

Strategic Stake Acquisitions in Rival Firms: Common vs. Cross-Ownership

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Keywords: Common Ownership, Cross Ownership, Corporate Governance, Competition

JEL Classifications: G34, L13

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Abstract

This paper examines the problem of a blockholder who controls a firm and seeks to acquire a noncontrolling stake in a rival company. The blockholder can either purchase the stake directly using personal funds or indirectly, through the firm he controls. The first option results in a pattern of *common ownership*, while the second leads to *cross-ownership*. We show that common ownership reduces competition intensity more effectively than cross-ownership and allows the blockholder to retain the benefits of the acquisition without sharing them with minority shareholders. However, this may create conflicts of interest with those shareholders, whereas cross-ownership always maintains an alignment of interests. Consequently, the blockholder may prefer cross-ownership if control over his company is not secure and could be challenged by minority shareholders.

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1 Introduction

This paper analyzes the strategic acquisition decisions of a blockholder who controls a company and aims to acquire an ownership stake in a rival firm. The blockholder faces two distinct options: direct purchase of the rival's shares using personal funds or having the controlled firm execute the acquisition. The first choice results in *common ownership*, with an investor holding stakes in competing firms, while the second leads to *cross-ownership*, with a firm holding a stake in a rival. Our objective is to investigate the optimal choice between these two acquisition modes.

Both common ownership and cross-ownership influence the behavior of the acquiring firm, which will internalize a portion of the rival's profits.¹ This reduces the intensity of competition, increasing aggregate profits and firm value. However, the gains accruing to the blockholder differ between the two modes. Common ownership has two distinct advantages: for any given size of the stake acquired in the rival firm, it increases firms' aggregate value more and allows the blockholder to retain the benefits of the acquisition without sharing them with minority shareholders. Conversely, the drawback of common ownership is the potential conflict of interest arising between the blockholder, who becomes more accommodating towards the rival after the acquisition, and his minority shareholders, who prefer more intense competition. Cross-ownership, on the other hand, always maintains an alignment of interests. If the blockholder's voting rights are below 50%, common ownership may create a risk that minority shareholders challenge control through mechanisms such as proxy fights or takeovers. If the challenge is successful, the blockholder may end up paying a premium for the stake without managing to lessen product market competition.

We construct a simple model to analytically identify and compare these effects. The model abstracts from financial constraints and assumes that the sole motive for the acquisition is the anticipated increase in firm value from reduced competition intensity.² Within this framework, we argue that the optimal choice between cross-ownership and common ownership hinges on two main factors: the nature and intensity of competition in the product market, and the effectiveness of the corporate governance structure in disciplining the controlling party.

Regarding the nature of competition, the model indicates that cross-ownership is more likely to be chosen when product-market competition exhibits strategic substitutability. In this scenario, a partial acquisition always decreases the profits of the blockholder's controlled firm, giving rise to the conflict of interest mentioned above. This factor becomes more significant the better the corporate governance structure functions to prevent the blockholder from exploiting minority shareholders. In contrast, with strategic complementarities, the profits of the acquiring blockholder's firm decrease less and may even increase if the size of the stake acquired is sufficiently

¹The acquired firm's behavior may also be influenced by the acquisition. However, our analysis abstracts from this effect, which is more controversial and in any case is the same for both acquisition modes, as discussed in greater detail below.

²Cross-ownership could be preferred if the blockholder lacks the funds for the acquisition, which are instead available to the firm he controls. See Almeida and Wolfenzon (2006) for an analysis of this effect in a related framework.

small, ensuring better alignment between the blockholder’s interests and those of minority shareholders. This favors common ownership.

Consequently, our analysis suggests that common ownership is more likely to be the preferred acquisition strategy when there are strategic complementarities in the product market and corporate governance is less effective in disciplining the controlling blockholder. Conversely, cross-ownership may be favored under strategic substitutability or when the corporate governance structure is more effective in protecting minority shareholder interests.

The rest of the paper is organized as follows. After a brief discussion of the relevant literature in Section 2, Section 3 presents the fundamental assumptions of our model. Section 4 compares common ownership and cross-ownership, weighing their advantages and disadvantages. It demonstrates that the controlling blockholder of a firm, when not facing the risk of losing control to minority shareholders, prefers direct acquisition over acquisition through the controlled firm. However, when the potential for disciplinary action by minority shareholders is significant, cross-ownership may be favored as it aligns the interests of the blockholder and minority shareholders. Section 5 presents comparative statics results. Section 6 endogenizes the size of the stake acquired in the rival firm, which in the baseline model is taken as exogenous, and shows that our results extend to this richer setting. Section 7 analyzes the case of bilateral acquisitions. Finally, Section 8 provides concluding remarks.

2 Relation to the Literature

Many papers have documented the relevance and growth of overlapping ownership in recent decades. Most of them focus on common ownership patterns arising when large institutional investors hold stakes in companies competing in the same product market. For example, Backus et al. (2021) examine S&P 500 firms and show that common ownership by financial investors more than tripled from the 1980s to 2017.³ Boot et al. (2022) conduct a similar study for European firms and find that common ownership more than doubled from 2004 to 2015. Other studies have documented the role of cross-ownership as well, where firms hold shares in other firms operating in the same industry. Cross-ownership appears to be more limited than common ownership, yet it is not negligible. For example, Huse et al. (2024) find that in the automobile industry, common ownership links represent between 31% and 39% of equity ownership, while cross-ownership links range from 6% to 9%. Some industries where cross-ownership is present are: automobiles (Alley (1997), Ono et al. (2004), Neto et al. (2020)), finance (Dietzenbacher et al. (2000)), media (Ferguson (1983)), steel (Gilo et al. (2006)), and electric power (Amundes and Bergman (2002)). Cross ownership in itself can soften the intensity of product market competition and can reinforce common ownership. Huse et al. (2024) document that in the automobile industry, over the period 2007-2021, common ownership links constitute between

³Amel-Zadeh et al. (2022) confirm the trend by expanding the analysis to include corporate insiders and non-institutional blockholders.

31% and 39% of the equity ownership, whereas cross-ownership links are in the range 6%-9%.

The industrial organization literature has long recognized that overlapping ownership can weaken product market competition. This effect is largely uncontroversial when the common owners control some of the competing companies. However, the case where the common owners hold minority stakes is still debated, even though a consensus seems to be emerging that competition is weakened in this case as well.⁴ On the empirical side, Azar et al. (2018) show that common ownership indeed increases prices in the U.S. airline industry, a finding corroborated by Park and Seo (2019). Kennedy et al. (2017) and Dennis et al. (2022) present various critiques of these empirical analyses, which however, according to Azar et al. (2022), do not invalidate their primary finding.

The most plausible mechanism through which common ownership moderates competition is probably that of Anton et al. (2023), who propose that firms with common owners implement low-powered incentive schemes for managers to maintain high prices and profits. Shekita (2021) documents three main corporate governance mechanisms – voice and engagement, executive compensation, and voting – that affect firm decision-making.⁵

The literature has also shown how partial cross-ownership can soften the intensity of competition, both in the case of Cournot (Reitman (1994), Dietzenbacher et al. (2000)) and Bertrand competition (Shelegia and Spiegel (2012)). The insights of the static models extend to the case of the infinitely repeated Cournot model (Maluog, 1992) or infinitely repeated Bertrand model (Gilo et al. (2006)).

Our analysis assumes that each firm pursues only the interests of its controlling shareholders. This alone implies that the acquiring firm becomes more accommodating after the acquisition, thereby reducing the intensity of competition. While other assumptions, such as the proportional control assumption mentioned in footnote 4, would strengthen the lessening-of-competition effect of the acquisition, this effect would be the same under both common ownership and cross-ownership and thus would not influence the choice between the acquisition modes.

To the best of our knowledge, this is the first paper to study the choice between common and cross-ownership. However, Almeida and Wolfenzon (2006) examine a similar problem in a related framework. Specifically, they consider an entrepreneur with a controlling stake in a firm who intends to initiate a new project in an unrelated market. The entrepreneur can either choose direct shareholding, financing the new project independently, or pyramidal ownership, where the existing firm finances the venture. They argue that direct shareholding is preferred if the entrepreneur does not face financial constraints, as the entrepreneur does not have to share the project's

⁴Common ownership will make firms compete less aggressively under the proportional control assumption of Rotemberg (1984) and O'Brien and Salop (2000). These authors propose that the managers of companies with heterogeneous shareholders maximize a weighted average of shareholder payoffs, with weights corresponding to their ownership shares. Consequently, under common ownership, each firm maximizes a linear combination of its own and its rivals' profits. The higher the weight attributed to rivals' profits, the less aggressively firms compete in product markets.

