeovers succeed.

4 Bidding Competition

As noted earlier, the single-bidder case does not literally rule out that there are multiple bidders competing for the target. It merely presumes that such competition is "ineffective" in the sense that the binding constraint is shareholder approval—given by the free-rider condition (5)—and not outbidding of rivals. "Effective" bidding competition, by definition, therefore implies that the requirement to outbid rivals, rather than winning shareholder approval, determines the winning bid price.

We consider two potential bidders, bidder 1 and bidder 2, competing to gain control of the target. Bidder $i = 1, 2$ has internal funds A_i. If bidder i gains control, the target value increases to $v_i > 0$, where $v_1 > v_2$ without loss of generality. Regardless of which bidder gains control, his ability to extract private benefits is limited by the same legal environment, $\overline{\phi}$. (Section 7.3 examines the case in which bidders come from different legal environments.) The takeover process is the same as in the single-bidder case, except that both bidders make their offers simultaneously.

[15] Here and elsewhere, we say that an event is more likely if it occurs for a larger set of parameter values.

In stage 3, as before, the controlling bidder finds it optimal to divert a fraction $(1-\bar{\phi})$ of the target value as private benefits. In stage 2, target shareholders can be faced with up to two offers. The case of a single offer is as before. The case of two offers is as follows.

Lemma 2. *In a Pareto-dominant equilibrium, the winning bid is the highest bid among those satisfying $b_i \geq \overline{\phi} v_i$, if any.*

In stage 1, the bidders must decide whether to bid for the target. If so, they make their offers simultaneously. Denote by $\widehat{b}_i$ the highest offer which bidder i is willing and able to make. That is, $\widehat{b}_i$ is the highest value of b_i satisfying the bidder's participation constraint

$$v_i \geq b_i + c \tag{9}$$

and his budget constraint

$$A_i + \bar{\phi} v_i \geq b_i + c. \tag{10}$$

Consequently, the highest offer which bidder i is willing and able to make is

$$\widehat{b}_i = \bar{\phi} v_i + \min\left\{(1-\overline{\phi})v_i, A_i\right\} - c. \tag{11}$$

The first term on the RHS represents the security benefits if bidder i gains control. The bidder is both willing and able to pay for these benefits as he can always pledge their value to outside investors. The third term is the execution cost, c. All else equal, it reduces the bidder's willingness to pay for the target. Finally, the second term is the minimum of the bidder's private benefits and his internal funds, which increase his willingness and ability to pay, respectively, for the target.

Lemma 3. *Bidder 1 wins the takeover contest if and only if*

$$\min\left\{(1-\overline{\phi})v_1, A_1\right\} \geq c \tag{12}$$

and

$$A_1 \geq \min\left\{(1-\overline{\phi})v_2, A_2\right\} - \overline{\phi}(v_1 - v_2). \tag{13}$$

Lemma 3 lays out two conditions for bidder 1 to win the takeover contest. The first condition, (12), states that bidder 1 must be willing to incur and able to fund the execution cost. This condition is the same as in the single-bidder case. It is independent of bidder 2's presence or his characteristics. If this condition does not hold, there is either no bidding competition or no bidding at all.[16] Consequently, to allow for bidding competition, we henceforth assume that c is small enough for condition (12) to hold.

Assumption 1. $\min\left\{(1-\overline{\phi})v_1, A_1\right\} \geq c$.

The second condition, (13), arises solely due to bidding competition. It determines under what conditions bidder 1's maximum offer, $\widehat{b}_1$, exceeds bidder 2's maximum offer, $\widehat{b}_2$. As is shown, bidder 1's internal funds, A, must exceed some minimum threshold. Accordingly, the RHS of (13) captures the extent to which bidding competition tightens bidder 1's budget constraint. Importantly, the RHS decreases with $\overline{\phi}$. Hence, as legal investor protection improves, competition has less of a tightening effect on bidder 1's budget, making it more likely that he can outbid his less efficient rival, bidder 2.

Proposition 2. *Under effective competition for the target, stronger legal investor protection makes it more likely that efficient takeovers succeed.*

When the more efficient bidder is wealthier ($A_1 \geq A_2$), condition (13) always holds, i.e., irrespective of the quality of legal investor protection. Indeed, bidder 1 not only has a higher valuation of the target, but he also has a larger budget: He has both more internal funds ($A_1 \geq A_2$) and a higher outside funding capacity ($\overline{\phi}v_1 > \overline{\phi}v_2$). Thus, while bidder 2's presence may very well force bidder 1 to raise his bid, it will never exhaust his budget constraint. By implication, bidder 1 always wins the takeover contest, and the quality of legal investor protection is irrelevant for the takeover outcome.

Suppose now that the less efficient bidder is wealthier ($A_1 < A_2$). When legal investor protection is weak, the outcome is now more likely to be inefficient. As an illustration, consider the extreme case in which investors enjoy no legal protection at all ($\overline{\phi} = 0$). In

[16] If $\min\left\{(1-\overline{\phi})v_1, A_1\right\} = (1-\overline{\phi})v_1 < c$, both bidders' participation constraints are violated as $\min\left\{(1-\overline{\phi})v_2, A_2\right\} \leq (1-\overline{\phi})v_2 < (1-\overline{\phi})v_1$. In that case, there is no bidding at all.

that case, the two bidders have no outside funding capacity and must rely entirely on their own funds to finance their bids. While bidder 1 has a higher valuation of the target, his budget is tighter than bidder 2's, possibly so tight as to prevent him from making an offer exceeding bidder 2's. In that case, bidder 2 wins the takeover contest. As legal investor protection improves, both bidders can pledge a larger fraction of the firm value to outside investors, which increases both their budgets. However, because bidder 1 can create more value, his budget increases more than bidder 2's, making it more likely that he can outbid his less efficient rival.[17]

Formally, we have from condition (13) that if $A_1 \geq \min\{v_2, A_2\}$, the takeover outcome is always efficient—i.e., regardless of the quality of legal investor protection. In all other cases, there exists a critical value $\overline{\phi}' > 0$ such that the takeover outcome is efficient if and only if $\overline{\phi} \geq \overline{\phi}'$.

We conclude by examining whether—conditional on the takeover succeeding—target shareholders benefit from stronger legal investor protection. To win the takeover contest, a bidder must not only outbid his rival, but his offer must also satisfy the free-rider condition. Accordingly, the winning bid is $b_i^* = \max\left\{\widehat{b}_j, \overline{\phi} v_i\right\}$ for $j \neq i$. As the losing bidder's maximum bid, $\widehat{b}_j$, is (weakly) increasing in $\overline{\phi}$, this implies that the winning bid is (weakly) increasing in $\overline{\phi}$. Thus, conditional on the takeover succeeding, target shareholders benefit from stronger legal investor protection.

Intuitively, stronger legal investor protection affects the bid price through two channels. First, it increases the value of the security benefits regardless of the winning bidder's identity ($\overline{\phi} v_i$ increases with $\overline{\phi}$), thus forcing each bidder to raise his bid. Second, it increases both bidders' outside funding capacity, thus allowing them to compete more fiercly for the target's shares ($\widehat{b}_i$ increases weakly with $\overline{\phi}$). For both reasons, stronger legal investor protection raises the winning bid price. Consistent with this result, Rossi and Volpin (2004) find that takeover premia are higher in countries with stronger legal investor protection.

[17] In the budget constraint (10), the LHS increases with $\overline{\phi}$ at a rate of v_i. Since $v_1 > v_2$, an increase in $\overline{\phi}$ increases bidder 1's budget more than it increases bidder 2's budget.

5 Firm-Level Governance

So far, we have focused on the legal environment as the main source of investor protection. However, firms can often improve on this minimum level. For instance, boards of directors or audit committees may curb controlling shareholders' self-serving behavior. In what follows, we assume that potential bidders, by way of setting up such institutions, can credibly limit their private benefits extraction, thus effectively converting private benefits into pledgeable security benefits. However, doing so is costly. Monitors, such as auditors and independent directors, require compensation for their activities. Such compensation is (realistically) paid out of the firm's own pocket. Accordingly, we assume that converting x units of private benefits into security benefits reduces firm value by γx, where $0 < \gamma < 1$.[18] Security benefits are thus given by $\overline{\phi}(v - \gamma x) + x$, while private benefits amount to $(1 - \overline{\phi})(v - \gamma x) - x$. Starting from the level of private benefits associated with the level of legal investor protection, $(1 - \overline{\phi})v$, this implies that the maximum amount of private benefits that can be converted is $x \leq (1 - \overline{\phi})(v - \gamma x)$ or, equivalently, $x \leq \frac{(1-\overline{\phi})v}{1+\gamma(1-\overline{\phi})}$.

5.1 Single-Bidder Case

Stages 2 and 3 are analogous to the basic model. In particular, in stage 3, we have maximum dispersion, $\phi = \bar{\phi}$, while in stage 2 a successful tender offer must satisfy the free-rider condition

$$b \geq \overline{\phi}(v - \gamma x) + x. \tag{14}$$

Next, consider stage 1, where the bidder must choose the offer price b. In addition to satisfying the free-rider condition (14), a successful tender offer must also satisfy the bidder's participation constraint

$$v - \gamma x - b - c \geq 0 \tag{15}$$

and his budget constraint

$$A + \overline{\phi}(v - \gamma x) + x \geq b + c. \tag{16}$$

[18] Realistically, γx may not be a deadweight loss, given that directors' and auditors' salaries are transfers to third parties. Thus, we do not assume in any way that firm-level governance is socially wasteful.

As usual, the optimal bid in the single-bidder case is such that the free-rider condition (14) holds with equality. Hence, the bidder's budget constraint becomes

$$A \geq c, \tag{17}$$

and his participation constraints becomes

$$(1-\overline{\phi})(v-\gamma x)-x \geq c. \tag{18}$$

The budget constraint (17) is identical to that in our basic model and is independent of legal investor protection but also of firm-level governance. Intuitively, once the free-rider condition is accounted for, the additional outside funding capacity due to firm-level governance does not relax the bidder's budget constraint as the bid price—and thus the bidder's need for funds—increases in lockstep: $b = \overline{\phi}(v-\gamma x)+x$. Consequently, the only effect of firm-level governance is that it reduces the bidder's private benefits, thus tightening his participation constraint. Unlike in the basic model, however, this is now for *two* reasons. For one, there is the direct, marginal reduction in private benefits of x. In addition, however, there is also the inframarginal reduction of $(1-\overline{\phi})\gamma x$ arising from the fact that the cost of firm-level governance is paid out of the firm's pocket.

