

How Are Firms Sold? The Role of Common Ownership

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Abstract

We find that common ownership among acquirers enhances rather than hinders competition in the firm sale process. One common owner raises the likelihood that target firms are sold through auction (vs. negotiation with one buyer) by 21.5%. The effect is causal according to identifications based on mergers between financial institutions. Exploring economic channels, we observe selling firms respond to common ownership among acquirers by avoiding cross-owned acquirers, bargaining hard, and inviting more buyers when cross-owned acquirers initiate the deal but not by terminating the deal. Consistent with enhanced competition, common ownership among acquirers is positively associated with deal quality.

I. Introduction

Since the widespread adoption of antitakeover provisions in the 1980s, hostile takeovers and public takeover auctions have become rare; almost all firms are now sold through private auction or negotiation with a single buyer (Boone and Mulherin (2007), Liu and Mulherin (2018), Liu and Officer (2021), and Brown, Liu, and Mulherin (2022)). Given the tremendous amount of capital spent on mergers and acquisitions (M&As), “How should firms be sold?” remains a salient question.¹ Auction theory proposes that firms should be sold through auction because the participation of multiple bidders can enhance competition (Brannman, Klein, and Weiss (1987) and Bulow and Klemperer (1996)). Yet, the

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¹See, among others, Moeller, Schlingemann, and Stulz (2004) and Betton, Eckbo, and Thorburn (2008).

auction may not always be optimal because, as Hansen (2001) argues, disclosing confidential information to multiple acquirers is costly for the selling firm.

Common ownership is ubiquitous among U.S. firms (He and Huang (2017) and Schmalz (2018)). However, the role of common owners among acquirers in the firm selling process has not been studied in the literature. Motivated by the importance of the firm sale process and the ubiquity of common ownership, this study examines whether common ownership among acquirers affects competition in the firm sale process and how the firm is sold (that is, by auction vs. negotiation). We also examine the economic channels through which common ownership among acquirers affects competition in the firm sale process.

Prior studies of common ownership have focused on its anticompetitive effects in product market competition under the premise that consumers are passive price takers.² In the firm sale process, common owners of multiple acquirers have incentives to underpay the selling firm by reducing competition. Consider an extreme case in which an investor cross-owns all potential acquirers and can affect their acquisition decisions. The common owner may instruct one acquirer to negotiate with the selling firm, asking other acquirers to refrain from participating. This strategy lowers competition in the acquisition. The same intuition applies to the more general case in which the common owner cross-owns some but not all potential acquirers. A common owner may also try to form a bidding cartel among cross-owned bidders in a private takeover auction (Graham and Marshall (1987), Asai and Charoenwong (2024)). Thus, in theory, common owners among potential acquirers may dampen competition in the firm sale process. However, in practice, the anticompetitive effect of common ownership may be much weaker than theory suggests. Hemphill and Kahan (2020) highlight that many factors can reduce a common owner's ability and incentive to implement anticompetitive strategies, which we discuss in greater detail below.

Our setting differs from prior studies of common ownership in that, unlike consumers of firm products, selling firms are not passive price takers. Rather, selling firms actively influence the firm sale process. They decide whether they will be sold through auction or negotiation, how many and which buyers to invite to the auction, and whether and when to initiate and terminate the sale process. Aware of possible anticompetitive actions of cross-owned acquirers, selling firms are incentivized to enhance the competition by selling through auction rather than negotiation with one buyer when there are common owners among acquirers. Given selling firms' preference for enhanced competition and the difficulties and costs for common owners to undertake anticompetitive actions (Hemphill and Kahan (2020)), common ownership among acquirers can result in enhanced rather than weaker competition in the firm sale process.

Common ownership among acquirers can also enhance competition in the firm sale process by improving acquiring firms' governance. In the model of Edmans, Levit, and Reilly (2019), a common owner's exit decision is informative about firm quality because it sells low-quality portfolio firms first. Managers of cross-owned firms have incentives to improve performance and governance to avoid being sold.

²See, among others, He and Huang (2017), Azar, Schmalz, and Tecu (2018), and Azar, Raina, and Schmalz (2022). See Schmalz (2018), (2021) for comprehensive reviews of the literature.

He, Huang, and Zhao (2019) show that institutional investors have stronger incentives to monitor cross-owned firms in the presence of corporate governance externalities. Thus, cross-owned firms have stronger incentives to participate in acquisitions that are potentially value-enhancing than other firms do, which implies that the existence of common owners among acquirers can enhance competition in the firm sale process.

It is thus unclear a priori whether common ownership among acquirers enhances or weakens competition in the firm sale process. To answer this research question, we build a sample of M&As over the 1993–2016 period and examine Securities and Exchange Commission (SEC) filings to determine whether the target firm is sold through auction or negotiation with a single buyer. We know which firm is the acquirer but cannot observe which firms are the contesting acquirers because the acquirer and the target firm do not disclose such information. To circumvent the difficulty in identifying the contesting acquirers, we identify the five industry competitors closest to the acquirer and regard them as potential contesting acquirers because product market competitors share similar firm characteristics and may seek to acquire the same target firm.³

We find that common ownership between an acquirer and potential contesting acquirers is positively associated with the likelihood that the target firm is sold through auction. One common owner among potential acquirers is associated with a 21.5% higher likelihood of auction. The main result is robust to a long battery of additional tests. Our results indicate that the presence of common owners among acquirers raises the likelihood that the firm is sold through auction. This finding is consistent with the hypothesis that common ownership among acquirers enhances competition in the firm sale process. In line with enhanced competition, we also show that common ownership among acquirers is associated with better deal quality.