⁵See Schmalz (2021) for a review of this and other possible governance mechanisms through which common ownership may affect competitive outcomes.

benefits with minority shareholders. This effect is also present in our setting. However, Almeida and Wolfenzon (2006) do not consider the impact of the investment mode on product market competition, nor do they examine the conflict of interest between the blockholder and minority shareholders. These issues arise specifically in the framework analyzed in this paper. On the other hand, our analysis abstracts from financial constraints, which instead play a crucial role in their analysis.

Levy et al. (2018) examine the effects of partial vertical integration. They demonstrate that while the downstream firm gains from integration, the minority shareholders of the upstream firm may incur losses. This observation mirrors our finding that cross-ownership may create a conflict of interest with minority shareholders. Furthermore, they endogenize the degree of integration, arguing that partial integration, where only a controlling stake in the other firm is acquired, may be optimal. As noted, while we initially treat the stake to be acquired as exogenous, later we endogenize it as well, along the lines of Denicolò and Panunzi (2023).

3 The Basic Model

In this section, we lay out the building blocks of the model that will be analyzed in the following sections.

3.1 Players

We consider two firms, $i = 1, 2$, competing in the same product market. In firm 1, a blockholder, denoted as B_1 , owns a fraction $\alpha < \frac{1}{2}$ of the shares, while the remaining fraction $1 - \alpha$ is dispersed among many small shareholders. As for firm 2, for simplicity, we assume that it is wholly owned by blockholder B_2 .⁶

B_2 is willing to sell a fraction s of his shares. B_1 has the option to acquire the stake s directly, using personal wealth or funds borrowed in a perfect capital market (resulting in *common ownership*), or have firm 1 execute the acquisition (leading to *cross-ownership*). Initially, we take s as exogenously given, assuming that $s \leq \alpha$. Later, we will endogenize it. This however necessitates the introduction of additional elements into the model, which, for the time being, we can abstract from.

3.2 Timing

We model the partial acquisition as a three-stage game. In the first stage, B_1 decides whether to acquire the minority stake s in firm 2 directly or through firm 1 and negotiates the acquisition price with B_2 . In the second stage, the minority shareholders of firm 1 can wrest control away from the blockholder, replacing him with a manager of their own choice. Finally, in the last stage of the game, the firms compete in the product market.

⁶This assumption will be relaxed when we analyze bilateral acquisitions in Section 5, where we assume complete symmetry between the two firms.

3.3 Payoffs and objectives

At the product-market competition stage, firms aim to maximize their controlling shareholders' payoffs. Denote blockholders' payoffs as U_i and firms' profits as Π_i .

Suppose for now that each company is controlled by its respective blockholder, and consider firm 1 first. Before the acquisition, B_1 's payoff is simply a share α of firm 1's profit, $U_1 = \alpha\Pi_1$. Therefore, firm 1 will maximize Π_1 .

After the acquisition, B_1 's payoff changes. In the case of common ownership, it becomes $U_1 = \alpha\Pi_1 + s\Pi_2$ (minus the acquisition price, which, however, is predetermined at the product-market competition stage). In the case of cross-ownership, instead, it is $U_1 = \alpha(\Pi_1 + s\Pi_2)$.

In both cases, if B_1 retains control over firm 1, firm 1 will assign a positive weight to firm 2's profit. Denoting this weight as λ , firm 1 will thus be maximizing $\Pi_1 + \lambda\Pi_2$, where $\lambda = s$ under cross-ownership, and $\lambda = \frac{s}{\alpha}$ under common ownership. As long as $\lambda > 0$, firm 1 will become more accommodating, leading to a reduction in competition intensity.⁷

On the other hand, firm 2 will always maximize Π_2 , as B_2 's payoff is proportional to Π_2 even after the divestiture, when it becomes $U_2 = (1 - s)\Pi_2$. As noted, recent contributions in industrial organization have suggested that firm 2 may also consider the interests of the new minority shareholder. This potentially provides another reason why competition may become less intense. Here, however, we abstract from this effect. In our analysis, the reduction in competition intensity stems exclusively from changes in the behavior of the acquiring firm due to the change in its controlling stakeholder's objectives. In any case, accounting for the change in firm 2's behavior would not alter our main results because, for any given s , the effect would be similar under both common and cross-ownership, thus not influencing the choice between the two.

3.4 Product market competition

Each firm i chooses an action x_i , such as a price or output level, and obtains a profit, $\Pi_i(x_i, x_j)$, that depends on its own action and that of the rival firm, x_j . Since firm 1 will be maximizing $\Pi_1(x_1, x_2) + \lambda\Pi_2(x_1, x_2)$, it appears that the equilibrium strategies depend on λ . Accordingly, we will denote these strategies as $x_1^*(\lambda)$ and $x_2^*(\lambda)$, and the resulting profits as $\Pi_1^*(\lambda)$ and $\Pi_2^*(\lambda)$.

In the Appendix, we present an example where the nature of the actions x_i , demand, and costs are fully specified, leading to specific functional forms for the profit functions. Most of our analysis, however, requires only the following regularity conditions.

A1: Firm 2's profits $\Pi_2^*(\lambda)$ and industry profits $\Pi_1^*(\lambda) + \Pi_2^*(\lambda)$ increase in λ for any $\lambda \in [0, 1]$.

⁷The assumption $s \leq \alpha$ implies that λ cannot exceed one. In other words, the assumption rules out the possibility that, under common ownership, firm 1 may give more weight to the profit of the rival than to its own profit when making product market competition choices.

A2: There exists $\bar{\lambda} \in [0, 1)$ such that $\Pi_1^*(\lambda)$ is increasing in λ for $\lambda < \bar{\lambda}$ and decreasing for $\lambda > \bar{\lambda}$.

A3: If $\bar{\lambda} > 0$, there exists $\tilde{\lambda} \in (\bar{\lambda}, 1)$ such that $\Pi_1^*(\tilde{\lambda}) = \Pi_1^*(0)$.

Assumption A1 states that the rival benefits, and industry profits increase, as firm 1 becomes more accommodating. This property holds in most models of product market competition. It is this property, and more specifically the positive effect of λ on industry profits, that makes the acquisition profitable. In our model, the sole reason why B_1 is interested in acquiring the stake s from B_2 is indeed to capitalize on the increase in firm value generated by the acquisition.

Assumption 2 states that the profit of firm 1 may either always decrease in λ or follow an inverted-U shape. As shown in the Appendix, the former tends to arise when the actions x_i are strategic substitutes, while the latter arises when they are strategic complements. Assumption 3 states that in this latter case, firm 1's profit, while initially increasing, must eventually drop below the profit obtained without the acquisition as λ increases further.

Figure 1 illustrates this pattern for the example presented in the Appendix. It shows that $\Pi_1^*(\lambda)$ always decreases with λ under Cournot competition. With Bertrand competition, on the other hand, $\Pi_1^*(\lambda)$ first increases and then decreases as λ increases.

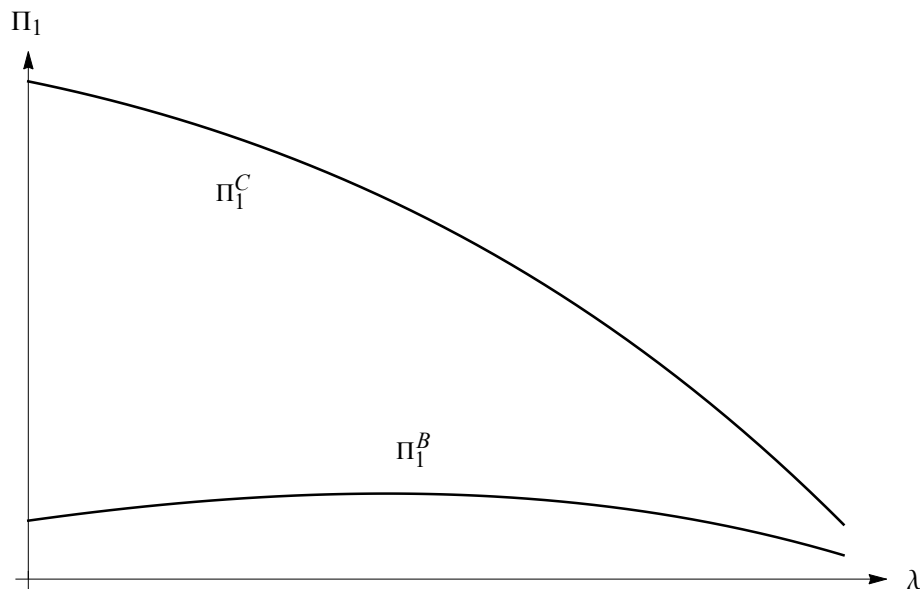


Figure 1: The profit of firm 1 as a function of λ in the case of Cournot and Bertrand competition for the linear-demand constant marginal cost example presented in the Appendix. The figure has been drawn for a value of the product differentiation parameter γ equal to $\frac{3}{4}$.