Given that firm-level governance has no benefits, but only costs, the bidder optimally sets $x^* = 0$. As a result, the remaining analysis of the single-bidder case is isomorphic to that in our basic single-bidder model.

5.2 Bidding Competition

As we will see next, firm-level governance does matter under effective competition among bidders. Stages 2 and 3 are analogous to the basic competition model, except that the free-rider condition in Lemma 2 is replaced by the requirement that $b \geq \overline{\phi}(v-\gamma x)+x$.

Consider next stage 1, and denote by $\widehat{b}_i$ the highest offer which bidder i is willing and able to make. That is, $\widehat{b}_i$ is the highest value of b_i satisfying the bidder's participation constraint

$$v_i - \gamma x_i - b_i - c \geq 0 \tag{19}$$

and his budget constraint

$$\bar{\phi}(v_i - \gamma x_i) + x_i + A_i \geq b_i + c. \tag{20}$$

Hence, converting private benefits into security benefits ($x_i > 0$) relaxes the bidder's budget constraint but tightens his participation constraint.

Given (19) and (20), the highest offer which bidder i is willing and able to make is

$$\widehat{b}_i = \bar{\phi} v_i + \min\left\{(1-\overline{\phi})v_i - \gamma x_i, A_i + x_i(1-\overline{\phi}\gamma)\right\} - c. \tag{21}$$

The first term in brackets is decreasing in x_i, while the second term is increasing in x_i. Accordingly, if the binding constraint is the bidder's participation constraint (i.e., $(1-\overline{\phi})v_i < A_i$), his maximum offer is given by $\widehat{b}_i = v_i - \gamma x_i - c$, which implies he optimally sets $x_i^* = 0$. In contrast, if the binding constraint is the bidder's budget constraint (i.e., $(1-\overline{\phi})v_i \geq A_i$), his maximum offer is given by $\widehat{b}_i = \bar{\phi} v_i + A_i + x_i(1-\overline{\phi}\gamma) - c$. As this expression is increasing in x_i, the bidder optimally raises x_i until the second term in brackets equals the first.[19] Formally, this implies that x_i^* is given by

$$(1-\overline{\phi})v_i - \gamma x_i^* = A_i + x_i^*(1-\overline{\phi}\gamma).$$

Lemma 4. *Bidder i's optimal choice of firm-level governance is given by*

$$x_i^* = \begin{cases} 0 & \text{if} \quad (1-\overline{\phi})v_i < A_i \\ \frac{(1-\overline{\phi})v_i - A_i}{1+\gamma(1-\overline{\phi})} & \text{if} \quad (1-\overline{\phi})v_i \geq A_i \end{cases}. \tag{22}$$

Some comparative statics are of interest. Specifically, we have from (22) that $\frac{\partial x_i^*}{\partial \gamma} \leq 0$, $\frac{\partial x_i^*}{\partial A_i} \leq 0$, $\frac{\partial x_i^*}{\partial \overline{\phi}} \leq 0$, and $\frac{\partial x_i^*}{\partial v_i} \geq 0$. Moreover, the case where $(1-\overline{\phi})v_i \geq A_i$ is more likely when

[19] If the bidder increased x_i beyond this point, the binding constraint in (21) would be again his participation constraint, implying his maximum offer would be decreasing in x_i. Accordingly, "optimal" means x_i^* is the choice of firm-level governance that maximizes bidder i's likelihood of winning the takeover contest.

$\overline{\phi}$ and A_i are small and v_i is large.

Corollary 1. *Bidder i's optimal choice of firm-level governance is decreasing in the costs of governance, the bidder's wealth, and the strenght of legal investor protection, and is increasing in the (gross) firm value created by the bidder.*

That x_i^* is decreasing in the costs of governance is intuitive. Also intuitive is that it is decreasing in the bidder's wealth. After all, the only purpose of firm-level governance in our model is that it relaxes the bidder's budget constraint. Indeed, if the bidder is sufficiently wealthy ($A_i > (1-\overline{\phi})v_i$), his optimal choice of firm-level governance is $x_i^* = 0$. Likewise, it is intuitive that x_i^* is decreasing in the strenght of legal investor protection. Indeed, legal investor protection and firm-level governance serve the same purpose in our model, but the latter is more costly. Finally, that x_i^* is increasing in firm value illustrates why empirical correlations between firm-level governance and firm value should be interpreted with caution. Indeed, in our model, the causality goes the other way: Higher firm value, which is exogenous in our model, implies that more private benefits can be converted into pledgeable security benefits by way of firm-level governance.

Inserting bidder i's optimal choice of firm-level governance, (22), into his maximum offer function, (21), we obtain that the highest offer which he is willing and able to make is

$$\widehat{b}_i = \min\left\{v_i, \frac{v_i + \gamma A_i}{1+\gamma(1-\overline{\phi})}\right\} - c, \tag{23}$$

where $\widehat{b}_i = v_i - c$ if and only if $(1-\overline{\phi})v_i \leq A_i$.

Accordingly, if bidder i is sufficiently wealthy ($A_i \geq v_i$), he is both willing and able to make a bid up to his full valuation of the target, $v_i - c$, regardless of the quality of legal investor protection. Moreover, in this case, we know from (22) that his optimal choice of firm-level governance is $x_i^* = 0$. In contrast, if $A_i < v_i$, there exists a critical value $\overline{\phi}' = \frac{v_i - A_i}{v_i}$ such that bidder i's maximum offer is less than his full valuation if $\overline{\phi} < \overline{\phi}'$ and equal to his full valuation if $\overline{\phi} \geq \overline{\phi}'$. In the former case, bidder i's maximum offer is increasing in $\overline{\phi}$, while his optimal choice of firm-level governance is $x_i^* > 0$ with $\frac{\partial x_i^*}{\partial \overline{\phi}} < 0$ and $x_i^* \to 0$ as $\overline{\phi} \to \overline{\phi}'$.

Given Assumption 1, we can again compare under what conditions bidder 1's maximum offer, $\widehat{b}_1$, exceeds bidder 2's maximum offer, $\widehat{b}_2$.

Lemma 5. *Bidder 1 wins the takeover contest if and only if*

$$A_1 \geq \min\left\{(1-\overline{\phi})v_2, A_2\right\} - \frac{(v_1 - v_2)}{\gamma}. \tag{24}$$

As in our basic competition model, stronger legal investor protection promotes efficient takeover outcomes. Formally, if $A_1 \geq \min\{v_2, A_2\} - \frac{(v_1-v_2)}{\gamma}$, the takeover outcome is efficient for any value of $\overline{\phi}$. In all other cases, there exists a critical value $\overline{\phi}'' > 0$ such that the outcome is efficient if and only if $\overline{\phi} \geq \overline{\phi}''$.

This benefit of legal investor protection notwithstanding, allowing for firm-level governance may render legal investor protection irrelevant. To illustrate, consider the extreme case in which the costs of firm-level governance approach zero ($\gamma \to 0$). In this case, condition (24) implies that bidder 1 always wins the takeover contest, regardless of his private wealth or the quality of legal investor protection. Intuitively, the role of legal investor protection in our model is to provide bidders with pledgeable income, while that of private wealth is to make up for shortfalls in bidders' pledgeable income. Hence, if bidders can costlessly convert private benefits into pledgeable security benefits, neither legal investor protection nor the bidders' private wealth matter for efficiency.

More generally, allowing for firm-level governance, even if costly, makes it more likely that the target goes to the bidder who creates the most value. This is because higher-value bidders have more private benefits that can be converted into security benefits, which gives their outside funding capacity a greater boost.

Proposition 3. *Under effective competition for the target, introducing firm-level governance improves on the efficiency of the takeover outcome. The improvement is larger when legal investor protection is weak, when the costs of firm-level governance are low, and when the difference in firm values created by the bidders is large.*

As an illustration of how firm-level governance can improve the efficiency of the takeover outcome, suppose that $A_1 < v_2 < A_2$ (implying $A_1 < v_1$).[20] By condition (11), this implies

[20] Any non-trivial claims made in this example are proven in Appendix B.

that without firm-level governance, bidder 1's maximum offer is $\widehat{b}_1 = \bar{\phi}v_1 + \min\left\{(1-\overline{\phi})v_1, A_1\right\} - c$, whereas bidder 2's is $\widehat{b}_2 = v_2 - c$. Thus, by Lemma 3, bidder 1 loses the takeover contest if $\bar{\phi} < \frac{v_2 - A_1}{v_1}$.

Suppose now we introduce firm-level governance, thus allowing bidders to convert private benefits into pledgeable security benefits. By Lemma 4, bidder 2 optimally sets $x_2^* = 0$, implying his maximum offer remains unchanged. In contrast, bidder 1 sets $x_1^* = 0$ for all $\bar{\phi} > \frac{v_1 - A_1}{v_1}$ but $x_1^* = \frac{(1-\overline{\phi})v_1 - A_1}{1+\gamma(1-\overline{\phi})} > 0$ for all $\bar{\phi} \leq \frac{v_1 - A_1}{v_1}$. In the latter case, bidder 1's maximum offer increases to $\widehat{b}_1 = \frac{v_1 + \gamma A_1}{1+\gamma(1-\overline{\phi})} - c$ (see (23)).

The upward shift of bidder 1's maximum offer function makes it more likely that bidder 1 succeeds, thus improving efficiency. While the takeover outcome was, and still is, efficient if $\bar{\phi} \geq \frac{v_2 - A_1}{v_1}$, it was previously (i.e., without firm-level governance) inefficient if $\bar{\phi} < \frac{v_2 - A_1}{v_1}$. Introducing firm-level governance narrows the range of $\bar{\phi}-$values for which the takeover outcome is inefficient. Precisely, by Lemma 5, bidder 1 loses the takeover contest if $\bar{\phi} < \frac{v_2 - v_1 + \gamma(v_2 - A_1)}{\gamma v_2}$, which is lower than the corresponding threshold without firm-level governance, $\frac{v_2 - A_1}{v_1}$. In fact, if the costs of firm-level governance are sufficiently small ($\gamma \leq \frac{v_1 - v_2}{v_2 - A_1}$), bidder 1 always wins the takeover contest, i.e., irrespective of the quality of legal investor protection.