Institutional investors decide their ownerships in the acquirer and the contesting acquirers. One concern is that our main finding might be driven by the target firm's characteristics and characteristics of the acquirer and contesting acquirers based on which institutional investors decide their ownerships. We control for important acquirer and target firm characteristics including their institutional ownership, firm size, profitability, market-to-book ratio, leverage ratio, and cash holding. Yet it is possible that unobserved firm characteristics drive both common ownership among acquirers and the target's decision to sell through auction or negotiation. In addition, we cannot completely rule out the possibility of reverse causality although it is very unlikely that institutional investors build their common

³Anecdotal evidence suggests that industry rivals often try to buy the same target. For example, Nvidia and Intel competed to acquire Arm, a chip technology firm (*Reuters*, Feb. 17, 2022, "Intel would be interested in participating in consortium to invest in Arm - Intel CEO," <https://www.reuters.com/article/intel-investor-day-idCNL1N2US2RM>). Euronet Worldwide Inc, a U.S. electronic payments company, offered a higher bid than its rivals (Ant Financial Services Group) to acquire MoneyGram International Inc (*Reuters*, Mar. 14, 2017, "Euronet Worldwide trumps Ant Financial's offer to buy MoneyGram," <https://www.reuters.com/article/us-moneygram-intl-m-a-euronet-worldwid-idUSKBN16L1A8>). Uber lost the bid competition against Just Eat Takeaway in acquiring Grubhub (*CNBC*, June 10, 2020, "Uber exasperated with Grubhub sale process as deal slips away, sources say," <https://www.cnbc.com/2020/06/10/uber-exasperated-with-grubhub-sale-process-as-deal-slips-away.html>).

ownership among acquirers before the acquisition because they expect that the target will sell itself through auction or negotiation.

To alleviate the concerns of unobserved heterogeneity and reverse causality, we follow He and Huang (2017) and employ mergers between financial institutions as an instrumental variable (IV) for common ownership. The IV analysis shows that common ownership among acquirers raises the likelihood of auction versus negotiation. To create a clean sample arguably free of endogeneity concerns, we exclude M&As in which common ownership between an acquirer and identified contesting acquirers is *not* the result of mergers between financial institutions. In the clean sample, we continue to observe that common ownership raises the likelihood of auction.

We explore four economic channels through which common ownership among acquirers affects the firm sale process. First, we show that target firms avoid cross-owned acquirers, probably to prevent possible anti-competitive actions by the cross-owners of acquirers. Second, we find that selling firms are more likely to sell through auctions that involve more buyers when cross-owned acquirers initiate the deal. Third, we observe evidence of hard bargaining as an economic channel. On the one hand, selling firms do not seem to respond to the common ownership among acquirers by terminating the deal, an indicator of hard bargaining. On the other hand, when common owners exist among acquirers, target firms are more likely to receive cash as payment and they lengthen the selling process, which are indications of hard bargaining. Lastly, we observe no evidence that target firms choose to sell through an auction to reduce the cost of sharing confidential information with cross-owned acquirers.

This study adds to the literature on common ownership, which has focused on whether common owners hinder product market competition. Unlike these studies, the selling firms in our setting are not passive price takers but actively make their selling decisions in response to the common ownership among acquirers. Thus, we offer a new approach to studying the impacts of common ownership on corporate decisions and market competition.

Our findings have implications for policymakers. We show that when the counterparty is not a passive price taker, common owners' anticompetitive effect can be weakened or nullified by the counterparty's active roles. Thus, policies that improve consumers' bargaining power can alleviate concerns over the anticompetitive effects of ubiquitous common ownership (He and Huang (2017), Schmalz (2018), (2021)).

Matvos and Ostrovsky (2008) propose that gains to all acquirer shareholders' crossownership in the target firm compensate for their losses in the acquirer around the deal announcement. Harford, Jenter, and Li (2011), in contrast, show that large acquirer shareholders who could influence the acquirer's merger decisions often have small ownership in the target firm and conclude that acquirer-target cross-holdings do not explain value-reducing M&As. Antón, Azar, Gine, and Lin (2022), like Matvos and Ostrovsky (2008) argue that all acquirer shareholders' cross-ownership in the acquirer's rival firms (acquirer-rival cross-ownership hereafter) help compensate for their losses in the acquirer firm around the deal announcement. They find that the acquirer-rival cross-ownership is negatively associated with the acquirer's 3-day returns around the

acquisition announcement. Note that the finding of Antón et al. (2022) is subject to the criticism of Harford et al. (2011). Consistent with Harford et al. (2011), we find that the negative association documented by Antón et al. (2022) is driven by the high correlation (0.59) between the acquirer–rival cross-ownership and the acquirer–target cross-ownership. The coefficient on the acquirer–rival cross-ownership becomes insignificant once the acquirer–target cross-ownership is excluded from the regression. In addition, the coefficient on the acquirer–rival cross-ownership becomes insignificant when we consider acquirer returns over longer windows around the deal announcement. For this reason, we focus on large shareholders' common ownership in acquirers and show that it affects competition in the firm sale process. As such, we contribute to the literature by showing that common ownership of large shareholders is more important for merger decisions than that of small shareholders, which is consistent with the finding of Harford et al. (2011).

Previous studies center on acquirers' role in the firm sale process and implicitly assume that target firms are passive players. Yet recent studies have shown that the landscape of takeover competition has evolved from public bidding wars in the 1980s to behind-the-scenes negotiations and auctions in which target management plays decisive, active roles (Boone and Mulherin (2007), Liu and Mulherin (2018), Liu and Officer (2021), and Brown et al. (2022)). As such, we add to the literature by shedding light on target firms' active roles in the firm sale process.

The paper proceeds as follows: [Section II](#) develops our hypotheses. [Section III](#) describes our data sample. [Section IV](#) examines the effect of common ownership on the likelihood that the firm is sold through auction versus negotiation. [Section V](#) explores the economic channels behind the effect. [Section VI](#) investigates the effect of common ownership on deal quality. [Section VII](#) concludes.

II. Hypothesis Development

Our hypotheses focus on whether the presence of common owners among potential acquirers weakens or enhances competition in the firm sale process, which we proxy with how the target firm is sold: either through auction or through negotiation with a single acquirer. Auctions involve more acquirers and thus are regarded as more competitive than negotiations.

A. Theories on Preference for Auction Versus Negotiation

Although auction theory suggests that additional bidders benefit the seller by raising the selling price via more intense competition in the auction (Bulow and Klemperer (1986)), this theory does not appear to capture how firms are auctioned in practice. The typical private auction of a firm proceeds as follows (Macy (1990), Hansen (2001)): Once the firm decides to sell, it hires an advisor, who builds a list of potential acquirers and approaches them. After signing confidentiality agreements, interested acquirers receive an offering memorandum that contains limited confidential information about the selling firm's financial situation and their plans for product development, and so forth. If a potential acquirer is still interested in purchasing the selling firm after reviewing the information

shared at this stage, the acquirer will submit a nonbinding bid. The selling firm and the advisor then assess the received bids and invite selected bidders to participate in the last round of auction. These bidders will be offered more in-depth confidential information before submitting their final bids.