3.5 Fight over control

While our assumptions imply that B_2 always controls firm 2, the situation of firm 1, where B_1 holds only a stake $\alpha < \frac{1}{2}$, is more complex. Under cross-ownership, both B_1 and his minority shareholders' payoffs simply consist of a share of the cash flow generated by firm 1. Consequently, there is no conflict of interest, and it is natural to assume that the minority shareholders remain passive. As a result, B_1 will wield control over firm 1, dictating its product-market competition choices.

If B_1 acquires the stake s in firm 2 directly, however, his payoff is no longer solely a fraction of the cash flow generated by firm 1, as discussed above. Under common ownership, therefore, B_1 's interests are thus no longer perfectly aligned with those of his minority shareholders. Specifically, B_1 now desires firm 1 to engage in less intense competition than its minority shareholders would prefer.

Our assumption that $\alpha < \frac{1}{2}$ makes this conflict of interests consequential, as B_1 could potentially lose control of firm 1. For example, minority shareholders can vote against the blockholder in a proxy fight.⁸ More generally, minority shareholders could somehow manage to form a coalition to replace B_1 as the firm's manager, appointing instead an alternative manager who is instructed to maximize firm 1's profit.⁹

For the sake of generality, we do not model the fight for control of firm 1 explicitly but adopt a reduced-form formulation. That is, we simply assume that the probability of the fight succeeding, denoted as z , is an increasing function $z = \Psi[\Pi_1^*(0) - \Pi_1^*(\lambda)]$ of the loss of profit caused by the acquisition, with $\Psi(0) = 0$. If the fight succeeds, and the new manager appointed by minority shareholders maximizes Π_1 , the acquisition will not lessen competition, and the firms' profits remain unchanged from before the acquisition.

3.6 Acquisition price

The mode of acquisition, common ownership or cross-ownership, is chosen by B_1 . Not being financially constrained,¹⁰ B_1 will simply choose the mode that maximizes his post-acquisition payoff. This depends on the acquisition price, which is determined through negotiations between B_1 and B_2 .¹¹

⁸A proxy fight occurs when a group of shareholders in a firm combines forces to vote out the current management or board of directors to take control of the firm. The ultimate goal of a proxy fight is to gather enough shareholder votes to achieve desired outcomes.

⁹Another scenario is a hostile takeover challenging B_1 's control. However, this mechanism would require relaxing the assumption of atomistic minority shareholders. With atomistic shareholders, hostile takeovers face the well-known free-rider problem analyzed by Grossman and Hart (1980): since each shareholder tenders their share only if the bid is at least as large as the post-takeover share value, the raider cannot profit unless he already owns a toehold before the tender offer (Shleifer and Vishny (1986)) or can appropriate private benefits of control.

¹⁰As noted, financial constraints are instead a crucial ingredient in the analysis of Almeida and Wolfenzon (2006), which aims to explain why pyramids can be preferred to direct shareholding.

¹¹We assume that in the case of cross-ownership, B_1 negotiates on behalf of firm 1. This assumption is not restrictive if one rules out side payments between B_1 and B_2 , as in this case there is no conflict of interest between B_1 and his minority shareholders.

To model these negotiations, we adopt the generalized Nash bargaining solution. That is, we assume that the agreement maximizes the generalized Nash product:

$$W = (U_1 - \bar{U}_1)^\mu (U_2 - \bar{U}_2)^{1-\mu}$$

where $\bar{U}_i$ denotes the players' disagreement payoffs and $\mu \in [0, 1]$ the bargaining power of the acquirer, B_1 . This implies that bargaining is efficient, ensuring that the acquisition, which boosts industry profits and generates a positive bargaining surplus, will always occur. It also implies that when rents can be transferred from B_1 to B_2 on a one-to-one basis so that the payoff frontier has a slope of -1 , B_1 will obtain a share μ of the bargaining surplus. As we will see, this property holds under common ownership, but not under cross-ownership. In this latter case, B_1 will obtain less than a share μ of the bargaining surplus.¹²

4 Exogenous Stake

This section compares cross-ownership and common ownership for a given stake s . Section 6 will extend the comparison to the case where the stake is determined endogenously, possibly depending on the acquisition mode.

4.1 The advantages of common ownership

We start by identifying the advantages of common ownership over cross-ownership. To this end, we assume for the time being that B_1 always retains control over firm 1. In other words, we assume that $z = 0$ irrespective of the value of $\Pi_1^*(0) - \Pi_1^*(\lambda)$.

Proposition 1 *If B_1 is sure of retaining control of firm 1, he always prefers common ownership over cross-ownership for any given stake s to be acquired.*

Proof. To prove the proposition, we compare B_1 's payoff under the two acquisition modes.

To begin with, note that when the blockholders bargain over the acquisition price, the disagreement payoffs are $\bar{U}_1 = \alpha\Pi_1^*(0)$ and $\bar{U}_2 = \Pi_2^*(0)$, both with common and cross-ownership. It is then convenient to re-normalize the payoffs relative to this disagreement point, defining:

$$u_i = U_i - \bar{U}_i$$

as the gain obtained by B_i relative to the disagreement payoff.

Under common ownership, since the two blockholders collectively own the entire firm 2 and a share α of firm 1 both before and after the acquisition, the bargaining surplus is:

$$S_{CO} = \alpha\pi_1^*\left(\frac{s}{\alpha}\right) + \pi_2^*\left(\frac{s}{\alpha}\right) > 0,$$

¹²Note that we do not rule out negative prices. Imposing a nonnegative acquisition price would not significantly affect the main conclusions of our model.

where:

$$\pi_i^*(\lambda) = \Pi_i^*(\lambda) - \Pi_i^*(0)$$

denotes the change in firm i 's equilibrium profit due to the acquisition.

Note that S_{CO} rewrites as:

$$S_{CO} = \alpha \left[\pi_1^* \left(\frac{s}{\alpha} \right) + \pi_2^* \left(\frac{s}{\alpha} \right) \right] + (1 - \alpha) \pi_2^* \left(\frac{s}{\alpha} \right).$$

Assumption 1 implies that both terms on the right-hand side are positive, revealing that the bargaining surplus is positive. This reflects the lessening-of-competition effect of common ownership.

Since the two blockholders can utilize the acquisition price to transfer rents from one another on a one-to-one basis, the payoff frontier,

$$u_1 = S_{CO} - u_2,$$

has a slope of -1 . It is then straightforward to verify, using the Nash bargaining solution, that B_1 's payoff under common ownership is:

$$u_1^{CO} = \mu \left[\alpha \pi_1^* \left(\frac{s}{\alpha} \right) + \pi_2^* \left(\frac{s}{\alpha} \right) \right].$$

Under cross-ownership, the derivation of the payoff frontier is more complex as the level of the bargaining surplus depends on the way it is divided among the players. To proceed, consider the limiting case where B_2 has no bargaining power ($\mu = 1$). In this case, the acquisition price is lowered to the point where B_2 neither gains nor loses from the acquisition. Denoting this acquisition price as $\tilde{P}_{CR}$, we have:

$$s\Pi_2^*(s) + \tilde{P}_{CR} = \Pi_2^*(0).$$

In this limiting scenario, the bargaining surplus would be obtained entirely by B_1 and it would be:

$$S_{CR} = \alpha \left[\Pi_1^*(s) + (1 - s)\Pi_2^*(s) - \tilde{P}_{CR} - \Pi_1^*(0) \right] = \alpha [\pi_1^*(s) + \pi_2^*(s)].$$

The bargaining surplus is just a share α of the increase in industry profits, as the remaining share is reaped by firm 1's minority shareholders.