6 Financing Frictions

One of the contributions of this paper is to introduce financing constraints into a standard takeover model. Doing so puts the focus on bidders' budget constraints, with the implication that they may frustrate efficient takeovers. This section studies financing frictions that may affect bidders' budgets and thereby the efficiency of the takeover outcome. Section 6.1 considers margin requirements that limit bidders' outside funding capacity. Section 6.2 analyzes shadow costs of internal funds. Section 6.3 explores the role of asset tangibility.

6.1 Margin Requirements

Margin requirements are common in lending. For instance, when lending cash to investors for the purpose of buying securities, brokers typically require that investors put up some equity of their own. Reasons for margin requirements are moral hazard and asymmetric information on the part of the borrower, which can be mitigated if the borrower puts up some equity of his own, and the aversion of lenders to possess collateral, which can be mitigated if the asset has an equity buffer that prevents it from going "under water" too quickly. Consistent with investors' reluctance to lend an amount equal to the full asset value, we assume that they provide funds only up to $(1-\pi)\bar{\phi}v$, where $\bar{\phi}v$ is the pledgeable asset value, as before, and π is the fraction which the borrower needs to contribute out of his own pocket ("haircut").

6.1.1 Single-Bidder Case

The analysis of the single-bidder case is analogous to our basic model, with the exception that the bidder's budget constraint is replaced by

$$A + (1-\pi)\bar{\phi}v \geq b + c. \tag{25}$$

Inserting the binding free-rider condition $b = \bar{\phi}v$ into (25), we obtain

$$A \geq \pi\bar{\phi}v + c. \tag{26}$$

Note that unlike, e.g., firm-level governance, margin requirements affect the bidder's budget constraint but not the free-rider condition, as they do not affect the fundamental value of the target if taken over by the bidder. Consequently, the budget constraint—after inserting the binding free-rider condition—does not collapse into the familiar constraint $A \geq c$ from Section 3 or, likewise, from Section 5.1.

In conjunction with the bidder's participation constraint (7), this implies that we have the following result.

Lemma 6. *The bidder takes over the target if and only if*

$$\min\{(1-\overline{\phi})v, A - \pi\bar{\phi}v\} \geq c. \tag{27}$$

By inspection, stronger legal investor protection impairs efficiency, for two reasons. First, like in the basic model, stronger legal investor protection reduces the bidder's profits, thereby tightening his participation constraint. Second, and this effect is new, stronger legal investor protection tightens the bidder's budget constraint: While it raises his need for funds by $\overline{\phi}v$—through the binding free-rider condition $b = \bar{\phi}v$—it increases his outside funding capacity only by $(1-\pi)\overline{\phi}v$. As a consequence, the bidder faces a "funding gap" of $\pi\bar{\phi}v$, which he must cover out of his internal funds.

In condition (27), the LHS decreases with both $\overline{\phi}$ and π. Notably, the cross-derivative with respect to $\overline{\phi}$ and π is negative, implying that legal investor protection and margin requirements are complements: A higher value of one amplifies the negative effect of the other (on the likelihood that the takeover succeeds).

In sum, when the bidder's outside funding capacity is impaired by margin requirements, stronger legal investor protection tightens both his participation constraint and his budget constraint. That said, the qualitative implication of Proposition 1, namely, that stronger legal investor protection makes efficient takeovers less likely, remains valid.

6.1.2 Bidding Competition

Again, the main change relative to the basic model is that bidder i's budget constraint is now

$$A_i + (1-\pi)\bar{\phi}v_i \geq b_i + c. \tag{28}$$

In conjunction with the participation constraint (9), this implies that the highest offer which bidder i is willing and able to make is

$$\widehat{b}_i = \bar{\phi}v_i + \min\left\{(1-\overline{\phi})v_i, A_i - \pi\bar{\phi}v_i\right\} - c. \tag{29}$$

Given Assumption 1, we can again derive conditions under which bidder 1's maximum offer, $\widehat{b}_1$, exceeds bidder 2's maximum offer, $\widehat{b}_2$.

Lemma 7. *Bidder 1 wins the takeover contest if and only if*

$$A_1 \geq \min\left\{(1-\overline{\phi})v_2, A_2 - \pi\bar{\phi}v_2\right\} + \pi\bar{\phi}v_1 - \overline{\phi}(v_1 - v_2). \tag{30}$$

Note that the RHS is decreasing in $\overline{\phi}$ and increasing in π, while the cross-derivative of the

RHS with respect to $\overline{\phi}$ and π is strictly positive.

Proposition 4. *Under effective competition for the target, the takeover outcome is more likely to be efficient if legal investor protection is strong and margin requirements are low. Furthermore, the positive effect of legal investor protection is weaker when margin requirements are high, while the negative effect of margin requirements is stronger when legal investor protection is strong.*

Intuitively, the RHS in (30) is increasing in π because stronger margin requirements hurt bidder 1 relatively more than bidder 2 due to his larger outside funding capacity. As for the cross-derivative, recall that stronger legal investor protection increases bidder 1's outside funding capacity more than bidder 2's. This can be easily seen from (28), where the difference $\Delta = (1 - \pi)\bar{\phi}(v_1 - v_2)$ is increasing in $\bar{\phi}$. That said, the rate of increase, $\frac{\partial \Delta}{\partial \bar{\phi}} > 0$, is decreasing in π, meaning the positive effect of legal investor protection—namely, to increase bidder 1's *relative* outside funding capacity—is weaker when margin requirements are high. Likewise, we have that $\frac{\partial \Delta}{\partial \pi} < 0$ is lower when $\bar{\phi}$ is high. While an increase in margin requirements always hurts bidder 1 relatively more, it hurts him (relatively) the most when the difference between his and bidder 2's outside funding capacity is largest, i.e., when legal investor protection is strong.

Finally, the winning bid, $b_i^* = \max\left\{\widehat{b}_j, \overline{\phi} v_i\right\}$ for $j \neq i$, is (weakly) decreasing in π. Hence, our model predicts that takeover premia are lower when margin requirements are high.

6.2 Shadow Costs of Internal Funds

Thus far we have assumed that bidders' internal funds are *excess* cash or liquid funds. However, in a world with financing frictions, firms will likely hold internal funds for a reason, e.g., to smooth out operational risks or fund investment projects that otherwise cannot be funded. This, however, implies that internal funds have a positive shadow value. Accordingly, we assume that using $a \leq A$ units of internal funds entails a shadow cost of τa representing, e.g., the forgone returns from alternative investment projects or the costs of liquidating less-than-fully-liquid assets.

6.2.1 Single-Bidder Case

The analysis is analogous to our basic model, except that the bidder's participation constraint is now

$$v - b - c - \tau a \geq 0. \tag{31}$$

Hence, using a units of internal funds lowers the bidder's payoff by τa. In contrast, the bidder's budget constraint depends only on his available internal funds, A, not on the amount actually used. Consequently, it is still given by (4) or—after inserting the binding free-rider condition—by (6).

Inserting the binding free-rider condition into (31) yields

$$(1 - \overline{\phi})v - \tau a \geq c. \tag{32}$$

Since using internal funds involves a shadow cost, the bidder will first exhaust his outside funding capacity. Hence, the amount of internal funds drawn on is $a = b + c - \overline{\phi}v$ or—after inserting the binding free-rider condition—$a = c$. As a result, the bidder's participation constraint becomes

$$(1 - \overline{\phi})v \geq (1 + \tau)c. \tag{33}$$

As one might expect, an increase in the shadow costs of internal funds, τ, tightens the bidder's participation constraint.

In conjunction with the bidder's budget constraint (6), this yields the following result.

Lemma 8. *The bidder takes over the target if and only if*

$$\min\left\{\frac{(1 - \overline{\phi})v}{1 + \tau}, A\right\} \geq c. \tag{34}$$

As in the basic single-bidder model, legal investor protection has no effect on the bidder's budget constraint. However, it tightens the bidder's participation constraint, making efficient takeovers less likely.

Of particular interest is that the cross-derivative of the LHS in (34) with respect to $\overline{\phi}$ and τ is positive. This has two implications. First, it implies that the negative effect of legal investor protection on efficiency is weaker when τ is high. Intuitively, while legal investor protection reduces the bidder's private benefits, it also improves his outside funding capacity, thereby reducing his need for internal funds, which in turn is more valuable when internal funds have a high shadow value. Second, it implies that the negative effect of shadow costs of internal funds is weaker when legal investor protection is strong. Intuitively, stronger legal investor protection means that the bidder needs to use less internal funds, meaning a given increase in τ involves a smaller reduction in his payoff.

6.2.2 Bidding Competition

Analogous to the single-bidder case, the main change relative to the basic model is that bidder i's participation constraint is now

$$v_i - b_i - c - \tau a_i \geq 0. \tag{35}$$

Given that bidder i fully exhausts his outside funding capacity before tapping into internal funds, the amount of internal funds drawn on is $a_i = b_i + c - \overline{\phi} v_i$. Hence, bidder i's participation constraint becomes

$$\overline{\phi} v_i + \frac{(1-\overline{\phi})v_i}{1+\tau} - b_i - c \geq 0. \tag{36}$$

In conjunction with his budget constraint (10), this implies that the highest offer which bidder i is willing and able to make is

$$\widehat{b}_i = \bar{\phi} v_i + \min\left\{\frac{(1-\overline{\phi})v_i}{1+\tau}, A_i\right\} - c. \tag{37}$$

Again, we can determine the conditions under which bidder 1's maximum offer, $\widehat{b}_1$, exceeds bidder 2's maximum offer, $\widehat{b}_2$

Lemma 9. *Bidder 1 wins the takeover contest if and only if*

$$A_1 \geq \min\left\{\frac{(1-\overline{\phi})v_2}{1+\tau}, A_2\right\} - \overline{\phi}(v_1 - v_2). \tag{38}$$

Note that the RHS is decreasing in $\overline{\phi}$ and τ, while the cross-derivative with respect to $\overline{\phi}$ and π is strictly positive.