According to conventional auction theory, negotiating with a single buyer is not optimal for the selling firm. However, rather than increasing the number of bidders, as this theory suggests, selling firms and their advisors often limit the number of bidders in the auction. More striking, firms are overall equally likely to be sold through auction compared to negotiation with a single buyer (Boone and Mulherin (2007), Liu and Officer (2021)).

Research has tried to explain the discrepancy between conventional auction wisdom and the actual firm sale process. Aktas, de Bodt, and Roll (2010) propose that negotiation may be preferred if the selling firm can threaten the negotiating acquirer with a follow-up auction if the negotiation fails. Hansen (2001) emphasizes the cost of disclosing confidential information with acquirers, which can lower the selling firm's value because the acquirers—who are often product market competitors, suppliers, and customers of the selling firm—can use the information to enhance their competitive advantage at the cost of the selling firm. Therefore, it may be optimal to hold an auction with only a few bidding acquirers or even to negotiate with one sole buyer.

Ye (2007) focuses on the cost acquirers incur when assessing the selling firm's value in preparation for a bid. Information production costs are often substantial for large and complex selling firms. Acquirers may be reluctant to incur information production costs if the likelihood of winning is low—such as when there are many possible acquirers. Thus, it may be optimal for the selling firm to negotiate with one buyer or to invite only a few bidders with potentially high offer prices to participate in the final round of auction.

In addition to information production costs, managers of selling firms may also be incentivized to negotiate with a single acquirer. Instead of bargaining for the best deal for shareholders, the managers may negotiate a better deal for themselves with a single buyer (Boone and Mulherin (2007)). When an auction involves more acquirers, managers may find it more difficult to strike favorable terms for themselves.

In sum, the selling firm's preference for auction versus negotiation depends on the tradeoff between the benefits and costs of each selling process. On the one hand, auctions involve more buyers and are expected to raise the selling price; however, disclosing confidential information to more buyers can lower the selling firm's value by reducing its competitive advantage. In addition, acquirers may be reluctant to produce information on synergy gains if the likelihood of winning the auction is low. The selling firm should hold a private auction if the expected benefit from the auction outweighs the costs of information disclosure. Negotiation, on the other hand, may be preferable to selling firms' managers if they can negotiate better terms for themselves at the cost of shareholders.

Existing theories do not consider how common ownership among potential acquirers may impact the firm sale process. We address this question and develop hypotheses for the possible impacts of common ownership among potential acquirers on how the target firm is sold.

B. Hypotheses on the Role of Common Ownership in the Firm Sale Process

We develop testable hypotheses for three scenarios. In the first scenario, a common owner among potential acquirers plays no role in the firm sale process and thus will not affect how the target firm is sold. This is the null hypothesis. In the second scenario, a common owner among potential acquirers can exert anticompetitive effects. Under this scenario, a common owner dampens competition and reduces the likelihood that a firm is sold through auction. In the third scenario, selling firms actively respond to common ownership among acquirers and common ownership raises cross-owned firms' incentive to participate in acquisitions. In this scenario, common ownership among acquirers enhances competition in the firm sale process.

1. The Null Hypothesis

Prior studies of common ownership have centered on anticompetitive effects on product market competition (He and Huang (2017), Schmalz (2018), (2021)). In these studies, common owners are incentivized to hinder product market competition to maximize their profits.

Yet, the anticompetitive role of common ownership may be much weaker in practice than in theory. Hemphill and Kahan (2020) propose that many factors can weaken a common owner's ability and incentive to implement anti-competitive strategies. Common owners, usually managing large portfolios, may not have incentives to influence a portfolio firm's acquisition decision due to costly managerial time and effort. Furthermore, even if a common owner desires to influence the decisions of cross-owned acquirers, the managers and shareholders of cross-owned acquirers may not cooperate with the common owner. In addition, anticompetitive actions are often illegal, and if detected, legal and reputational costs are prohibitively expensive.

Consider, for instance, the difficulties in forming a bidding cartel in a takeover auction (McAfee and McMillan (1998)). A cartel must have an enforceable mechanism to divide the spoils among the bidders in the cartel, which is difficult because a common owner does not wholly own the cross-owned bidders. The common owner may find it difficult to convince other shareholders and managers of the cross-owned bidding firms to join the cartel. Once detected, the litigation costs of forming a bidding cartel are expensive. As such, it is unclear a priori whether common owners among potential acquirers can meaningfully impact the firm sale process.

Therefore, the null hypothesis is that common ownership among acquirers does not affect how the target firm is sold:

Hypothesis 0. A common owner among potential acquirers does not affect competition in the firm sale process and does not influence whether the target firm is sold through auction or negotiation with a single buyer.

2. The Anticompetitive Role of Common Owners in the Firm Sale Process

According to the logic of the anticompetitive effect, a common owner of multiple potential acquirers has incentives to underpay the selling firm by reducing competition in the firm sale process. As discussed above, one way to lower

competition is to reduce the number of acquirers pursuing the selling firm; another way is to form a bidding cartel among cross-owned bidders in a takeover auction (Graham and Marshall (1987), Asai and Charoenwong (2024)). If a common owner among potential acquirers can produce anticompetitive effects and the selling firm cannot prevent or counteract these effects, we have the following hypothesis:

Hypothesis 1. A common owner among potential acquirers hinders competition in the firm sale process, reducing the likelihood that the target firm is sold through auction.

3. Enhanced Competition When There Exist Common Owners among Acquirers

Although common owners can more easily lower product market competition when consumers are passive price takers, selling firms are not passive players in the firm sale process. Instead, they decide whether they will be sold through auction or negotiation, how many and which buyers to invite to the auction, and whether and when to initiate and terminate the sale process. They are incentivized to raise competition by selling through auctions when there exist common owners among acquirers in case that the common owners may undertake anticompetitive actions. That is, they prefer to be sold through auction in the existence of such common owners. Their preference for auction and the difficulties and costs for common owners to exert anticompetitive effects imply that common ownership among acquirers can be associated with enhanced rather than weaker competition in the firm sale process.

The existence of common owners among acquirers may also enhance competition in the firm sale process by raising cross-owned firms' willingness to participate in acquisitions. In the model of Edmans et al. (2019), managers of cross-owned firms endeavor to improve their governance to avoid being sold first by common owners. Being sold first reveals that the firm is of worse quality than other firms in the common owner's portfolio. He et al. (2019) show that institutional investors are more incentivized to monitor cross-owned firms because of corporate governance externalities. As such, cross-owned firms can have stronger incentives to participate in acquisitions that are potentially value-enhancing, implying that common ownership among potential acquirers enhances competition in the firm sale process.