However, if $\mu < 1$, the acquisition price must be higher than $\tilde{P}_{CR}$ for B_2 to obtain a share of the bargaining surplus. Consequently, minority shareholders will benefit less from the acquisition, resulting in a bargaining surplus higher than S_{CR} , and this effect becomes more pronounced as μ increases.

To be precise, when the acquisition price, and hence B_2 's payoff, increases by one dollar, B_1 will lose α dollars and the minority shareholders $(1 - \alpha)$ dollars. Therefore, the payoff frontier under cross-ownership has a slope of $-\frac{1}{\alpha}$:

$$u_1 = S_{CR} - \frac{u_2}{\alpha}.$$

With this new payoff frontier, the Nash bargaining solution becomes:

$$u_1^{CR} = \alpha \mu [\pi_1^*(s) + \pi_2^*(s)].$$

Comparing B_1 's equilibrium payoff under common and cross-ownership, one gets:

$$u_1^{CO} - u_1^{CR} = \mu \left[\alpha \pi_1^* \left(\frac{s}{\alpha} \right) + \pi_2^* \left(\frac{s}{\alpha} \right) - \alpha \pi_1^*(s) - \alpha \pi_2^*(s) \right].$$

Now, the term inside square brackets on the right-hand side of this expression rewrites as:

$$\alpha \left[\pi_1^* \left(\frac{s}{\alpha} \right) + \pi_2^* \left(\frac{s}{\alpha} \right) - \pi_1^*(s) - \pi_2^*(s) \right] + (1 - \alpha) \pi_2^* \left(\frac{s}{\alpha} \right).$$

Assumption 1 implies that both terms of the above expression are positive, implying that $u_1^{CO} > u_1^{CR}$. ■

To gain intuitive insight, consider the limiting case $\mu = 1$, meaning B_1 has all the bargaining power. In this scenario, under common ownership, B_1 captures the entire increase in firm 2's profits, while under cross-ownership, he only receives a share α of it, with the remaining portion going to minority shareholders. Put differently, under cross-ownership, minority shareholders fully share in the benefits of the acquisition. In contrast, under common ownership, minority shareholders do not receive any portion of the increase in firm 2's profits. Consequently, they might lose from the acquisition, which is indeed the case if $\pi_1^* \left(\frac{s}{\alpha} \right) < 0$. Furthermore, for any given stake s , the reduction in competition resulting from the acquisition is greater under common ownership, as $\frac{s}{\alpha} > s$. This is because a larger portion of B_1 's payoff stems from firm 2's profits when he acquires the share directly rather than indirectly, thereby giving him a stronger incentive to compete less intensely.

In summary, when $\mu = 1$, under common ownership, the blockholder secures a larger share of a larger surplus, implying that B_1 prefers acquiring the stake s directly rather than having it acquired by firm 1. As μ decreases below 1, the difference between the bargaining surplus under common and cross-ownership diminishes and may even change sign if μ is sufficiently small. However, a new effect then comes into play: under the Nash bargaining solution, B_1 receives a lower share of the bargaining surplus under cross-ownership, because rents cannot be transferred from B_2 to B_1 on a one-to-one basis. This new effect implies that our conclusion remains unchanged even as B_2 's bargaining power increases.

4.2 The disadvantages of common ownership

Proposition 1 highlights a fundamental advantage of common ownership over cross-ownership. However, the downside of common ownership is that it may create a conflict of interest between B_1 and the minority shareholders of firm 1. Specifically, a conflict of interest arises if $\pi_1^* \left(\frac{s}{\alpha} \right) < 0$. In the rest of this section, we assume that this inequality indeed holds.

The conflict arises because B_1 's income is $\alpha \Pi_1^*(\lambda) + s \Pi_2^*(\lambda)$, whereas the income of minority shareholders comes entirely from firm 1's profit. This implies that minority

shareholders would prefer firm 1 to compete more aggressively than the blockholder does. In contrast, cross-ownership maintains alignment of incentives between B_1 and the minority shareholders.

This conflict of interest poses a challenge for the blockholder if minority shareholders can contest his control over the firm. To make the analysis interesting, assume that the probability of the blockholder losing control of his firm as a consequence of the acquisition is positive: $z = \Psi \left[-\pi_1^* \left(\frac{s}{\alpha} \right) \right] > 0$.¹³ In this case, B_1 might incur a loss if the price paid for the stake s includes a premium. Assume that players are risk-neutral and correctly anticipate the probability of B_1 losing control over firm 1.

Proposition 2 *If $\pi_1^* \left(\frac{s}{\alpha} \right) < 0$, there exists a threshold $\tilde{z}$ such that common ownership is preferred when the probability that B_1 loses control over his firm is lower than the threshold, $z \leq \tilde{z}$, while cross-ownership becomes preferable otherwise.*

Proof. Proceeding as in the proof of Proposition 1, one sees that since the bargaining surplus now materializes only with probability $1 - z$, B_1 's payoff under common ownership is:

$$u_1^{CO} = \mu(1 - z) \left[\alpha \pi_1^* \left(\frac{s}{\alpha} \right) + \pi_2^* \left(\frac{s}{\alpha} \right) \right].$$

This vanishes when $z = 1$ and, according to Proposition 1, it is greater than u_1^{CO} when $z = 0$. The result then follows by continuity. ■

5 Comparative statics

Now that we have identified the advantages and disadvantages of each acquisition mode, we will analyze the factors that determine which one is more likely to be adopted. To do this, we make additional assumptions that enable us to further parameterize the model.

First, we focus on a simple, specific model of product-market competition. We assume that each firm $i = 1, 2$ supplies a single product, the inverse demand for which is:

$$p_i = 1 - q_i - \gamma q_j,$$

where p_i is the price and q_i is the output level. The parameter $\gamma \in [0, 1]$ represents the degree of product differentiation: when $\gamma = 1$, the products are perfect substitutes; when $\gamma = 0$, they are independent. Production costs are normalized to zero. We consider both the case where firms compete in quantities (Cournot) and prices (Bertrand).

The formulas for equilibrium profits for each case are reported in the Appendix, which also verifies that Assumptions 1-3 hold. In this example, the parameter γ may be regarded as an index of the intensity of competition: when $\gamma = 0$ there are two separate monopolies so firms effectively do not compete; when instead $\gamma = 1$, the product becomes homogeneous and competition is fiercest. The intensity of

¹³In this section, we consider a constant z . Later on, we will allow z to be an increasing function of $-\pi_1^* \left(\frac{s}{\alpha} \right)$.

competition also depends on whether firms compete in prices or quantities, with Cournot corresponding to less aggressive competition than Bertrand.

Second, we posit a piecewise linear function $\Psi(\cdot)$, so that the probability of B_1 losing control over his company is:

$$z = \begin{cases} 1 & \text{if } \sigma\pi_1^*\left(\frac{s}{\alpha}\right) > 1 \\ \sigma\pi_1^*\left(\frac{s}{\alpha}\right) & \text{if } 0 \leq \sigma\pi_1^*\left(\frac{s}{\alpha}\right) \leq 1 \\ 0 & \text{if } \sigma\pi_1^*\left(\frac{s}{\alpha}\right) < 0, \end{cases}$$

for some positive parameter σ . Using this parametrization, we can identify three main factors determining the optimal acquisition mode.

First, a higher σ , indicating a more effective corporate governance structure, makes cross-ownership more likely to be preferred. This is an immediate consequence of Proposition 2. When σ is close to zero, the risk of losing control is negligible, and thus the comparison between common and cross-ownership is entirely driven by the factors highlighted in Proposition 1. When instead σ is large (and $\pi_1^*\left(\frac{s}{\alpha}\right) < 0$) common ownership is too risky, and B_1 opts for cross-ownership.