Proposition 5. *Under effective competition for the target, the takeover outcome is more likely to be efficient if legal investor protection is strong and the shadow costs of internal funds are high. Furthermore, the positive effect of legal investor protection is weaker when internal funds command a high shadow cost, while the positive effect of shadow costs of internal internal funds is weaker when legal investor protection is strong.*

In our analysis, the main inefficiency in takeovers is that less efficient but wealthy bidders may win the contest because i) limited pledgeability constrains bidders' outside funding capacity, and ii) their internal funds may allow them to overcome this "funding gap" and outbid more efficient but less wealthy rivals. Consequently, any financing friction making it more difficult or costly for bidders to raise *outside* funds—such as the margin requirements analyzed in the previous section—must reduce efficiency. Conversely, any financing friction making it more difficult, or costly, for bidders to draw on their *internal* funds must improve the efficiency of the takeover outcome.

In this light, it becomes transparent why high shadow costs of internal funds must necessarily improve efficiency: They make it less likely that wealthy but inefficient bidders find it profitable to use their internal funds to outbid less wealthy but more efficient rivals. Intuitively, this positive effect is more pronounced when legal investor protection is weak, because this is precisely when internal funds matter the most and the inefficiency is consequently greatest. It is also intuitive why the positive effect of legal investor protection is weaker when internal funds have a high shadow value: If internal funds are very expensive, then inefficient but wealthy bidders are less likely to win in the first place, and institutions improving the relative outside funding capacity of more efficient bidders, such as legal investor protection, are relatively less important.

Finally, the winning bid, $b_i^* = \max\left\{\widehat{b}_j, \overline{\phi} v_i\right\}$ for $j \neq i$, is (weakly) decreasing in τ. Thus, while high shadow costs of internal funds are good for efficiency, they are bad for target shareholders as they imply a lower bid premium.

6.3 Asset Tangibility

Some assets are highly tangible, more difficult to steal, and their cash flows are more readily verifiable. In a world with financing frictions, such assets are highly desirable, as they command a higher outside funding capacity. To explore the effect of asset tangibility on the takeover outcome, we assume that a fraction ψ of the target value *cannot* be expropriated—irrespective of the quality of legal investor protection.[21] From an empirical perspective, the implications of asset tangibility for financing constraints are an important research topic (e.g., Almeida and Campello, 2007). That being said, the economic forces through which asset tangibility and legal investor protection affect the takeover outcome are similar, so we shall be relatively brief here.

6.3.1 Single-Bidder Case

The analysis is similar to the basic model, except that the bidder's budget constraint is replaced by

$$A + \psi v + (1 - \psi)\bar{\phi} v \geq b + c. \tag{39}$$

Because asset tangibility affects the fraction of the target value that cannot be expropriated, it also affects the free-rider condition. In this regard, the analysis of asset tangibility is different from, say, our previous analyses of margin requirements and costly internal funds. Precisely, the free-rider condition becomes

$$b \geq \psi v + (1 - \psi)\bar{\phi} v. \tag{40}$$

Inserting the binding free-rider condition into (39), we obtain the familiar budget constraint

$$A \geq c, \tag{41}$$

[21] Almeida and Campello (2007) argue that asset tangibility is "a proxy for pledgeability" (p. 1430) and that "Assets that are more tangible sustain more external financing because such assets mitigate contractibility problems" (p. 1431).

while the bidder's participation constraints becomes

$$(1-\psi)(1-\bar{\phi})v \geq c.$$

Thus, irrespective of the quality of investor protection, an increase in asset tangibility tightens the bidder's participation constraint but has no effect on his budget constraint.

Lemma 10. *The bidder takes over the target if and only if*

$$\min\{(1-\psi)(1-\overline{\phi})v, A\} \geq c. \tag{42}$$

Note that the cross-derivative of the LHS with respect to ψ and $\overline{\phi}$ is positive, implying that legal investor protection and asset tangibility are subtitutes: A higher value of one dampens the negative effect of the other.

6.3.2 Bidding Competition

Again, the main change relative to the basic model is that bidder i's budget constraint is now

$$A_i + \psi v_i + (1-\psi)\bar{\phi} v_i \geq b_i + c. \tag{43}$$

In conjunction with his participation constraint (9), this implies that the highest offer which bidder i is willing and able to make is

$$\widehat{b_i} = v_i(\bar{\phi} + (1-\overline{\phi})\psi) + \min\left\{(1-\psi)(1-\overline{\phi})v_i, A_i\right\} - c. \tag{44}$$

Accordingly, we have:

Lemma 11. *Bidder 1 wins the takeover contest if and only if*

$$A_1 \geq \min\left\{(1-\psi)(1-\overline{\phi})v_2, A_2\right\} - (v_1 - v_2)(\bar{\phi} + (1-\overline{\phi})\psi). \tag{45}$$

As one might expect, asset tangibility and legal investor protection both have a positive effect on the takeover outcome: The RHS is decreasing in both ψ and $\overline{\phi}$. More interestingly, the cross-derivative with respect to $\overline{\phi}$ and ψ is positive, implying that legal investor protection and asset tangibility are subtitutes.

Proposition 6. *Under effective competition for the target, the takeover outcome is more likely to be efficient if legal investor protection is strong and asset tangibility is high. Furthermore, the positive effect of asset tangibility is weaker when legal investor protection is strong, while the positive effect of legal investor protection is weaker when asset tangibility is high.*

Finally, the winning bid, $b_i^* = \max\left\{\widehat{b}_j, \psi v_i + (1-\psi)\overline{\phi} v_i\right\}$ for $j \neq i$, is increasing in ψ. Hence, our model predicts that takeover premia are higher when asset tangibility is high.

7 Applications and Extensions

Taking into account the interaction between legal investor protection and financing constraints also provides new insights into the optimal allocation of voting rights, the sale of controlling blocks, and the role of legal investor protection for cross-border M&A. For brevity, we begin directly with the competition model, noting that the single-bidder case is relatively straightforward to analyze. Moreover, given that the execution cost matters only in the single-bidder model, we shall set $c = 0$ for simplicity.

7.1 "One Share–One Vote"

This section studies the implications of departures from "one share–one vote" for the efficiency of the takeover outcome. Suppose the target has a dual-class share system: A fraction $\alpha \in (0, 1]$ of the shares have (equal) voting rights, while the remaining shares are non-voting. A "one share–one vote" structure corresponds to $\alpha = 1$.

In stage 3, as before, the controlling bidder finds it optimal to divert a fraction $(1 - \bar{\phi})$ of the target value as private benefits. In stage 2, target shareholders of different voting classes may face different bids, which they each must accept or reject. That is, we explicitly allow bidders to make different bids for voting and non-voting shares. As it turns out, this problem can be simplified.

Lemma 12. *Without loss of generality, we can assume that bidders make a bid only for voting shares.*

From the bidder's perspective, it is immaterial whether or not he acquires non-voting shares: They do not help him to gain control. Thus, the most he is willing to pay for non-voting shares is their "fundamental" value, $\overline{\phi}v_i$.[22] (In contrast, as shown in Section 4, bidders may pay a higher price for voting shares to gain control of the target.) Also, due to free-riding, non-voting shareholders will tender only if the bid price is at least $\overline{\phi}v_i$. Accordingly, the only bid price at which a transaction may occur is $\overline{\phi}v_i$. At this price, however, both parties (bidder and non-voting shareholders) are indifferent between trading and not trading. Thus, without loss of generality, we may assume that bidders do not make a bid for non-voting shares.

The tendering decision is the same as in our basic model. Hence, by Lemma 2, voting shareholders tender to the highest bidder offering $b_i \geq \overline{\phi}v_i$, if any. In stage 1, the bidders must decide whether to bid for the target. Thus, we must again characterize the highest offer which bidder i is willing and able to make, $\widehat{b}_i(\alpha)$, i.e., the highest value of b_i satisfying the bidder's participation constraint

$$\alpha\bar{\phi}v_i + (1-\overline{\phi})v_i \geq \alpha b_i \tag{46}$$

and his budget constraint

$$A_i + \alpha\bar{\phi}v_i \geq \alpha b_i. \tag{47}$$

In the participation constraint (46), $\alpha\bar{\phi}v_i$ is the value of the security benefits associated with the voting shares, $(1-\overline{\phi})v_i$ are the bidder's private benefits, and αb_i is the total payout to the voting shareholders. In the budget constraint (47), the LHS represents the bidder's total budget, consisting of his internal funds, A_i, and his outside funding capacity, $\alpha\bar{\phi}v_i$, while the RHS reflects his need for funds.

[22] As is customary in the literature, we express bids in terms of a measure one of shares. Given that a fraction $(1-\alpha)$ of the shares are non-voting, this means the bidder is willing to pay up to $(1-\alpha)\overline{\phi}v_i$ for all of the non-voting shares.

Accordingly, the highest offer which bidder i is willing and able to make is

$$\widehat{b}_i = \bar{\phi} v_i + \frac{1}{\alpha} \cdot \min\left\{(1-\overline{\phi})v_i, A_i\right\}. \tag{48}$$

This expression resembles (11), except that $c = 0$ and that the second term is normalized by the fraction of voting shares, α. Indeed, when not all shares carry a vote, the bidder's willingness and ability to pay, respectively, is spread across fewer shares. This increases the maximum offer he is willing and able to make (for the voting shares). In particular, the bidder's willingness to pay is higher, because he can now obtain the same private benefits by acquiring fewer shares. Likewise, his ability to pay is higher, because he can now use his private wealth for the acquisition of fewer shares.[23]

Lemma 13. *Bidder 1 wins the takeover contest if and only if*

$$A_1 \geq \min\left\{(1-\overline{\phi})v_2, A_2\right\} - \alpha\overline{\phi}(v_1 - v_2). \tag{49}$$

By inspection, the RHS decreases with α. Thus, the likelihood that bidder 1 wins the takeover contest is highest under a "one share–one vote" structure.[24]

Proposition 7. *"One share–one vote" is socially optimal.*

When the more efficient bidder is also wealthier ($A_1 \geq A_2$), condition (49) holds for any value of α. That is, the takeover outcome is always efficient—irrespective of the fraction of voting shares. The intuition is the same as in our basic model: Not only does bidder 1 have a higher valuation of the target, but he also has a larger budget. Hence, bidder 1 can always outbid his less efficient rival, bidder 2.