We thus have the following hypothesis:

Hypothesis 2. Common ownership among acquirers enhances competition in the firm sale process and raises the likelihood that the target firm is sold through auction.

III. Sample Construction and Summary Statistics

A. Our Sample of Mergers and Acquisitions

We retrieve mergers and acquisitions of U.S. public firms announced between Jan. 1993 and Dec. 2016 from the Refinitiv Securities Data Company (SDC)

Platinum M&A Database, the same data source as Chen, Hshieh, and Zhang (2024). The sample starts in 1993 because our analysis requires hand-collecting information on the selling process from SEC filings, and these data become available on the EDGAR website in 1993. To ensure the acquirer controls the target firm after the takeover, we focus on M&A bids with the deal form of “Merger” or “Acquisition of majority interest.” There are 6878 such M&A bids. We also apply the following filters. First, the deal value must be at least \$150 million and at least 1% relative to the acquirer’s market value of equity. We focus on these relatively large deals because of their economic importance and the costs of hand-collecting data on the target firm’s selling process. Second, the acquirer’s financial data for the year end before the deal announcement must be available in Compustat. Third, the acquirer’s and the target’s market capitalizations must be available in CRSP for the quarter end before the deal announcement. Fourth, the acquirer and the target both must have share prices greater than \$1 (i.e., they are not penny stocks) and have at least 120 nonzero daily stock returns during the pre-offer period (from Day -379 to the announcement date (Day 0)). Our final sample contains 1,009 M&A bids. See [Appendix A](#) for a detailed explanation of our sample construction process.

Following Boone and Mulherin (2007) and Liu and Officer (2021), we examine the background section of the acquirer and the target firms’ SEC filings to collect information on the number of firms that signed confidentiality agreements with the target firm and the number of firms that showed an interest in acquiring it, as well as information regarding whether the deal was initiated by the target or the acquirer firm. We regard a target firm as privately auctioned if more than one buyer showed interest in buying it or signed a confidentiality agreement. Out of the 1,009 target firms in our sample, 388 (38.5%) are privately auctioned. Following Schwert (2000) and Betton, Eckbo, and Thorburn (2008), we classify a target firm as publicly auctioned if a different acquirer publicly announces a competing bid within 12 months of the last bid announcement. We classify 38 target firms (3.8% of the 1,009 bids) as publicly auctioned. Our finding is consistent with prior research reporting that public auctions have become rare since the 1990s. In total, 408 target firms (40.4% of the 1,009 bids) in our sample are auctioned (privately or publicly), and the remaining target firms are sold through negotiation with a single buyer. The fraction of auctioned target firms in our sample is comparable to prior studies (Boone and Mulherin (2007), Liu and Officer (2021)).

B. Common Ownership Between Acquirers and Potential Contesting Acquirers

We calculate the common ownership between the acquirer and contesting acquirers of the same target as follows: For each acquirer, we identify five potential competing acquirers from the same 3-digit SIC industry with the closest market capitalizations and show that our results are robust to alternative industry classifications.⁴ We then compute common ownership between the acquirer and each of the

⁴We identify an acquirer’s industry peers as potential competing acquirers if the acquirer has fewer than five industry peers. If the acquirer already has n actual contesting acquirers in the bid contest, we identify $5-n$ potential contesting acquirers. We do not observe cases with more than five actual contesting acquirers in our final sample.

five potential contesters and employ the average common ownership across the five pairs as our common ownership measure. Our baseline results remain qualitatively unchanged if we count all the acquirer's industry peers as competing acquirers.

Firms from a different industry than the acquirer may also participate in the firm sale process; however, it is difficult for econometricians, who lack deep knowledge about each specific takeover, to identify potential contesters from a different industry. To circumvent this difficulty, we re-run our analysis using several alternative industry classifications and observe qualitatively similar results. Our results also remain robust among cross-industry M&As and within-industry M&As, as discussed later in the paper.

We focus on common ownership among institutional investors and retrieve the ownership data of the acquirer and the identified competing acquirers from the Thomson Financial CDA/Spectrum Institutional (13F) database.⁵ We consider only common ownership above 5% following prior studies (e.g., He and Huang (2017)). A common owner has weaker incentives to influence the cross-owned firms' acquisition decisions when it has trivial ownership in these firms. Even if a common owner is incentivized to influence the cross-owned firms' decisions, it cannot influence these decisions without significant ownership. Our baseline results are robust to alternative cutoff levels (1%, 2%, 3%, and 10%) of common ownership.

Denote α^i as the ownership of institutional investor i in the acquirer at the quarter-end before the bid announcement, β^i as the ownership of institutional investor i in the acquirer's contester, and k as the cutoff level of common ownership (5% in our baseline results). Following He and Huang (2017), our main common ownership measure is the number of institutional investors with at least 5% ownership in both the acquirer and the contester:

$$(1) \quad \text{Common Owners} = \sum_i 1_{\alpha^i > k} 1_{\beta^i > k}.$$

We then calculate the average number of common owners between the acquirer and each of the five potential contesting acquirers and use this figure as our main measure of common ownership. For example, if the acquirer has 1, 0, 0, 1, and 0 common owners with the five potential contesting acquirers, then the common owner measure equals 0.4 ($= (1 + 0 + 0 + 1 + 0)/5$). Section IV.B shows that our results are robust to five alternative measures of common ownership.

C. Summary Statistics

Table 1 Panel A presents the frequency of M&As in our sample by year. The number of M&As ranged from 10 in 1993 to 117 in 1997. Among all 1,009 M&A deals, 408 (40.4%) target firms are sold through auctions involving more than one contesting acquirer.

Table 1 Panel B presents summary statistics of the variables used in our analysis, which are defined in Appendix B.⁶ On average, there are 0.18 institutional

⁵The SEC requires institutional investors to report their holdings on Form 13F if they have more than \$100 million in securities under management. Institutions have been required to disclose all common stock positions greater than \$200,000 or 10,000 shares on a quarterly basis since 1980.

⁶We winsorize all variables except dummies at the upper and lower 1% to mitigate the impact of outliers.