Second, a higher stake to be acquired, s , makes common ownership less likely to be preferred. In fact, common ownership is always the optimal acquisition mode when s is small. Under Bertrand competition, this follows from the fact that $\pi_1^*\left(\frac{s}{\alpha}\right) > 0$ when s is small, implying that minority shareholders welcome the acquisition, and the probability of losing control vanishes. For the case of Cournot competition, the result depends on our specific functional forms, which imply that the negative effect of a positive but small s on the risk of losing control is always dominated by its positive effect on industry profits, as is demonstrated in the Appendix. As s grows large, cross-ownership may become preferable. Intuitively, the higher s is, the greater the profit loss $-\pi_1^*\left(\frac{s}{\alpha}\right)$, and thus the probability of B_1 losing control of his company increases. In this parametrized model, it turns out that this effect is dominant and there is no re-switching of acquisition modes.

Third, common ownership is more likely to be preferred under Bertrand competition than under Cournot competition. Under Cournot competition, a partial acquisition always decreases the profits of firm 1, giving rise to a conflict of interest with minority shareholders and the consequent risk of losing control. In contrast, under Bertrand competition, the profits of firm 1 decrease less and may even increase if the size of the stake acquired is sufficiently small. This occurs because when firm 1 becomes more accommodating and raises its price, firm 2 reacts by raising its price as well, potentially benefiting both firms. Conversely, under Cournot competition, firm 2 increases its output in response to firm 1's more accommodating stance, which harms firm 1. The different response of the rival to the change in firm 1's behavior explains why under Bertrand competition there is better alignment between the blockholder's interests and those of minority shareholders under common ownership, clearly favoring this acquisition mode.

While Bertrand competition is more favorable to common ownership than Cournot competition, one cannot say that more intense competition always favors common ownership. Indeed, a higher γ , indicating that the products are closer substitutes and hence competition is more intense, always favors cross-ownership under Cournot competition. Additionally, it also favors cross-ownership under Bertrand competition as long as γ is not too large. Therefore, the effect of more intense competition on the choice of the acquisition mode is generally ambiguous.

6 Endogenous Stakes

This section endogenizes the size of the stake s , which has thus far been treated as exogenous. It demonstrates that the insights obtained from the case of an exogenous stake extend to richer settings, and it reveals new effects that influence the comparison between common and cross-ownership.

Assumption A1 implies that a higher stake always increases industry profits. Therefore, endogenizing the stake requires introducing countervailing effects into the model. We explore two such effects.

First, when the probability of a change in the company's control depends on the profits of the acquiring firm, the blockholder may acquire a lower stake than is feasible to increase the chance of retaining control. However, this effect operates only under common ownership, leaving the stake under cross-ownership as exogenous.

Second, the acquisition may degrade the corporate governance of the acquired company, as discussed in Denicolò and Panunzi (2023). We now consider each effect in turn.

6.1 Disciplinary actions

Suppose that the blockholders can choose any size of the stake s within an interval $[0, \bar{s}]$, where $\bar{s} < \alpha$. The negotiations between the blockholders now determine both the acquisition price and the stake s . Increasing s up to $\bar{s}$ maximizes the increase in industry profits in case B_1 retains control over his company. However, if control of firm 1 is contestable, B_1 may opt for acquiring a lower stake under common ownership to reduce the likelihood of a control shift.

Such concerns do not arise under cross-ownership. Therefore, under cross-ownership, the equilibrium stake is always $s_{CR}^* = \bar{s}$. If $\pi_1^* \left(\frac{\bar{s}}{\alpha} \right) \geq 0$, the concern does not arise under common ownership either. In this case, therefore, we will have $s_{CO}^* = s_{CR}^* = \bar{s}$, and Proposition 1 implies that common ownership is always preferred to cross-ownership.

However, if $\pi_1^* \left(\frac{\bar{s}}{\alpha} \right) < 0$, a trade-off arises under common ownership. The equilibrium stake is selected to maximize the bargaining surplus:

$$S_{CO} = [1 - \Psi(\pi_1^*)] (\alpha \pi_1^* + \pi_2^*),$$

where equilibrium profits are evaluated at $\lambda = \frac{\bar{s}}{\alpha}$. Since the slope of the payoff frontier is -1 , B_1 will then obtain a share μ of S_{CO} and B_2 the remaining share

$(1 - \mu)$. Now, the change in the bargaining surplus caused by a marginal increase in s is:

$$\frac{1 - \Psi(\pi_1^*)}{\alpha} \left[\pi_1^{*'} + \frac{1}{\alpha} \pi_2^{*'} \right] + \frac{1 - \Psi(\pi_1^*)}{\alpha} \pi_1^{*'} \Psi'(\pi_1^*) \left[\pi_1^* + \frac{s}{\alpha} \pi_2^* \right]. \quad (1)$$

The first term is positive, as demonstrated in the proof of Proposition 1, representing the softening-of-competition effect of common ownership. However, the second term is negative if $\pi_1^* \left(\frac{\bar{s}}{\alpha} \right) < 0$. It reflects the risk that the minority shareholders may initiate a proxy fight to replace B_1 and highlights that the risk increases with s . If this effect is sufficiently strong, we may have $s_{CO}^* < \bar{s}$.

Even if $s_{CO}^* < s_{CR}^* = \bar{s}$, the comparison between common ownership and cross-ownership rests on the same effects highlighted in Proposition 2. However, in the current context, common ownership is more likely to be favored compared to situations with exogenous stakes. This preference stems from B_1 having additional flexibility compared to the case where $s = \bar{s}$. This extra flexibility holds no value under cross-ownership but can prove valuable under common ownership.

6.2 Private benefits extraction

In the model we have just analyzed, the stake s is semi-endogenous: endogenous under common ownership but fixed to the exogenous upper bound in the case of cross-ownership. We now propose a different modeling strategy that fully endogenizes the stake. This approach views overlapping ownership as not only softening competition but also undermining corporate governance, a concept formalized in Denicolò and Panunzi (2023).

Specifically, we assume that blockholder B_2 can extract private benefits of control by diverting a fraction of firm 2's profit.¹⁴ Following Burkart et al. (1998), this profit diversion entails a deadweight loss, rendering it inefficient. Consequently, B_2 will refrain from engaging in profit diversion when he is the sole owner of firm 2. However, once he sells a positive stake s , an incentive to divert profits inefficiently arises. Moreover, the greater the stake, the stronger the incentive becomes. The equilibrium level of overlapping ownership balances the benefit of softer competition against the cost of poorer corporate governance.

6.2.1 Assumptions

To formally analyze this mechanism, let us denote the fraction of profits diverted by B_2 as $d \in [0, 1]$. We assume constant returns to scale in the technology used to extract private benefits, meaning that the deadweight loss is also proportional to firm 2's profits, $\mathcal{L}(d)\Pi_2^*$. We assume that the fraction $\mathcal{L}$ increases at an increasing rate with d : $\mathcal{L}'(d) > 0$ and $\mathcal{L}''(d) > 0$. Additionally, we assume $\mathcal{L}(0) = 0$ and impose the conditions $\mathcal{L}'(0) = 0$ and $\mathcal{L}'(1) > 1$.

The variable d is chosen by B_2 to maximize his payoff, which, after selling a stake

¹⁴The possibility that B_1 too extracts private benefits of control is not relevant for the analysis as long as one focuses on the case of unilateral acquisition.

s , is given by:

$$[(1-s)(1-d) + d - \mathcal{L}(d)] \Pi_2^*.$$

The payoff includes B_2 's residual cash-flow rights, $(1-s)(1-d)$, and the private benefits he extracts, net of the deadweight loss, $d - \mathcal{L}(d)$. Both terms are proportional to firm 2's profits. This property, which is implied by the assumption of constant returns to scale, facilitates the analysis as the choice of d becomes independent of product market competition.

For simplicity, we focus on the case where B_1 is certain to retain control of his company. The issues created by the conflicts of interest arising under common ownership remain unchanged, and they could be incorporated into the analysis along the same lines as in the previous section.

6.2.2 Analysis

Clearly when $s = 0$ the blockholder chooses $d = 0$. However, when $s > 0$, he will select a positive level of profit diversion. Specifically, the equilibrium level of profit diversion, denoted as d^* , is determined by the first-order condition:

$$\mathcal{L}'(d^*) = s.$$

From the second-order condition, it follows that the higher the stake that B_2 sells, the more he will engage in inefficient profit diversion. This represents a cost of both cross- and common ownership in this model.¹⁵

Profit diversion also affects firms' objectives. Since a stake s in firm 2 now generates a cash flow of $s[(1 - \mathcal{L}(d^*(s)))] \Pi_2^*$, under common ownership, the weight firm 1 attaches to the rival's profit is

$$\lambda_{CO} = \frac{s[(1 - \mathcal{L}(d^*(s)))]}{\alpha}.$$

By the same logic, under cross-ownership, the weight is:

$$\lambda_{CR} = s[(1 - \mathcal{L}(d^*(s)))] .$$

Both weights are lower than in the baseline model. However, it remains true that the softening-of-competition effect of any given stake s is higher under common ownership.