Suppose now instead that the less efficient bidder is wealthier ($A_1 < A_2$). If A_1 is sufficiently large, the takeover outcome is again efficient regardless of the fraction of voting

[23] Deviations from "one share–one vote" are equivalent to allowing for restricted bids where the biddders compete for a fraction $\alpha \geq 0.5$ of the shares and the winner is the bidder with the highest bid.

[24] In contrast, the security-voting structure (i.e., the value of α) is irrelevant in the single-bidder case, because the bid price must equal the post-takeover value of the security benefits.

shares. This situation—i.e., when both bidders are financially unconstrained—is the situation analyzed in much of the theory of takeovers.

However, if A_1 is sufficiently small, the takeover outcome may be inefficient. Indeed, while bidder 1 has a higher willingness to pay for the target, bidder 2's ability to pay may be higher due to his larger wealth. As an illustration, suppose that $A_i \leq (1-\overline{\phi})v_i$. By (48), this implies that the highest offer which bidder i is willing and able to make is

$$\widehat{b}_i = \bar{\phi} v_i + \frac{A_i}{\alpha}. \tag{50}$$

Hence, even though bidder 2 generates lower security benefits ($\bar{\phi} v_2 < \bar{\phi} v_1$), his maximum offer may be higher than bidder 1's if A_2 is sufficiently larger than A_1. Moreover, when α is small, a smaller wealth difference, $A_2 - A_1$, is needed for bidder 2 to be able to outbid bidder 1. Intuitively, the effect of bidder wealth on the takeover outcome is larger when α is small, because a given wealth can then be spread across fewer voting shares.

More formally, it follows from condition (49) that if $A_1 \geq \min\left\{(1-\overline{\phi})v_2, A_2\right\}$, the takeover outcome is efficient for any value of α, i.e., irrespective of the fraction of voting shares. By contrast, if $A_1 < \min\left\{(1-\overline{\phi})v_2, A_2\right\} - \overline{\phi}(v_1 - v_2)$, the takeover outcome is inefficient for any value of α. In all intermediate cases, there exists a critical value

$$\widehat{\alpha} = \frac{\min\left\{(1-\overline{\phi})v_2, A_2\right\} - A_1}{\overline{\phi}(v_1 - v_2)}, \tag{51}$$

such that the takeover outcome is efficient if and only if $\alpha \geq \widehat{\alpha}$. By inspection, $\widehat{\alpha}$ decreases with $\bar{\phi}$. Hence, departures from "one share–one vote" are more likely to lead to an inefficient takeover outcome when legal investor protection is weak. (Conversely, weak legal investor protection is more likely to lead to an inefficient takeover outcome when the fraction of voting shares, α, is small.)

Corollary 2. *Deviations from "one share–one vote" are more likely to lead to an inefficient takeover outcome when legal investor protection is weak.*

Our results must be contrasted with those of Grossman and Hart (1988, GH) and Harris and Raviv (1988, HR), who also find that "one share–one vote" is socially optimal. The economics behind their result, however, is fundamentally different. In GH and HR, departures from "one share–one vote" may allow bidders with low security benefits but high private benefits to win against bidders with high security benefits but low private benefits, even if the former are less efficient—i.e., even if they generate lower *total* benefits. In our model, this possibility does not arise, as security and private benefits are positively aligned. That is, our model assumes that bidders can divert more value in absolute (i.e., dollar) terms from more valuable firms. In contrast, in both GH and HR, bidders can divert more value in absolute terms from less valuable firms.

The converse is also true: The main inefficiency in our model—which is minimized under a "one share–one vote" structure—does not arise in GH and HR. Recall that the main inefficiency in our model is not that less efficient bidders may have a higher *willingness* to pay, as in GH and HR, but rather that they may have a higher *ability* to pay. Hence, the sole reason why efficient takeovers may not materialize in our model is because bidders are financially constrained. In contrast, in both GH and HR, bidders are arbitrarily wealthy, so financing constraints play no role.

7.2 Sales of Controlling Blocks

This section considers the case in which the target has a controlling shareholder ("incumbent"). The incumbent owns a fraction $\beta \geq 0.5$ of the target's shares and generates firm value $v_0 \geq 0$, which is divided into security benefits $\overline{\phi} v_0$ and private benefits $(1 - \overline{\phi}) v_0$. The target faces a (single) potential acquirer ("bidder"). If the bidder gains control of the target, its value increases to $v_1 > v_0$.

A transfer of control must be mutually beneficial, given that the incumbent can always block the transfer at will. Accordingly, a control transfer may only occur if the bidder is willing and able to compensate the incumbent for his controlling block. Consistent with the law and legal practice in the United States, we assume that minority shareholders enjoy no rights in this sale-of-control transaction. In particular, the bidder is under no obligation to extend his offer to minority shareholders. In fact, he is under no obligation to make them any offer at all. This rule, known as "market rule" (MR), is the prevailing rule in the United States. Given that it imposes no obligation on the acquirer, "the MR is probably best described as the absence of a rule, rather than a rule" (Schuster, 2010, p. 8).

Many other countries, including most European countries, use a different rule—the "equal opportunity rule" (EOR) or "mandatory bid rule" (MBR)—which requires that the bidder makes an offer to minority shareholders on the same terms as his offer to the controlling blockholder. At the end of this section, we offer a brief discussion of how our results might change if the bidder were instead subject to the EOR/MBR.

In stage 3, as before, the bidder diverts a fraction $(1-\bar{\phi})$ of the target value as private benefits. In stage 2, the incumbent and the minority shareholders may face different bids, which they each must accept or reject. Note the analogy to Section 7.1. There, we assumed without loss of generality that bidders do not make a bid for non-voting shares. Likewise, here, the bidder has nothing to gain from acquiring minority shares: They do not help him to gain control, and the only price at which a transaction may occur is at their "fundamental" value, $\overline{\phi}v_1$, making everybody indifferent between trading and not trading. Analogous to Lemma 12, we can thus assume without loss of generality that the bidder does not make a bid for minority shares.

We must again characterize the highest offer which the bidder is willing and able to make, $\widehat{b}_1(\beta)$, i.e., the highest value of b_1 satisfying his participation constraint

$$\beta\bar{\phi}v_1 + (1-\overline{\phi})v_1 \geq \beta b_1 \tag{52}$$

and his budget constraint

$$A_1 + \beta\bar{\phi}v_1 \geq \beta b_1. \tag{53}$$

Conditions (52) and (53) are similar to (46) and (47), except that α is replaced with β. Accordingly, the highest offer which the bidder is willing and able to make is

$$\widehat{b}_1 = \bar{\phi}v_1 + \frac{1}{\beta} \cdot \min\left\{(1-\overline{\phi})v_1, A_1\right\}, \tag{54}$$

while the incumbent's valuation of the controlling block is

$$\beta b_0 = \beta\overline{\phi}v_0 + (1-\overline{\phi})v_0. \tag{55}$$

For a sale-of-control transaction to occur, the bidder's maximum offer for the controlling block, $\beta\widehat{b}_1$, must equal or exceed the incumbent's valuation of the same, βb_0.[25] Otherwise, there are no gains from trade.[26]

Lemma 14. *The bidder gains control of the target and only if*

$$A_1 \geq (1-\overline{\phi})v_0 - \beta\overline{\phi}(v_1 - v_0). \tag{56}$$

Condition (56) is similar to condition (49). The latter condition reflects the requirement that bidder 1's maximum offer for the block of voting shares, $\alpha\widehat{b}_1$, must exceed bidder 2's maximum offer, $\alpha\widehat{b}_2$. Likewise, condition (56) states that the bidder's maximum offer for the controlling block, $\beta\widehat{b}_1$, must exceed the incumbent's valuation, βb_0. The main difference is that the incumbent's wealth does not enter in condition (56). As the incumbent already owns the controlling block, his ability to pay is irrelevant. In a sense, the incumbent is like a rival bidder who is arbitrarily wealthy.

By inspection, the RHS of (56) decreases with β. Thus, the likelihood that the sale of control takes place increases with the size of the controlling block.

Proposition 8. *Efficient sales of control are more likely to succeed when the controlling block is large (as a fraction of the total equity value).*

Recall that the incumbent's wealth plays no role: He can always "afford" the controlling block by simply refusing to sell it. Accordingly, whether or not the sale of control takes place depends solely on the bidder's wealth. If A_1 is sufficiently large, the sale of control always takes place—irrespective of the size of the controlling block. Thus, absent financial constraints, the takeover outcome is always efficient.

In contrast, if the bidder is financially constrained, the sale of control may not take place. Precisely, for the sale of control to succeed, the bidder must compensate the incumbent for his security benefits, $\beta\overline{\phi}v_0$, and his private benefits, $(1-\overline{\phi})v_0$. To do so, the bidder can use

[25] Recall that we express bids in terms of a measure one of shares. Thus, if the highest offer which the bidder is willing and able to make is $\widehat{b}_1$, his maximum offer for the controlling block will be $\beta\widehat{b}_1$.

[26] The sale will occur at a price $\beta b \in [\beta b_0, \beta\widehat{b}_1]$ depending on the incumbent's and bidder's relative bargaining powers. For our purposes, the value of b is not of interest, as it does not affect efficiency.

his internal funds, A_1, and his outside funds, $\beta\bar{\phi}v_1$. Clearly, if $A_1 \geq (1-\overline{\phi})v_0$, the sale of control always takes place. In contrast, if $A_1 < (1-\overline{\phi})v_0$, the bidder is unable to pay in full for the incumbent's private benefits out of his internal funds and must additionally tap his outside funds, $\beta\bar{\phi}v_1$. However, since the bidder must also pay for the incumbent's security benefits, $\beta\overline{\phi}v_0$, his "disposable outside funds" are only $\beta(\overline{\phi}v_1 - \overline{\phi}v_0)$. If this is enough to cover the funding gap of $(1-\overline{\phi})v_0 - A_1$, the sale of control will take place. Otherwise, it will fail. Importantly, the bidder's "disposable outside funds" are increasing in β, which explains the statement in Proposition 8.