TABLE 1
Summary Statistics

Table 1 Panel A reports the number of mergers and acquisitions in our sample and the number of auctioned deals by year. We retrieve the sample of mergers and acquisitions from the SDC Platinum database over the 1993–2016 period. Panel B reports summary statistics of the variables for the whole sample. Panel C reports summary statistics for the auctioned sample and the negotiated sample separately. A target firm is auctioned if more than one firm tries to buy it. See Appendix B for variable definitions. Statistical significance at the 10%, 5%, and 1% levels is denoted by *, **, and ***, respectively.

Panel A. Frequency of Mergers and Acquisitions by Year

Year	Whole Sample		Auctioned	
	N		N	%
1993	10		5	50.0%
1994	23		7	30.4%
1995	49		13	26.5%
1996	66		25	37.9%
1997	117		41	35.0%
1998	92		32	34.8%
1999	98		34	34.7%
2000	63		19	30.2%
2001	41		15	36.6%
2002	26		9	34.6%
2003	43		16	37.2%
2004	45		12	26.7%
2005	36		8	22.2%
2006	45		26	57.8%
2007	48		26	54.2%
2008	21		11	52.4%
2009	18		12	66.7%
2010	27		9	33.3%
2011	17		11	64.7%
2012	21		15	71.4%
2013	28		13	46.4%
2014	24		17	70.8%
2015	25		15	60.0%
2016	26		17	65.4%
Total	1,009		408	40.4%

Panel B. Summary Statistics of the Whole Sample

	N	Mean	SD	p25	p50	p75
Auction	1,009	0.404	0.491	0	0	1
# Common owners	1,009	0.180	0.351	0	0	0.2
<i>Deal characteristics</i>						
Acquirer toehold	1,009	0.020	0.139	0	0	0
Same SIC3 industry	1,009	0.448	0.498	0	0	1
Target defense indicator	1,009	0.166	0.372	0	0	0
# Acquirer-target common owners	1,009	0.181	0.447	0	0	0
<i>Acquirer characteristics</i>						
Institutional ownership	1,009	0.599	0.248	0.422	0.618	0.791
Market-to-book	1,009	1.913	1.319	1.097	1.383	2.176
Ln (Size)	1,009	7.909	1.664	6.726	7.806	9.150
ROA	1,009	0.034	0.074	0.010	0.027	0.072
Market leverage	1,009	0.454	0.297	0.178	0.400	0.783
Cash holdings	1,009	0.132	0.159	0.027	0.063	0.170
<i>Target characteristics</i>						
Institutional ownership	980	0.461	0.252	0.258	0.447	0.651
Market-to-Book	980	1.667	1.125	1.044	1.229	1.791
Ln (Size)	980	5.952	1.218	5.020	5.912	6.885
ROA	980	0.001	0.130	0.003	0.014	0.056
Market leverage	980	0.466	0.312	0.165	0.430	0.814
Cash holdings	980	0.171	0.208	0.025	0.063	0.267

Panel C. Summary Statistics of Auctioned Deals Versus Negotiated Deals

	Auction			Negotiation			Auction - Negotiation
	N	Mean	SD	N	Mean	SD	
# Common owners	408	0.257	0.415	601	0.128	0.288	0.129***
<i>Deal characteristics</i>							
Acquirer toehold	408	0.012	0.110	601	0.025	0.156	-0.013
Same SIC3 industry	408	0.412	0.493	601	0.473	0.500	-0.061
Target Defense Dummy	408	0.159	0.366	601	0.170	0.376	-0.010
# Acq-target common owners	408	0.213	0.487	601	0.160	0.418	0.054

(continued on next page)

TABLE 1 (continued)
Summary Statistics

Panel C. Summary Statistics of Auctioned Deals Versus Negotiated Deals (continued)

	Auction			Negotiation			Auction - Negotiation
	<i>N</i>	Mean	SD	<i>N</i>	Mean	SD	
<i>Acquirer characteristics</i>							
Institutional ownership	408	0.615	0.254	601	0.587	0.244	0.028
Market-to-book	408	1.768	1.237	601	2.011	1.365	-0.243**
Ln (size)	408	8.222	1.641	601	7.697	1.647	0.526***
ROA	408	0.034	0.056	601	0.033	0.084	0.001
Market leverage	408	0.505	0.300	601	0.419	0.290	0.087***
Cash holdings	408	0.112	0.140	601	0.145	0.170	-0.032**
<i>Target characteristics</i>							
Institutional ownership	396	0.474	0.250	584	0.452	0.252	0.020
Market-to-book	396	1.501	0.911	584	1.779	1.238	-0.279***
Ln (size)	396	6.153	1.201	584	5.815	1.212	0.338***
ROA	396	0.005	0.123	584	-0.002	0.135	0.006
Market leverage	396	0.522	0.312	584	0.428	0.307	0.088***
Cash holdings	396	0.139	0.179	584	0.192	0.224	-0.053***

investors that own at least 5% of both the acquirer and the average contesting acquirer. The acquirer has an average of 2% toehold ownership in the target before the acquisition announcement, consistent with the findings of Betton and Eckbo (2000) and Betton et al. (2009). For about 44.8% of the M&A bids, the acquirer and the target are from the same 3-digit SIC industry, and 16.6% of the target firms have defensive tactics (e.g., poison pills) in place at the time of the M&A announcement. The average acquirer has institutional ownership of 60%, a market-to-book ratio of 1.9, total assets of \$2.7 billion, return on assets (ROAs) of 3.4%, a leverage ratio of 45.4%, and a cash/asset ratio of 0.13 before the M&A announcement. By comparison, the average target firm has institutional ownership of 46%, a market-to-book ratio of 1.7, total assets of \$0.38 billion, ROAs of 0.1%, a leverage ratio of 46.6%, and a cash/asset ratio of 0.17.

Table 1 Panel C compares the characteristics of auctioned and negotiated M&As. The acquirer and the potential contesting acquirers have an average of 0.26 common owners for takeover auctions, which is twice the average number of common owners for takeover negotiations (0.13). The difference, 0.26 versus 0.13, is statistically significant at the 1% level. Thus, takeover auctions see more common owners among potential acquirers than takeover negotiations.

The difference in common ownership between takeover auctions and negotiations does not appear to be driven by either the acquirer's or the target's institutional ownership. The acquirer's average institutional ownership is 61.5% in auctions compared to 58.7% in negotiations, and the difference is statistically insignificant. The target firm's average institutional ownership is also similar between auctioned and negotiated takeovers: 47.4% in auctions versus 45.2% in negotiations. In addition, the acquirer and the target have a similar number of common owners (0.21 and 0.16, respectively) in auctions and negotiations. The difference is again statistically insignificant.