The deadweight loss from private benefits extraction reduces the bargaining surplus by an amount equal to $\mathcal{L}(d^*(s)) \Pi_2^*(\lambda)$. For any given stake s , the reduction is greater under common ownership, as firm 2's profit is higher. Nevertheless, Proposition 1 still holds. This can be seen by noting that for any given s_{CR} , the blockholder can reproduce, under common ownership, the same softening-of-competition effect

¹⁵Denicolò and Panunzi (2023) also analyze other reasons why overlapping ownership may weaken corporate governance. These include the possibility that when firms are managed by executives, reducing blockholder B_2 's residual stake $1 - s$ may diminish his incentive to monitor the managers, as well as the possibility that blockholder B_2 may have less incentive to engage in privately costly efforts that could enhance the firm's profitability.

of cross-ownership by setting s_{CO} such that:

$$\frac{s_{CO} [(1 - \mathcal{L}(d^*(s_{CO})))]}{\alpha} = s_{CR} [(1 - \mathcal{L}(d^*(s_{CR})))] .$$

The existence of a solution to this equation can be established by noting that when $s_{CO} = s_{CR}$, the left-hand side is higher than the right-hand side as $\alpha < 1$, whereas when $s_{CO} = 0$, the left-hand side vanishes and thus is lower than the right-hand side. By continuity, a value of $s_{CO} < s_{CR}$ that generates the same product-market equilibrium as s_{CR} therefore exists.¹⁶ And since $s_{CO} < s_{CR}$, the deadweight loss caused by the extraction of private benefits is lower. Therefore, the joint payoff of the two blockholders is higher.

In summary, the above argument demonstrates that for any given s_{CR} , there exists an s_{CO} such that the bargaining surplus, if B_1 is sure of retaining control of his company, is higher under common ownership. As a result, common ownership is the superior acquisition mode even with endogenous stakes.

The above argument also highlights an additional reason why common ownership dominates cross-ownership: it allows for the same benefits in terms of reduced competition at a lower cost in terms of degraded corporate governance.

Note that it remains uncertain whether, in equilibrium, the optimal stake s will be higher under common or cross-ownership. This uncertainty arises because a marginal increase in s has a bigger softening-of-competition effect under common ownership, but it also entails a greater increase in the deadweight loss from private benefit extraction, as $\Pi_2^*(\frac{s}{\alpha}) > \Pi_2^*(s)$. Either effect can prevail.¹⁷

7 Bilateral acquisitions

So far, our focus has been on unilateral acquisitions. This section demonstrates that our insights also apply to bilateral acquisitions.

When analyzing the bilateral case, it is convenient to posit full symmetry. Therefore, we assume that initially, each blockholder owns a fraction $\alpha < \frac{1}{2}$ of his firm, with the remaining shares dispersed among atomistic shareholders. Each blockholder then sells a stake $s < \frac{\alpha}{2}$ to either the other blockholder (common ownership) or to the other firm (cross-ownership). The stakes are purchased solely from the blockholders due to the free-riding among dispersed shareholders. For simplicity, we revert to the scenario where the size of the stake, s , is exogenous.

¹⁶Note that there may be values $s_{CO} > s_{CR}$ that satisfy the condition, but they are suboptimal compared to the smaller values.

¹⁷While we have analyzed the choice between common and cross-ownership as alternatives, they could be implemented jointly. Intuitively, since common ownership is more profitable for the blockholder but is limited by the threat of losing control, the blockholder might acquire as much as he can directly while keeping the risk of losing control limited, and acquire the rest through his controlled company. For example, assume Bertrand competition, and suppose that disciplinary action is certain when profits fall below their value under no acquisition. With a stake s_{CO} acquired directly and a stake s_{CR} acquired indirectly through firm 1, it is easy to see that $\lambda = \frac{s_{CO}}{\alpha} + s_{CR}$. The blockholder can then choose any combination of direct and indirect acquisition such that directly a stake such that $\Pi_1^*(\frac{s_{CO}}{\alpha} + s_{CR}) \geq \Pi_2^*(0)$.

Even after the acquisitions, each blockholder retains a controlling share of $\alpha - s > s$ of his firm and thus makes decisions regarding product market competition. Therefore, at the product-market competition stage, each firm i now aims to maximize

$$(\alpha - s)\Pi_i(x_i, x_j) + s\Pi_j(x_j, x_i)$$

under common ownership, and

$$(\alpha - s) [\Pi_i(x_i, x_j) + s\Pi_j(x_j, x_i)]$$

under cross-ownership. Therefore, denoting by λ_i the weight given to the rival's profit, we have $\lambda_i = \frac{s}{\alpha - s}$ if both blockholders opt for direct acquisition, and $\lambda_i = s$ if they have the acquisitions made by their controlled companies. Since the weights of both firms can now be positive, we write the equilibrium profits as $\Pi_1^*(\lambda_1, \lambda_2)$ and $\Pi_2^*(\lambda_1, \lambda_2)$.

Assumptions A1-A3 need to be adjusted for the new scenario, even though their interpretation remains unchanged.

A1': For any λ_j , both firm i 's profit, $\Pi_i^*(\lambda_i, \lambda_j)$, and industry profits, $\Pi_i^*(\lambda_i, \lambda_j) + \Pi_j^*(\lambda_i, \lambda_j)$, increase with λ_i .

A2': For any λ_j , there exists $\bar{\lambda}(\lambda_j) \in [0, 1]$ such that $\frac{\partial \Pi_i^*}{\partial \lambda_i} > 0$ for $\lambda_i < \bar{\lambda}(\lambda_j)$ and $\frac{\partial \Pi_i^*}{\partial \lambda_i} < 0$ for $\lambda_i > \bar{\lambda}(\lambda_j)$.

A3': For any λ_j , if $\bar{\lambda}(\lambda_j) > 0$, there exists $\tilde{\lambda} \in (\bar{\lambda}, 1)$ such that $\Pi_1^*(\tilde{\lambda}, \lambda_j) = \Pi_1^*(0, \lambda_j)$.

It can be easily verified that the assumptions hold in the linear demand example. As in the unilateral case, the threshold $\bar{\lambda}(\lambda_j)$ is generally zero with strategic substitutes and is positive with strategic complements.

We assume that negotiations over the acquisition price for the two stakes are conducted simultaneously and separately, as in Nash-in-Nash bargaining. In other words, each blockholder delegates the bargaining to two distinct agents, one responsible for the acquisition and the other for the divestiture. Each agent of a blockholder maximizes the blockholder's payoff, taking the other agent's equilibrium behavior as given. This implies, in particular, that acceptance of one offer cannot be conditioned on the acceptance of the other, ruling out, for instance, an exchange of shares between B_1 and B_2 .

Proposition 3 *If blockholders are sure of retaining control of their firms, they both always prefer common ownership over cross-ownership for any given stake s to be acquired.*

Proof. By symmetry, we can focus on B_1 's choice of the mode of acquisition of the stake s in firm 2; the same conclusion will hold for B_2 .

To begin with, suppose that B_1 anticipates that B_2 acquires the stake s in firm 1 directly, for a price P_{CO}^1 that is taken as given when negotiating over the price for the stake in firm 2.

If B_1 also acquires his stake directly from B_2 , at the product-market competition stage we have $\lambda_1 = \lambda_2 = \frac{s}{\alpha-s}$, so profits are $\Pi_i^*\left(\frac{s}{\alpha-s}, \frac{s}{\alpha-s}\right)$. However, if B_2 rejects B_1 's offer, having already acquired a stake s in firm 1 he will maximize $\alpha\Pi_2 + s\Pi_1$, so the relative weight of firm 1's profit is $\lambda_2 = \frac{s}{\alpha}$. The disagreement payoffs, therefore, are $(\alpha-s)\Pi_1^*\left(0, \frac{s}{\alpha}\right) + P_{CO}^1$ for B_1 and $\Pi_2^*\left(0, \frac{s}{\alpha}\right) + s\Pi_1^*\left(0, \frac{s}{\alpha}\right) - P_{CO}^1$ for B_2 . Since the two blockholders jointly own a share α of both companies, the bargaining surplus is:

$$S_{CO} = \alpha \left[\Pi_1^*\left(\frac{s}{\alpha-s}, \frac{s}{\alpha-s}\right) + \Pi_2^*\left(\frac{s}{\alpha-s}, \frac{s}{\alpha-s}\right) \right] - \alpha \left[\Pi_1^*\left(0, \frac{s}{\alpha}\right) + \Pi_2^*\left(0, \frac{s}{\alpha}\right) \right].$$

The payoff frontier has slope -1 , so in equilibrium, B_1 's payoff is the sum of his disagreement payoff and a share of the bargaining surplus.