Formally, it follows from condition (56) that if $A_1 \geq (1-\overline{\phi})v_0 - \frac{\overline{\phi}}{2}(v_1 - v_0)$, the sale of control always takes place—irrespective of the size of the controlling block. By contrast, if $A_1 < (1-\overline{\phi})v_0 - \overline{\phi}(v_1 - v_0)$, the sale of control never takes place. In all intermediate cases, there exists a critical value $\widehat{\beta} \geq 0.5$ given by

$$\widehat{\beta} = \frac{(1-\overline{\phi})v_0 - A_1}{\overline{\phi}(v_1 - v_0)}, \tag{57}$$

such that the sale of control takes place if and only if $\beta \geq \widehat{\beta}$. By inspection, $\widehat{\beta}$ decreases with $\bar{\phi}$. Thus, efficient sales of control are more likely to occur when legal investor protection is strong.

Corollary 3. *Stronger legal investor protection makes it more likely that efficient sales of control succeed.*

Bebchuk (1994) also finds that efficient sales of control may not take place, albeit for a different reason. In his model, an incumbent with low security benefits but high private benefits may not sell his controlling block to a potential acquirer with high security benefits but low private benefits, even if the sale of control is efficient. In our model, this configuration does not arise, as security and private benefits are positively aligned. Instead, efficient sales of control may fail in our model because bidders are financially constrained. In contrast, in Bebchuk's model, bidders are arbitrarily wealthy, so financing constraints play no role.

Thus far, we have (implicitly) assumed that the bidder makes an offer for the *entire* controlling block. We would like to point out that none of our results depend on this assumption. Given that the likelihood of an efficient sale-of-control transaction depends on the size of the controlling block, this may seem surprising. However, it can be easily shown that condition (56)—which is the central condition describing when the bidder gains control of the target—remains *unchanged* if we allow him to make a (restricted) offer for only a fraction of the controlling block.

To see this, suppose the bidder makes a bid $b_{1,\kappa}$ for a fraction $\kappa < 1$ of the controlling block, where $\kappa\beta \geq 0.5$ is to ensure that he acquires enough shares to gain control. We must again characterize the highest value of $b_{1,\kappa}$ satisfying the bidder's participation constraint

$$\kappa\beta\bar{\phi}v_1 + (1 - \overline{\phi})v_1 \geq \kappa\beta b_{1,\kappa} \tag{58}$$

and his budget constraint

$$A_1 + \kappa\beta\bar{\phi}v_1 \geq \kappa\beta b_{1,\kappa}. \tag{59}$$

Hence, the highest offer which the bidder is willing and able to make is

$$\widehat{b}_{1,\kappa} = \bar{\phi}v_1 + \frac{1}{\kappa\beta} \cdot \min\left\{(1 - \overline{\phi})v_1, A_1\right\}. \tag{60}$$

Comparing (60) with (54) illustrates that allowing the bidder to make a restricted bid raises his maximum offer: $\widehat{b}_{1,\kappa} > \widehat{b}_1$. Intuitively, the bidder is both willing and able to pay a higher price as he can spread his private benefits and wealth, respectively, over fewer shares. However, this offer is now only for a fraction κ of the incumbent's shares. The remaining fraction, $1 - \kappa$, is valued at the post-takeover share value $\bar{\phi}v_1 < \widehat{b}_1$, with the implication that the incumbent's total payoff is *excactly* the same as before:

$$\kappa\beta\widehat{b}_{1,\kappa} + (1 - \kappa)\beta\bar{\phi}v_1 = \beta\widehat{b}_{1.} \tag{61}$$

Intuitively, the incumbent's total payoff—i.e., the LHS in (61)—can be decomposed into two parts: The security benefits associated with his controlling block, $\beta\bar{\phi}v_1$, and the control premium paid to him by the bidder. The security benefits are evidently independent of κ. But so is the control premium. By (60), the control premium is equal to $\kappa\beta \times \frac{1}{\kappa\beta} \cdot$

$\min\left\{(1-\overline{\phi})v_1, A_1\right\}$, which depends only on the bidder's private benefits, $(1-\overline{\phi})v_1$, and his wealth, A_1.[27]

Having established that the incumbent's payoff is independent of how many shares he sells—as long as enough are sold to allow the bidder to gain control—the rest of the argument is straightforward. In particular, as the incumbent's payoff remains unchanged, the central condition in Lemma 14 describing when the sale-of-control transaction succeeds, (56), also remains unchanged.[28] Naturally, this implies that all results building on Lemma 14, such as Proposition 8 and Corollary 3, also remain unchanged.

Returning to our main analysis, we now show how the incumbent's controlling block can be endogenized. Suppose the incumbent is initially the firm's sole owner. In the spirit of Zingales (1995), he can retain a controlling block, $\beta \geq 0.5$, and sell the remaining shares, $1-\beta$, to dispersed investors. At some future date, the firm is approached by a potential bidder, as described above, and a control transfer may take place. As in Zingales' analysis, everybody has rational expectations about this future control transfer. For simplicity, we assume that the bidder has full bargaining power vis-à-vis the incumbent, though all of our qualitative results remain valid as long as he has some bargaining power.

We know that the control transfer succeeds if and only if condition (56) holds. In that case, given that the bidder has full bargaining power, he acquires the controlling block at a price equal to the incumbent's valuation, (55). Moreover, when the incumbent sells shares to dispersed investors, they rationally anticipate the control transfer and are thus willing to pay up to $(1-\beta)\,\overline{\phi}v_1$ for the minority stake. Overall, and as long as condition (56) holds, the incumbent's total payoff at the initial stage is therefore

$$\beta\overline{\phi}v_0 + (1-\overline{\phi})v_0 + (1-\beta)\,\overline{\phi}v_1. \tag{62}$$

[27] Recall that the bid in (60) is expressed in terms of a measure one of shares. Thus, to obtain the control premium (in dollars), one must multiply $\frac{1}{\kappa\beta}\cdot\min\left\{(1-\overline{\phi})v_1, A_1\right\}$ with the size of the block that is being traded, $\kappa\beta$.

[28] Precisely, the sale of control takes place if and only if

$$\kappa\beta\widehat{b}_{1,\kappa} + (1-\kappa)\beta\bar{\phi}v_1 \geq \beta\overline{\phi}v_0 + (1-\overline{\phi})v_0.$$

Inserting $\widehat{b}_{1,\kappa}$ from (60) and going through the same steps as in the Proof of Lemma 3 yields (56).

Given that $v_1 > v_0$, the incumbent's total payoff decreases with β. On the other hand, condition (56) becomes tighter as β decreases. Consequently, the incumbent chooses the smallest value of $\beta \geq 0.5$ that is compatible with condition (56).

Proposition 9. *The incumbent's optimal controlling block is*

$$\beta^* = \max\left\{\frac{(1-\overline{\phi})v_0 - A_1}{\overline{\phi}(v_1 - v_0)}, 0.5\right\}. \tag{63}$$

Zingales (1995) also models the incumbent's choice of controlling block in anticipation of a future control transfer. Moreover, he also assumes that the bidder is more efficient than the incumbent. However, Zingales assumes that the bidder is arbitrarily wealthy. In our model, if the bidder were sufficiently wealthy, the optimal controlling block would always be $\beta^* = 0.5$. In contrast, if the bidder is financially constrained—precisely, if $A_1 < (1-\overline{\phi})v_0 - \frac{\overline{\phi}}{2}(v_1 - v_0)$—the optimal controlling block is $\beta^* > 0.5$. By inspection, β^* decreases with $\overline{\phi}$.

Corollary 4. *The optimal controlling block is larger when legal investor protection is weak.*

This result is consistent with evidence by, e.g., La Porta et al. (1998, 1999), who find that ownership is more concentrated in countries with weaker legal investor protection.

Let us conclude with a brief discussion of how our results might change if—instead of being subject to the MR—the bidder were subject to the EOR/MBR. A formal analysis of the EOR/MBR is provided in Appendix C.

Under the EOR/MBR, the bidder is obliged to make an offer to minority shareholders on the same terms as his offer to the incumbent. Accordingly, if the bidder pays a control premium to the incumbent, he must pay the same control premium also to minority shareholders. This has two effects, both of which make efficient sale-of-control transactions less likely. First, paying a control premium also to minority shareholders reduces the bidder's profits and tightens his participation constraint. This effect—namely, that the EOR/MBR redistributes takeover gains from the bidder to minority shareholders—is well known (e.g., Kahan, 1993; Bebchuk, 1994). Second, and this effect is unique to our framework, any premium above the (pledgeable) security benefits must be financed out of the bidder's own funds. Thus, if the bidder is forced to pay a control premium also to minority shareholders, this tightens his budget constraint.

Besides the fact that efficient sale-of-control transactions are less likely to succeed, however, nothing changes. In particular, as is shown in Appendix C, all qualitative results from this section—i.e., Proposition 8, Corollary 3, and Corollary 4—continue to hold if the bidder were instead subject to the EOR/MBR.

7.3 Cross-Border M&A

This section extends our analysis to the case in which bidders come from different legal environments. Without loss of generality, we assume that $\overline{\phi}_1 > \overline{\phi}_2$. That is, bidder 1 comes from an environment with stronger legal investor protection than bidder 2. To isolate the effect of legal investor protection on the takeover outcome, we assume that both bidders have the same internal funds, A, and can create the same value, v.