Takeover auctions and negotiations are also different in other aspects. Compared to negotiations, acquirers in auctions are larger in size and have higher leverage ratios, lower market-to-book ratios, and lower cash-to-asset ratios. Target

firms in auctions are larger and have higher leverage ratios, lower market-to-book ratios, and lower cash-to-asset ratios than target firms in negotiations. Given these differences, we control for deal, acquirer, and target characteristics in our multivariate analyses and design identification strategies to infer whether common ownership exerts causal effects on the choice of auction versus negotiation in the firm sale process.

IV. Common Ownership and Competition in the Firm Sale Process

A. Baseline Results

In Table 2 Panel A, we divide the sample acquisitions into two groups depending on whether the acquirer has any common owners with competing acquirers. The likelihood of auction is 50% when common owners are present compared to 35% with no common owners. The difference of 15% points is statistically significant at the 1% level, suggesting that the existence of common owners is positively associated with the likelihood of auction.

Table 2 Panel B presents the linear probability regression results, where the dependent variable is an indicator of auction. Column 1 has a lone independent variable, which is the number of common owners; column 2 adds deal characteristics as control variables; column 3 further adds acquirer characteristics; and column 4 adds target firm characteristics. We control for the acquirer's industry fixed effects (Fama–French 48 industry codes) and cluster standard errors by industry throughout our analyses. We employ the linear probability model because probit and logit models are subject to the incidental parameter problem when the model includes industry-fixed effects (Chamberlain (1980)). Nevertheless, we find similar results when we employ a logit model without controlling for industry-fixed effects in the next subsection.

We observe that the coefficient on the number of common owners is positive and statistically significant throughout the 4 columns, with *t*-statistics ranging between 4.2 and 7.1. In terms of economic magnitude, one common owner increases the likelihood of auction by 27.3% points in column 1 without any control variables. The economic magnitude drops slightly to 21.5% points after adding all the control variables in column 4. In relative terms, a 1-standard-deviation increase in the number of common owners (0.35) is associated with an 18.7% to 23.7% increase in the likelihood of auction relative to its mean (40.4%).

We also observe that target firms with high market-to-book ratios, high cash-to-asset ratios, and low institutional ownership are negatively associated with the likelihood of auction, while larger acquirers and acquirers with low toehold ownership and high institutional ownership are positively associated with the likelihood of auction. Common ownership between the acquirer and the target does not show up significantly in columns 3 and 4 of Table 2 Panel B.

In sum, common ownership among acquirers is positively associated with the likelihood that the firm is sold through auction. This finding supports the hypothesis that common ownership among acquirers enhances competition in the firm sale process (i.e., Hypothesis 2).

TABLE 2
Common Ownership and the Likelihood that the Firm is Sold Through Auction

Table 2 Panel A reports the likelihood that the target firm is sold through auction for two samples: the sample of acquirers that have at least one common institutional blockholder with their potential competing acquirers versus the sample of acquirers that do not have one common owner. The test for the likelihood difference between the two samples is based on the two-sample proportion z-test. Panel B reports linear probability regression results where the dependent variable is a dummy variable that takes the value of 1 if the target firm is sold through auction and 0 if it is sold through negotiations with a single acquirer. The main independent variable is the average number of common institutional blockholders between the acquirer and its competitors (# Common Owners). See Appendix B for detailed variable definitions. The regressions control for industry (Fama–French 48 industry codes) fixed effects; *t*-statistics are in parentheses; the standard errors are clustered at the industry level. Statistical significance at the 10%, 5%, and 1% levels is denoted by *, **, and ***, respectively.

Panel A. Univariate Comparison

Likelihood of Auction		
With Common Owner	Without Common Owner	Diff. (with–without)
50.28%	35.11%	15.17%***

Panel B. Regression Results

	Dependent Variable: Auction			
	1	2	3	4
# Common owners	0.273*** (7.059)	0.270*** (5.835)	0.231*** (4.803)	0.215*** (4.204)
<i>Deal characteristics</i>				
Acquirer toehold		-0.141** (-2.357)	-0.137** (-2.302)	-0.140** (-2.193)
Same SIC3 industry		-0.070** (-2.627)	-0.056* (-1.949)	-0.049 (-1.584)
Target defense dummy		-0.037 (-0.881)	-0.029 (-0.580)	-0.032 (-0.668)
# Acquirer–target common owners		0.001 (0.037)	0.000 (0.009)	-0.001 (-0.045)
<i>Acquirer characteristics</i>				
Institutional ownership			0.177** (2.379)	0.167** (2.163)
Market-to-b ook			0.010 (0.646)	0.013 (0.862)
Ln (size)			0.017 (1.518)	0.022** (2.104)
ROA			0.123 (0.891)	0.013 (0.073)
Market leverage			0.103 (0.942)	0.036 (0.304)
Cash holdings			-0.149 (-1.026)	-0.079 (-0.637)
<i>Target characteristics</i>				
Institutional ownership				0.099* (1.705)
Market-to-book				-0.029* (-1.835)
Ln (size)				-0.024 (-0.995)
ROA				-0.017 (-0.101)
Market leverage				0.087 (0.868)
Cash holdings				-0.187** (-2.167)
Constant	0.355*** (50.841)	0.396*** (25.760)	0.107 (0.889)	0.226 (1.367)
Observations	1,009	1,009	1,009	980
Adjusted R^2	0.064	0.067	0.075	0.074

B. Robustness of the Baseline Results

A long battery of tests reveals the robustness of the baseline results. They are robust when we replace the indicator for auction with the indicator for public auction or private auction as the dependent variable (see Panel A of Table A1 in the Supplementary Material), employ 4 alternative industry classifications to identify potential contesting acquirers (the 2-digit SIC industries, the 4-digit SIC industries, the Fama–French 48 industries, and the Hoberg and Phillips (2010) Text-based Network industries), and use logit regressions rather than linear probability regressions in the baseline results (see Panel B of Table A1 in the Supplementary Material). The baseline results are also robust to alternative cutoff ownership levels to identify common owners (1%, 2%, 3%, and 10%) rather than the 5% cutoff in the baseline results (see Panel C of Table A1 in the Supplementary Material). The results remain robust when we control for indicators of various ranges of institutional ownership of the acquirer and the target firm, as well as squared acquirer and target institutional ownership (see Panel D of Table A1 in the Supplementary Material), and when we use alternative measures of common ownership among potential acquirers detailed in Panel E of Table A1 in the Supplementary Material. In addition, the baseline results are robust in the subsamples of within- and cross-industry M&As (see Panel F of Table A1 in the Supplementary Material). Lastly, common ownership of both passive and active institutional shareholders among acquirers is positively associated with the likelihood of auction (Harford et al. (2011)), as is common ownership by dedicated and transient institutional shareholders classified by Bushee (1998) (see Panel G of Table A1 in the Supplementary Material).⁷

C. Identification Strategies

In this subsection, we show that the common ownership effect on the likelihood of auction is causal using two identification strategies based on mergers between financial institutions.