For simplicity, in the rest of the proof we assume that the acquirer has all the bargaining power ($\mu = 1$). (The results extend immediately to any $\mu \in [0, 1]$, as in the proof of Proposition 1.) B_1 's payoff then is:

$$(\alpha-s)\Pi_1^*\left(0, \frac{s}{\alpha}\right) + P_{CO}^1 + S_{CO}.$$

Next, consider the alternative strategy where B_1 has the stake s acquired by firm 1. In this case, at the product-market competition stage, we have $\lambda_1 = s$ and $\lambda_2 = \frac{s}{\alpha-s}$. The blockholders' outside options are unchanged. To determine the bargaining surplus, observe that after firm 1 acquires a stake s in firm 2, B_1 owns a share $\alpha-s$ in firm 1, B_2 owns a share $\alpha-s$ in firm 2, and a share s in firm 1, and firm 1 owns a share s in firm 2. Therefore, they jointly own a share α in firm 1 and a share $\alpha-s + \alpha s$ in firm 2, of which $\alpha-s$ directly by B_2 and αs indirectly *via* firm 1. This implies that the bargaining surplus now is:

$$S_{CR} = \alpha\Pi_1^*\left(s, \frac{s}{\alpha-s}\right) + [\alpha - (1-\alpha)s] \Pi_2^*\left(s, \frac{s}{\alpha-s}\right) - \alpha \left[\Pi_1^*\left(0, \frac{s}{\alpha}\right) + \Pi_2^*\left(0, \frac{s}{\alpha}\right) \right],$$

and hence B_1 's payoff is:

$$(\alpha-s)\Pi_1^*\left(0, \frac{s}{\alpha}\right) + P_{CO}^1 + S_{CR}.$$

Now, notice that that

$$S_{CR} < \alpha \left[\Pi_1^*\left(s, \frac{s}{\alpha-s}\right) + \Pi_2^*\left(s, \frac{s}{\alpha-s}\right) \right] - \alpha \left[\Pi_1^*\left(0, \frac{s}{\alpha}\right) + \Pi_2^*\left(0, \frac{s}{\alpha}\right) \right],$$

and that:

$$\Pi_1^*\left(\frac{s}{\alpha-s}, \frac{s}{\alpha-s}\right) + \Pi_2^*\left(\frac{s}{\alpha-s}, \frac{s}{\alpha-s}\right) \geq \Pi_1^*\left(s, \frac{s}{\alpha-s}\right) + \Pi_2^*\left(s, \frac{s}{\alpha-s}\right),$$

because of assumption A1'. This implies that the bargaining surplus is higher under common ownership: $S_{CO} > S_{CR}$. Since the disagreement payoff is unchanged, it follows that B_1 prefers acquiring the stake s directly rather than having it acquired by firm 1.

The case where B_1 anticipates that B_2 acquires the stake s in firm 1 indirectly, via firm 2, for a price P_{CR}^1 that is taken as given when negotiating over the price for the stake in firm 2, is similar. All that changes are the players' payoffs at the disagreement point. In this case, if B_2 rejects B_1 's offer, at the product-market competition stage he will maximize $\alpha(\Pi_2 + s\Pi_1)$, so the relative weight of firm 1's profit is $\lambda_2 = s$. The disagreement payoffs, therefore, are $(\alpha - s)\Pi_1^*(0, s) + P_{CO}^1$ for B_1 and $\Pi_2^*(0, s) + s\Pi_1^*(0, s) - P_{CO}^1$ for B_2 . However, the change in the disagreement payoffs affects in the same way B_1 's equilibrium payoff under common and cross-ownership and thus it does not affect the comparison of the two. Therefore, B_1 prefers acquiring the stake s directly, rather than having it acquired by firm 1, even if he anticipates that B_2 will engage in indirect acquisition.

As noted, by symmetry the same conclusion applies to B_2 's choice of the mode of acquisition. Therefore, the equilibrium of the negotiation process will lead to bilateral common ownership. ■

Proposition 3 extends Proposition 1 to the case of bilateral acquisition. Proposition 2 can be extended similarly. As in the unilateral acquisition case, assumptions A2' and A3' imply that cross-ownership can lead to disciplinary action by minority shareholders when profits fall below their value without the acquisition. However, these two assumptions are more restrictive than their original counterparts, implying that common ownership is more likely optimal in the case of bilateral acquisitions.

8 Conclusions

This paper has analyzed the optimal acquisition mode for a blockholder aiming to reduce competition intensity by acquiring ownership stakes in rival firms, elucidating the respective advantages and drawbacks associated with common and cross-ownership structures. Common ownership offers two salient benefits: it more effectively mitigates competition for a given stake size in the rival, and it allows the blockholder to fully appropriate the gains from the acquisition without sharing them with minority shareholders. However, common ownership may engender a conflict of interest between the blockholder and minority shareholders. If minority shareholders can challenge the blockholder's control, such as through proxy fights, common ownership becomes less profitable.

In contrast, cross-ownership ensures an alignment of interests between the blockholder and minority shareholders, circumventing potential conflicts arising under common ownership. The choice between these two modes is consequently shaped by the nature of competition, as well as the effectiveness of governance structures in serving as a disciplining device. Specifically, common ownership is more favorable when product market variables exhibit strategic complementarities, which preserve a

better alignment between the blockholder's interests and those of minority shareholders. Conversely, strategic substitutes may yield conflicts, rendering cross-ownership more attractive. The effectiveness of corporate governance mechanisms in enforcing managerial accountability also plays an important role in determining the optimal ownership type. Cross-ownership may be preferred when shareholder activism serves as an effective disciplinary mechanism, ensuring consonance of interests.

References

- [1] Alley W. (1997), Partial Ownership Arrangements and Collusion in the Automobile Industry, *Journal of Industrial Economics*, 45, 191-205.
- [2] Almeida, H. and D. Wolfenzon (2006), A Theory of Pyramidal Ownership and Family Business Groups, *Journal of Finance*, 61(6), 2637-80.
- [3] Amel-Zadeh, A., F. Kasperk, and M. Schmalz (2002), Mavericks, universal, and common owners - The largest shareholders of U.S. public firms, *CESifo W.P.* 9926.
- [4] Amundsen, E.S. and L. Bergman (2002), Will cross-ownership re-establish power in the Nordic power market?, *Energy Journal*, 23, 73-95.
- [5] Anton, M., F. Ederer, M. Giné and M. Schmalz, (2023), Common ownership, competition, and top management incentives, *Journal of Political Economy*, 131(5), 1294-1355.
- [6] Azar, J., M. Schmalz, and I. Tecu (2018), Anticompetitive effects of common ownership, *Journal of Finance*, 73(4), 1513-1565.
- [7] Azar, J., M. Schmalz, and I. Tecu (2022), A refutation of 'Common ownership does not have anti-competitive effects in the airline industry', *ECGI W.P.* 837.
- [8] Backus, M., C. Conlon, and M. Sinkinson (2021), Common ownership in America: 1980-2017, *American Economic Journal: Microeconomics*, 13(3), 273-308.
- [9] Boot, N., J. Seldeslacht, and A. Banal-Estañol (2022), Common ownership: Europe vs. the U.S., *DIW Berlin W.P.* 2015.
- [10] Burkart, M., D. Gromb, and F. Panunzi (1998), Why higher takeover premia protect minority shareholders, *Journal of Political Economy*, 106(1), 172-204.
- [11] Denicolò, V., and F. Panunzi (2023), Common Ownership, Competition, and Corporate Governance, *CEPR D.P.* 18317.
- [12] Dennis, P., K. Gerardi, and C. Schenone (2022), Common ownership does not have anti-competitive effects in the airline industry, *Journal of Finance*, 77(5), 2766-2798.
- [13] Dietzenbacher E., B. Smid, and B. Volkerink (2000), Horizontal Integration in the Dutch Financial Sector, *International Journal of Industrial Organization*, 18, 1223-1242.
- [14] Ferguson, J.M. (1983), Daily newspaper advertising rates, local media cross-ownership, newspaper chains, and media competition, *Journal of Law and Economics*, 26, 635-654.