In a typical cross-border M&A transaction, the target adopts the corporate governance structures, accounting standards, and disclosure practices of the country of the acquirer (Rossi and Volpin, 2004; Bris and Cabolis, 2008; Chari, Ouimet, and Tesar, 2009). Hence, if bidder i wins the takeover contest, his private benefits are $(1 - \overline{\phi}_i)v$, while the security benefits accruing to all shareholders, including the bidder himself, are $\overline{\phi}_i v$. Note that unlike our previous analysis, private and security benefits are now inversely related: While bidder 1 generates higher security benefits, his private benefits are lower than bidder 2's. Also, note that both bidders now generate the same *total* (i.e., security plus private) benefits. From an efficiency standpoint, it is therefore immaterial who wins the takeover contest. Thus, the question is not whether efficient takeovers take place, but rather under what conditions bidders from environments with stronger legal investor protection can outbid their rivals from environments with weaker legal investor protection.

In principle, minority shareholder protection at the target firm may become *worse* if the acquirer comes from an environment with weaker legal investor protection.[29] Empirically, this case seems less relevant, however. In the vast majority of cross-border M&A deals, the

[29] "The target almost always adopts the governance standards of the acquirers, *whether good or bad*" (Rossi and Volpin, 2004, p. 300, italics added). Likewise, "the new law can be less protective than before, a type of legal reform that is unheard of in the literature" (Bris and Cabolis, 2008, p. 606).

acquirer comes from a country with *stronger*, not weaker, legal investor protection (Rossi and Volpin, 2004; Bris and Cabolis, 2008; Chari, Ouimet, and Tesar, 2009; Erel, Liao, and Weisbach, 2012), implying that "[o]n average, shareholder protection increases in the target company via the cross-border deal" (Rossi and Volpin, 2004, p. 291). To avoid this issue altogether, we assume that legal investor protection in the target's home country, $\overline{\phi}_0$, is less than or equal to $\overline{\phi}_2$. In the special case where $\overline{\phi}_0 = \overline{\phi}_2$, our model thus analyzes competition between a domestic bidder (bidder 2) and a foreign bidder (bidder 1) coming from a country with stronger legal investor protection.

The analysis is analogous to that in Section 4, except that $\overline{\phi}_i$ is bidder-specific, while both A and v are identical across bidders. Accordingly, bidder i's maximum offer is

$$\widehat{b}_i = \bar{\phi}_i v + \min \left\{ (1 - \overline{\phi}_i) v, A \right\}. \tag{64}$$

Proposition 10. *If $A < (1 - \overline{\phi}_2)v$, the bidder from the country with stronger legal investor protection wins the takeover contest. Otherwise, either of the two bidders may win the takeover contest.*

As both bidders create the same value, they have the same *willingness* to pay. Hence, the takeover outcome depends solely on their *ability* to pay. There are three cases.

If $A \geq (1 - \overline{\phi}_2)v$, neither bidder is financially constrained. As a result, both bidders can make a bid up to their full valuation of the target, v, which implies either of the two bidders may win the takeover contest.

The second case, $(1 - \overline{\phi}_2)v > A \geq (1 - \overline{\phi}_1)v$, illustrates perhaps best the strategic role of legal investor protection in takeover contests. While both bidders create the same value, v, bidder 1 generates more security benefits. Bidder 1 has therefore a higher outside funding capacity, allowing him to make a bid up to his full valuation, $\widehat{b}_1 = v$. In contrast, bidder 2 can only make a bid up to $\widehat{b}_2 = \overline{\phi}_2 v + A < v$. As a result, bidder 1 wins the takeover contest.

The third case, $A < (1 - \overline{\phi}_1)v$, is similar to the second, except that bidder 1 can no longer make a bid up to his full valuation. Consequently, both bidders can now only bid up to $\widehat{b}_i = \overline{\phi}_i v + A$. However, as bidder 1 generates more security benefits, he can still outbid his rival, bidder 2.

We may finally ask whether—conditional on the takeover succeeding—target shareholders benefit from stronger legal investor protection. In the first case above, the winning bid is independent of $\overline{\phi}_i$. In the second and third case, the winning bid is $b_1^* = \max\{\widehat{b}_2, \overline{\phi}_1 v\}$, which is (weakly) increasing in the quality of legal investor protection in the *acquirer's* country, $\overline{\phi}_1$. Consistent with this result, Bris and Cabolis (2008) find that takeover premia in cross-border M&A deals are higher when legal investor protection in the acquirer's country is stronger than in the target's. Likewise, Rossi and Volpin (2004) find that takeover premia are higher in cross-border M&A deals compared to domestic M&A deals, while the acquirer in a typical cross-border M&A deal is usually from a country with stronger legal investor protection.

8 Conclusion

This paper studies the effect of legal investor protection on the efficiency of the market for corporate control. Stronger legal investor protection limits the ease with which the bidder, once in control, can divert corporate resources as private benefits. This has two main implications. First, it reduces the bidder's profit, thus making efficient takeovers less likely. Second, it increases the bidder's pledgeable income and thus his outside funding capacity. However, absent effective bidding competition, this increased outside funding capacity does not relax the bidder's budget constraint, as the bid price increases in lockstep with his pledgeable income.

In contrast, under effective bidding competition, stronger legal investor protection—and the resulting increase in the bidders' outside funding capacity—may improve the efficiency of the takeover outcome. In particular, by boosting bidders' ability to raise outside funds against the value they create, stronger legal investor protection makes it less likely that more efficient but less wealthy bidders are outbid by less efficient but wealthier rivals.

The presence of a binding budget constraint also provides a novel rationale for the "one share–one vote" rule. In our model, this rule is socially optimal as it maximizes the likelihood that the takeover outcome is determined by bidders' ability to create value rather than by their budget constraints. In addition, our model provides novel empirical implications relating the takeover outcome to, e.g., firm-level governance, margin requirements, asset tangibility, and block ownership, to name just a few.

9 Appendix A: Proofs

Proof of Lemma 2. For a bid to succeed in equilibrium, it must satisfy the free-rider condition, $b_i \geq \overline{\phi} v_i$. If no bid satisfies this condition, the only equilibrium outcome is that the takeover does not place. Suppose instead that a bid satisfies $b_i \geq \overline{\phi} v_i$. If a target shareholder anticipates the bid to succeed, tendering his shares is (at least) a weakly dominant strategy. Hence, an equilibrium exists in which a bid b_i succeeds if and only if $b_i \geq \overline{\phi} v_i$. Among all equilibria, the target shareholders' payoff is highest in those in which the highest bid succeeds. Q.E.D.

Proof of Lemma 3. For a bid to succeed under competition, it would a fortiori also have to succeed absent competition. By Lemma 1, this is true if and only if condition (12) holds. Moreover, in a Pareto-dominant equilibrium, bidder 1 wins the takeover contest only if $\widehat{b}_1 \geq \widehat{b}_2$. Using expression (11), this can be written as

$$\bar{\phi} v_1 + \min\left\{(1-\overline{\phi})v_1, A_1\right\} - c \geq \bar{\phi} v_2 + \min\left\{(1-\overline{\phi})v_2, A_2\right\} - c \tag{65}$$

or

$$\min\left\{(1-\overline{\phi})v_1, A_1\right\} \geq \min\left\{(1-\overline{\phi})v_2, A_2\right\} - \overline{\phi}(v_1 - v_2). \tag{66}$$

If $(1-\overline{\phi})v_1 \leq A_1$, this condition always holds because

$$(1-\overline{\phi})v_1 > (1-\overline{\phi})v_2 - \overline{\phi}(v_1 - v_2) \geq \min\left\{(1-\overline{\phi})v_2, A_2\right\} - \overline{\phi}(v_1 - v_2). \tag{67}$$

Hence, condition (66) can be written as condition (13). Q.E.D.

Proof of Proposition 3. The result follows from comparing condition (24) with the corresponding requirement from Section 4, condition (13), noting that

$$\frac{v_1 - v_2}{\gamma} > v_1 - v_2 > \overline{\phi}(v_1 - v_2) \tag{68}$$

for all $\gamma < 1$ and $\overline{\phi} < 1$ and that $(\frac{1}{\gamma} - \overline{\phi})(v_1 - v_2)$ is decreasing in γ and $\overline{\phi}$ and increasing in $v_1 - v_2$. Q.E.D.

Proof of Lemma 12. Suppose bidder i bids b_i for voting shares and b_i^0 for non-voting shares. Who wins the takeover contest is determined solely by the bids for voting shares. Hence, in a Pareto-dominant equilibrium (for the voting shareholders), the winning bid is the highest among those satisfying $b_i \geq \overline{\phi} v_i$, if any. If bidder i fails to gain control, his bid for non-voting shares is irrelevant. (Bids for non-voting shares are conditional upon gaining control.) Conversely, if bidder i gains control, non-voting shareholders tender only if $b_i^0 \geq \overline{\phi} v_i$. In this case, the winning bidder's payoff is

$$\alpha \left(\overline{\phi} v_i - b_i\right) + (1 - \alpha) \left(\overline{\phi} v_i - b_i^0\right) + \left(1 - \overline{\phi}\right) v_i. \tag{69}$$

Given the requirement that $b_i^0 \geq \overline{\phi} v_i$, expression (69) is maximized for $b_i^0 = \overline{\phi} v_i$, in which case it becomes

$$\alpha \left(\overline{\phi} v_i - b_i\right) + \left(1 - \overline{\phi}\right) v_i, \tag{70}$$

which is the same as if bidder i did not bid for non-voting shares. Consequently, bidder i is indifferent between bidding and not bidding for non-voting shares: He makes zero profit on these shares, and they do not help him gain control. Q.E.D.

Proof of Lemma 14. The proof is analogous to that of Lemma 3 with $c = 0$ and expression (11) replaced by (54) for the bidder and

$$\widehat{b}_0 = \overline{\phi} v_0 + \frac{1}{\beta} \cdot (1 - \overline{\phi}) v_0 \tag{71}$$

for the incumbent, respectively. Q.E.D.