1. Identification Based on Mergers between Financial Institutions as an Instrument

Following He and Huang (2017), our first identification strategy utilizes mergers between financial institutions as an instrumental variable (IV) to common ownership. The merger between financial institutions must be completed within 1 year after the initial announcement, and the target institution must cease to file 13F forms within 1 year after the deal is completed. We use the list of financial institution mergers compiled by Lewellen and Lowry (2021), which augments the list of He and Huang (2017). It is unlikely that two financial institutions merge

⁷To further examine potential effects of common ownership in the firm sale process, we re-estimate model (4) of Table 2 Panel B but exclude the number of common owners between potential acquirers from the regression. The estimation results, reported in column 1 of Table A2 in the Supplementary Material, show that the coefficient on the number of common owners between the acquirer and the target is positive and statistically significant at the 10% level, which is inconsistent with the argument that acquirer-target common owners hinder competition in the firm sale process. Yet the positive coefficient on the number of acquirer-target common owners becomes insignificant once the number of common owners between potential acquirers is included in the regression as shown in Table 2 Panel B.

because they want to influence the sale process of a selling firm some years later. At the time of the merger, they cannot foresee whether the selling firm will be for sale. Therefore, the direction of causality runs from financial institution mergers to common ownership but not the other way around (i.e., there is no reverse causality).

The instrument takes the value of 1 if, first, any of the acquirer's institutional investors merged with another institutional investor over the 60 months prior to the bid announcement, and, second, the merger created common ownership above 5% between the acquirer and potential contesting acquirers. In the first-stage regression, we regress the number of common owners on the financial institutions merger indicator and the bid, acquirer, and target characteristics. In the second stage, we regress the takeover auction dummy on the fitted number of common owners from the first-stage regression and the bid, acquirer, and target characteristics.

Column 1 of Table 3 presents the first-stage regression results. The coefficient on the instrumental variable is 0.51 and statistically significant, with an associated t -statistic of 5.79. That is, a merger of financial institutions raises the number of common owners by 0.51. To assess the validity of the instrument, we follow prior studies and conduct the Cragg–Donald Wald F -test (Cragg and Donald (1993), Stock and Yogo (2005), and Roberts and Whited (2013)). In untabulated results, we also observe that the R^2 of our first-stage regression is over 30% when the instrumental variable is the only explanatory variable. This result and the Wald F -statistic of 176.23 indicate that mergers between financial institutions are a robust instrumental variable (Bennedsen, Nielsen, Perez-Gonzalez, and Wolfenzon (2007)), which is consistent with the findings of He and Huang (2017) and Lewellen and Lowry (2021).

TABLE 3

Identification Using Mergers Between Financial Institutions as an Instrument Variable

In Table 3, the instrumental variable takes the value 1 if, in the 60 months prior to the bid announcement, any of the acquirer's institutional owners merged with another institutional investor, and the merged institutional investors became a common owner of the acquirer and its competitors (neither shared a common owner before the merger of institutional investors). Columns 1–3 report the first-stage linear regression where the dependent variable is the average number of common institutional blockholders between the acquirer and its competitors (# Common Owners) and the key independent variable is the instrument; columns 4–6 report the second-stage regression results where the dependent variable is the takeover auction dummy and the key independent variable is the predicted number of common owners from columns 1 to 3, respectively. While we include all deals in columns 1 and 4, we exclude the 2007–2009 acquisition bids in columns 2 and 5. In columns 3 and 6, we re-measure the number of common owners by excluding the common ownership created by the Blackrock-BGI merger. We include the deal, acquirer, and target characteristics (see column 4 of Table 2 Panel B for the list of these control variables) and industry (Fama–French 48 industries) fixed effects in all regressions but do not report the coefficients on the control variables for brevity. t -statistics are in parentheses; the standard errors are clustered at the industry level. The Cragg–Donald test examines the strength of the instrumental variable. See Appendix B for detailed variable definitions. Statistical significance at the 10%, 5%, and 1% levels is denoted by *, **, and ***, respectively.

Dependent Variable	First Stage			Second Stage		
	# Common Owners			Auction		
	All	Exclude		All	Exclude	
Sample		2007–2009	BGI		2007–2009	BGI
	1	2	3	4	5	6
Mergers between financial institutions (IV)	0.510*** (5.788)	0.478*** (5.230)	1.045*** (47.876)			
Fitted # common owners				0.390*** (3.390)	0.474*** (4.113)	0.561*** (12.418)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes
Observations	980	894	980	980	894	980
Cragg–Donald F -statistic	176.228	143.404	11.131			
Adjusted R^2	0.392	0.407	0.288	0.037	0.031	0.004

Column 4 of [Table 3](#) reports the second-stage regression results. The coefficient on the fitted number of common owners is 0.39 and statistically significant at the 1% level with an associated t -statistic of 3.39. The economic magnitude of the coefficient is comparable to that in column 4 of [Table 2](#) Panel B (the coefficient was 0.22). The comparable economic magnitudes of the effect in different model specifications further corroborate the validity of the instrumental variable (Roberts and Whited (2013) and Jiang (2017)).

Lewellen and Lowry (2021) point out that the financial crisis period (2008–2009) witnessed an unusually high number of mergers between financial institutions. Thus, post-merger acquirer performance could be affected by the financial crisis, especially if the unaffected control firms are from different industries than the affected firms. This is not a concern for our setting because our M&As come from a long sample period and various industries. We also control for industry-fixed effects. Nevertheless, we address this concern by excluding acquisition bids in the 2008–2009 period from our analysis in columns 2 and 5 of [Table 3](#). We observe that the IV regression results remain qualitatively unchanged in these 2 columns.