- [15] Gilo D., Y. Moshe, and Y. Spiegel (2006), Partial Cross Ownership and Tacit Collusion, *RAND Journal of Economics*, 37, 81-99.
- [16] Grossman, S., and O. Hart (1980), Takeover bids, the free rider problem, and the theory of corporation, *Bell Journal of Economics*, 42-64.
- [17] Huse, C., R. Ribeiro, and F. Verboven (2024), Common ownership versus cross-ownership: Evidence from the automobile industry, *The Journal of Industrial Economics*, forthcoming.
- [18] Kennedy, P., P. O'Brien, M. Song, and K. Waehrer (2017), The competitive effects of common ownership: Economic foundations and empirical evidence, SSRN Working Paper.
- [19] Levy, N., Y. Spiegel, and D. Gilo (2018), Partial vertical integration, ownership structure, and foreclosure, *American Economic Journal: Microeconomics*, 10(1), 132-180
- [20] Malueg D. (1992), Collusive Behavior and Partial Ownership of Rivals, *International Journal of Industrial Organization*, 10, 27-34.
- [21] Neto, M.S., M.J. do Carmo, E.M.S. Ribeiro, and W.V.G. da Cruz (2020), Corporate ownership network in the automobile industry; Owners, shareholders and passive investment funds, *Research in Globalization*, 2, 100016.
- [22] O'Brien D., and S. Salop (2000), Competitive effects of partial ownership: Financial interest and corporate control, *Antitrust Law Journal*, 67, 559-614.
- [23] Ono H., T. Nakazato, C. Davis, and W. Alley (2004), Partial Ownership Arrangements in the Japanese Automobile Industry; 1990-2000, *Journal of Applied Economics*, 12(2), 355-367.
- [24] Park, A.H., and K. Seo (2019), Common ownership and product market competition: Evidence from the US airline industry, *SNU Working Paper*, 48(5), 617-640.
- [25] Reitman D. (1994), Partial Ownership Arrangements and the Potential for Collusion, *Journal of Industrial Economics*, 42, 313-322.
- [26] Rotemberg, J. (1984), Financial transaction costs and industrial performance, Working Paper, MIT.
- [27] Schmalz, M. (2021), Recent studies on common ownership, firm behavior, and market outcomes, *Antitrust Bulletin*, 66(1), 12-38.
- [28] Shekita, N. (2021), Interventions by common owners, *Journal of Competition Law & Economics*, 18(1), 99-134.
- [29] Shelegia S. and Y. Spiegel (2012), Bertrand Competition when Firms Hold Passive Ownership Stakes in One Another, *Economics Letters*, 114, 136-138.

- [30] Shleifer, A., and R. Vishny (1986), Large shareholders and corporate control, *Journal of Political Economy*, 94, 461-488.

APPENDIX

Consider the following duopoly model. The inverse demand for product $i = 1, 2$ is taken to be:

$$p_i = 1 - q_i - \gamma q_j,$$

where p_i is the price, q_i is the output level, and the parameter $\gamma \in [0, 1]$ represents the degree of product differentiation. When $\gamma = 1$, the products are perfect substitutes, and when $\gamma = 0$, they are independent. Production costs are normalized to zero.

In this example, when firms compete in quantities, it is straightforward to verify that equilibrium profits are:

$$\Pi_1^*(\lambda) = \frac{[2 - \gamma(1 + \lambda)][2 - \gamma(1 - \lambda) + \lambda\gamma^2]}{[4 - (1 + \lambda)\gamma^2]^2},$$

and

$$\Pi_2^*(\lambda) = \frac{(2 - \gamma)^2}{[4 - (1 + \lambda)\gamma^2]^2}.$$

It is easy to see that while firm 2's profits and aggregate profits increase with λ , in this case, $\Pi_1^*(\lambda)$ is always decreasing in λ : with strategic complements, firm 1 loses from becoming more accommodating. Therefore, the threshold defined in condition A2, $\bar{\lambda}$, vanishes. As a consequence, condition A3 is moot.

When firms compete in prices instead, equilibrium profits are:

$$\Pi_1^*(\lambda) = \frac{(1 - \gamma)[2 + \gamma(1 + \lambda)][2 + \gamma(1 - \lambda) - \lambda\gamma^2]}{(1 + \gamma)[4 - (1 + \lambda)\gamma^2]^2},$$

and

$$\Pi_2^*(\lambda) = \frac{(1 - \gamma)(2 + \gamma)^2}{(1 + \gamma)[4 - (1 + \lambda)\gamma^2]^2}.$$

Again, it is straightforward to verify that firm 2's profits and aggregate profits increase with λ . However, with strategic complements, the profit function $\Pi_1^*(\lambda)$ is no longer monotonically decreasing. Rather, it is inverted-U shaped: initially $\Pi_1^*(\lambda)$ increases with λ but eventually decreases, as shown in Figure 1. The critical threshold $\bar{\lambda}$ in condition A2 is:

$$\bar{\lambda} = \frac{\gamma(2 + \gamma)}{4 + (2 - \gamma)\gamma}.$$

Condition A3 then requires that the profits of firm 1, while initially increasing, cannot surpass those obtained when $\lambda = 0$ as λ approaches 1. Condition A3 clearly holds in this example, and the critical threshold $\tilde{\lambda}$ is:

$$\tilde{\lambda} = \frac{\gamma(4 - \gamma^2)}{4 - (2 - \gamma)\gamma^2}.$$

In this model, we consider both the case where firms compete in quantities (Cournot)

and prices (Bertrand). A switch from one mode of competition to another may also reflect changes in the intensity of competition, with Cournot typically being less aggressive than Bertrand.

Under Cournot competition, it is straightforward to verify that equilibrium profits are:

$$\pi_1^*(\lambda) = \gamma^2 \lambda \frac{[2\gamma^2 \lambda + \gamma^3(1 + \lambda) - 4(\gamma + \lambda)]}{(2 + \gamma) [4 - \gamma^2(1 + \lambda)]^2},$$

and

$$\pi_2^*(\lambda) = \gamma^2 \lambda \frac{[8 - \gamma^2(2 + \lambda)]}{(2 + \gamma) [4 - \gamma^2(1 + \lambda)]^2}.$$

Under Bertrand competition instead, equilibrium profits are:

$$\pi_1^*(\lambda) = \gamma^2 \lambda \frac{(1 - \gamma) [2\gamma^2 \lambda - \gamma^3(1 + \lambda) - 4(\gamma - \lambda)]}{(1 + \gamma) (2 - \gamma)^2 [4 - \gamma^2(1 + \lambda)]^2},$$

and

$$\pi_2^*(\lambda) = \frac{(1 - \gamma) [8 - \gamma^2(2 + \lambda)]}{(1 + \gamma) [4 - (1 + \lambda)\gamma^2]^2}.$$

It is easy to see that firm 2's profit and aggregate profits always increase with λ , consistently with condition A1. Under Cournot competition, i.e., with strategic complements, $\Pi_1^*(\lambda)$ decreases with λ , indicating that firm 1 loses from becoming more accommodating. Therefore, the threshold defined in condition A2, $\bar{\lambda}$, vanishes. However, under Bertrand competition, i.e., with strategic complements, the profit function $\Pi_1^*(\lambda)$ is inverted-U shaped: initially $\Pi_1^*(\lambda)$ increases with λ but eventually decreases, as shown in Figure 1. The threshold $\bar{\lambda}$ in condition A2 is:

$$\bar{\lambda} = \frac{\gamma(2 + \gamma)}{4 + (2 - \gamma)\gamma},$$

and the critical value $\tilde{\lambda}$ mentioned in condition A3, where $\pi_1^*(\lambda) = 0$, is:

$$\tilde{\lambda} = \frac{\gamma(4 - \gamma^2)}{4 - (2 - \gamma)\gamma^2}.$$

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