10 Appendix B: Example after Proposition 3

Recall that $A_1 < v_2 < A_2$ (implying that $A_1 < v_1$). The first unproven claim is that raising bidder 1's maximum offer from $\widehat{b}_1 = \overline{\phi} v_1 + A_1 - c$ to $\widehat{b}_1 = \frac{v_1 + \gamma A_1}{1 + \gamma(1 - \overline{\phi})} - c$ for all $\bar{\phi} \leq \frac{v_1 - A_1}{v_1}$

narrows the range of $\bar{\phi}-$values where the takeover outcome is inefficient, i.e., where bidder 1 loses. Given that bidder 2's maximum offer was, and still is, $\widehat{b}_2 = v_2 - c$, the takeover outcome was previously (i.e., without firm-level governance) inefficient if $\overline{\phi}v_1 + A_1 < v_2$ or $\overline{\phi} < \frac{v_2-A_1}{v_1}$. In contrast, it is now inefficient if $\frac{v_1+\gamma A_1}{1+\gamma(1-\overline{\phi})} < v_2$ or $\overline{\phi} < \frac{v_2-v_1+\gamma(v_2-A_1)}{\gamma v_2}$. To prove that $\frac{v_2-v_1+\gamma(v_2-A_1)}{\gamma v_2} < \frac{v_2-A_1}{v_1}$, it suffices to show that $\frac{v_1+\gamma A_1}{1+\gamma(1-\overline{\phi})}$ lies strictly above $\overline{\phi}v_1 + A_1$ for all $\bar{\phi} < \frac{v_1-A_1}{v_1}$. To see this, note that $\frac{v_1+\gamma A_1}{1+\gamma(1-\overline{\phi})} = \bar{\phi}v_1 + A_1$ at $\overline{\phi} = \frac{v_1-A_1}{v_1}$ with derivative $\frac{\partial}{\partial\overline{\phi}}\frac{v_1+\gamma A_1}{1+\gamma(1-\overline{\phi})}\Big|_{\overline{\phi}=\frac{v_1-A_1}{v_1}} = \gamma v_1 < v_1$. That $\frac{v_1+\gamma A_1}{1+\gamma(1-\overline{\phi})}$ is strictly increasing and convex in $\overline{\phi}$ completes the proof.

The second unproven claim is that if $\gamma \leq \frac{v_1-v_2}{v_2-A_1}$, bidder 1 wins the takeover contest for all $\overline{\phi}$. To see this, recall that $\widehat{b}_1 = \frac{v_1+\gamma A_1}{1+\gamma(1-\overline{\phi})} - c$ is strictly increasing in $\overline{\phi}$. Hence, we have that $\widehat{b}_1 \geq \widehat{b}_2 = v_2 - c$ for all $\overline{\phi}$ if $\frac{v_1+\gamma A_1}{1+\gamma} \geq v_2$ or $\gamma \leq \frac{v_1-v_2}{v_2-A_1}$. Indeed, if $\frac{A_1+v_1}{2} \geq v_2$, we have that $\frac{v_1-v_2}{v_2-A_1} \geq 1$. In this latter case, bidder 1 wins the takeover contest for all $\overline{\phi}$ even as $\gamma \to 1$.

11 Appendix C: Sales of Controlling Blocks Under the EOR/MBR

As in our main analysis, the question is whether a bid equal to the incumbent's valuation, $b_1 = b_0 = \overline{\phi}v_0 + \frac{(1-\overline{\phi})}{\beta}v_0$, is feasible—i.e., whether such a bid satisfies the bidder's participation and budget constraints.[30] If it does, then the sale of control will take place, albeit possibly at a higher price (depending on relative bargaining powers). If it does not, then the sale of control will fail, as raising the bid price only tightens the bidder's constraints.

Under the EOR/MBR, the bidder is obliged to extend his offer to minority shareholders on the same terms as his offer to the incumbent blockholder. However, this does not mean that minority shareholders will tender. Indeed, if the bidder's offer does not satisfy the free-rider condition, minority shareholders will optimally not tender (yet the control transfer may take place). This implies we must distinguish between two cases.

Case 1: $b_1 = \overline{\phi}v_0 + \frac{(1-\overline{\phi})v_0}{\beta} < \overline{\phi}v_1$. In this case, the incumbent's valuation lies below that of minority shareholders. Consequently, none of the minority shareholders tender, implying

[30] We have expressed the incumbent's valuation in terms of a measure one of shares, b_0. Cf., (55), which depicts the incumbent's valuation for his controlling block, βb_0.

the sale of control succeeds if and only if

$$\beta\bar{\phi}v_1 + (1-\overline{\phi})v_1 \geq \beta\overline{\phi}v_0 + (1-\overline{\phi})v_0 \tag{72}$$

and

$$A_1 + \beta\bar{\phi}v_1 \geq \beta\overline{\phi}v_0 + (1-\overline{\phi})v_0 \tag{73}$$

are both satisfied. Note that (72) is always satisfied as $v_1 > v_0$, whereas (73) is satisfied if and only if $\beta \geq \frac{(1-\overline{\phi})v_0 - A_1}{\overline{\phi}(v_1-v_0)}$, which is true given that Case 1 implies that $\beta > \frac{(1-\overline{\phi})v_0}{\overline{\phi}(v_1-v_0)}$. Hence, in Case 1, the sale of control always takes place.

Case 2: $b_1 = \overline{\phi}v_0 + \frac{(1-\overline{\phi})v_0}{\beta} \geq \overline{\phi}v_1$. In this case, all of the minority shareholders tender, implying the sale of control succeeds if and only if

$$v_1 \geq \overline{\phi}v_0 + \frac{(1-\overline{\phi})v_0}{\beta} \tag{74}$$

and

$$A_1 + \bar{\phi}v_1 \geq \overline{\phi}v_0 + \frac{(1-\overline{\phi})v_0}{\beta} \tag{75}$$

are both satisfied. Hence, the sale of control takes place if and only if

$$\beta \geq \max\left\{\frac{(1-\overline{\phi})v_0}{v_1-\overline{\phi}v_0}, \frac{(1-\overline{\phi})v_0}{A_1+\overline{\phi}(v_1-v_0)}\right\}. \tag{76}$$

Rearranging (76) (and noting that the RHS is strictly less than $\frac{(1-\overline{\phi})v_0}{\overline{\phi}(v_1-v_0)}$), we obtain:

Lemma A1. *Under the EOR/MBR, the bidder gains control of the target and only if*

$$\beta \geq \frac{(1-\overline{\phi})v_0}{\overline{\phi}(v_1-v_0) + \min\left\{(1-\overline{\phi})v_1, A_1\right\}}. \tag{77}$$

Condition (77), which characterizes the takeover outcome under the EOR/MBR, is the counterpart of condition (56) in our main analysis, which characterizes the outcome under the MR. Importantly, condition (77) is stricter than condition (56). To see this, we can rewrite condition (77) as

$$\beta \cdot \min\left\{(1-\overline{\phi})v_1, A_1\right\} \geq (1-\overline{\phi})v_0 - \beta\overline{\phi}(v_1 - v_0), \tag{78}$$

where the RHS is the same as in (56) but the LHS is strictly smaller. Thus, efficient sales of control are less likely to succeed under the EOR/MBR. As we explained in the main text, this is because paying a control premium also to minority shareholders tightens both the bidder's participation constraint and his budget constraint.

Proposition A1. *Efficient sales of control are less likely to succeed under the EOR/MBR than under the MR.*

In spite of Proposition A1, however, all *qualitative* results from our main analysis remain unchanged. For instance, as in Proposition 8, the likelihood that the sale of control takes place increases with β.

Proposition A2. *Under the EOR/MBR, efficient sales of control are more likely to succeed when the controlling block is large (as a fraction of the total equity value).*

Moreover, as in Corollary 3, efficient sales of control are more likely to take place when legal investor protection is strong: If $A_1 < (1-\overline{\phi})v_1$, the RHS in (77) is evidently decreasing in $\overline{\phi}$. Likewise, if $A_1 \geq (1-\overline{\phi})v_1$, the derivative of the RHS in (77) with respect to ϕ is

$$\frac{\partial}{\partial\overline{\phi}} \frac{(1-\overline{\phi})v_0}{v_1 - \overline{\phi}v_0} = \frac{v_0(v_0 - v_1)}{(v_1 - \overline{\phi}v_0)^2} < 0. \tag{79}$$

Corollary A1. *Under the EOR/MBR, stronger legal investor protection makes it more likely that efficient sales of control succeed.*

As in the our main analysis, we can finally endogenize the size of the incumbent's controlling block. Based on the two cases discussed above, the minority shareholders' payoff in the control transfer is

$$(1-\beta) \cdot \max\left\{\overline{\phi}v_0 + \frac{(1-\overline{\phi})v_0}{\beta}, \overline{\phi}v_1\right\},$$

which implies that, at the initial stage, dispersed investors are willing to pay up to this amount for the minority stake, $1-\beta$. Overall, and as long as condition (77) holds, the incumbent's total payoff at the initial stage is thus

$$\beta\overline{\phi}v_0 + (1-\overline{\phi})v_0 + (1-\beta)\cdot\max\left\{\overline{\phi}v_0 + \frac{(1-\overline{\phi})v_0}{\beta}, \overline{\phi}v_1\right\}, \tag{80}$$

which is decreasing in β. On the other hand, condition (77) becomes tighter as β decreases. Thus, and analogous to our main analysis, the incumbent chooses the smallest value of $\beta \geq 0.5$ that is compatible with condition (77):

Proposition A3. *Under the EOR/MBR, the incumbent's optimal controlling block is*

$$\beta^* = \max\left\{\frac{(1-\overline{\phi})v_0}{\overline{\phi}(v_1 - v_0) + \min\left\{(1-\overline{\phi})v_1, A_1\right\}}, 0.5\right\}. \tag{81}$$

Given that condition (77) is stricter than condition (56) (see above), the optimal controlling block under the EOR/MBR is either equal to (if $\beta^* = 0.5$) or larger (if $\beta^* > 0.5$) than the corresponding optimal controlling block under the MR in our main analysis.

Corollary A2. *The optimal controlling block is larger under the EOR/MBR than under the MR.*

Finally, based on the calculations preceding Corollary A1, the RHS in (77), and therefore also the RHS in (81), decreases with $\overline{\phi}$. Thus, as in Corollary 4, we obtain a negative correlation between ownership concentration and the quality of legal investor protection.

Corollary A3. *Under the EOR/MBR, the optimal controlling block is larger when legal investor protection is weak.*

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