As another robustness check, we exclude from the instrumental variable the Blackrock–BGI merger—an influential merger that resulted in common ownership among many firms—to assess whether our results are driven only by this merger. The first- and second-stage IV regression results, reported in columns 3 and 6 of [Table 3](#), show that the results remain robust after excluding the Blackrock–BGI merger from the construction of the instrumental variable.

2. Identification Based on a Clean Sample

In addition to the 2-stage IV regressions, we use mergers between financial institutions to create a clean sample of M&As, which excludes M&As with common ownership among acquirers that may exist for potentially endogenous reasons. The sample of M&As can be divided into three groups: i) M&As without common owners between the acquirer and potential contesting acquirers; ii) M&As with common ownership created through mergers of financial institutions; and iii) M&As with common ownership that is not created through mergers of financial institutions. Common ownership in the third category is not the result of mergers between financial institutions and might be created for endogenous reasons related to the acquisition bid. We thus form a clean sample by excluding the M&As in the third group.

[Table 4](#) presents the regression results based on the clean sample. The coefficient on the number of common owners remains positive and statistically significant at the 1% level throughout the four model specifications. Note that the economic magnitude of the coefficient (about 0.31) is comparable to that in the second-stage regression (column 4 of [Table 3](#)) and to that in [Table 2](#) Panel B. The comparability of the economic magnitude of the coefficient in different model specifications and in different identification strategies offers us confidence that the findings we document are robust (Roberts and Whited (2013), Jiang (2017)).

In sum, this section shows that common ownership between potential acquirers raises the likelihood that the target firm is sold through auction rather than negotiation with a single buyer. The effect is statistically and economically significant and remains robust in a long battery of additional tests. The effect seems

TABLE 5
Merger Likelihood

Table 5 examines the effect of common ownership on the likelihood of merger using the method of Bena and Li (2014). For each target, we identify five random (columns 1 and 2) or industry-size matched (columns 3 and 4) pseudo acquirers. Then we calculate all relevant variables for each pseudo acquirer–target pair and estimate linear probability regressions (columns 1 and 3) and conditional logit regressions (columns 2 and 4), where the dependent variable is the indicator for the real acquirer–target pair. Columns 3–4 have slightly fewer observations because, like Bena and Li (2014), we cannot always find five industry-size matched pseudo acquirers for each target. We control for deal fixed effects and cluster standard errors at the deal level. See Appendix B for detailed variable definitions. Statistical significance at the 10%, 5%, and 1% levels is denoted by *, **, and ***, respectively.

Model	Dependent Variable: Real Acquirer-Target Pair			
	Linear Probability		Conditional Logit	
	Random		Industry/Size-Matched	
Pseudo Acquirer	1	2	3	4
# Common owners	-0.164*** (-8.599)	-1.008*** (-6.112)	-0.171*** (-8.529)	-1.133*** (-6.006)
# Acquirer-target COs	0.090*** (4.867)	0.720*** (5.146)	0.075*** (4.178)	0.553*** (4.537)
<i>Acquirer Characteristics</i>				
Institutional ownership	0.022 (0.825)	0.971*** (4.685)	-0.028 (-1.216)	0.228 (1.203)
Ln (size)	0.101*** (27.663)	0.682*** (20.548)	0.139*** (28.560)	0.922*** (18.672)
Cash holdings	0.079*** (3.467)	0.888*** (3.192)	-0.090*** (-2.864)	-0.962*** (-3.104)
ROA	-0.025 (-1.398)	1.266*** (3.229)	-0.064 (-1.297)	0.023 (0.045)
Market-to-book	0.008*** (5.604)	0.051*** (3.487)	0.011*** (7.594)	0.078*** (6.208)
Market leverage	0.013 (0.454)	0.217 (0.829)	-0.170*** (-5.637)	-1.132*** (-4.344)
Constant	-0.443*** (-27.394)		-0.662*** (-22.379)	
Observations	5,964	5,964	5,837	5,837
Adjusted/Pseudo R ²	0.132	0.412	0.018	0.251

B. Deal Initiation

Selling firms can enhance the competition in the firm sale process by initiating the selling process and approaching acquirers that do not have common owners. Alternatively, they can choose to sell through auction and invite more buyers when cross-owned acquirers initiate the deal. We test these channels in Table 6. Panel A of Table 6 shows that common ownership among acquirers is not significantly associated with the likelihood that the deal is initiated by the acquirer or the target. However, common ownership among acquirers has a stronger effect on the likelihood of the target being sold through auction among acquirer-initiated deals compared to target-initiated deals (Table 6 Panel B). These results suggest that selling firms are aware of possible anti-competitive effects of common owners of acquirers. They are more likely to sell themselves through auction when a cross-owned acquirer initiates the deal.

C. Bargaining

Selling firms can also effectively enhance competition in the firm sale process by bargaining hard against cross-owned acquirers. One way to bargain hard is to

TABLE 6
Common Ownership Among Acquirers and Deal Initiation

Table 6 Panel A reports linear probability regression results where the dependent variable is an indicator equal to 1 if the deal is initiated by the target/acquirer, and 0 otherwise. We can identify the deal initiator in SEC filings for 929 of the 980 sample deals with available deal/acquirer/target characteristics. Panel B reports linear probability regression results where the dependent variable is a dummy variable that takes the value of 1 if the target firm is sold through auction, and 0 if it is sold through negotiations with a single acquirer. The main independent variable is the average number of common institutional blockholders between the acquirer and its competitors (# Common Owners). Column 1 uses only target-initiated deals; column 2 uses only acquirer-initiated deals; column 3 uses the full sample. We control for the deal, acquirer, and target characteristics and industry (Fama–French 48 industries) fixed effects in all regressions but do not report the coefficients on the control variables for brevity in Panel B. *t*-statistics are in parentheses; the standard errors are clustered at the industry level. See Appendix B for detailed variable definitions. Statistical significance at the 10%, 5%, and 1% levels is denoted by *, **, and ***, respectively.

Panel A. Effect of Common Ownership on Deal Initiation

	Dependent Variable	
	Target Initiated 1	Acquirer Initiated 2
# Common owners	0.044 (1.386)	-0.016 (-0.511)
<i>Deal characteristics</i>		
Acquirer toehold	-0.054 (-0.569)	0.100 (0.887)
Same SIC3 industry	0.012 (0.345)	-0.013 (-0.485)
Target defense dummy	-0.023 (-0.668)	-0.007 (-0.181)
# Acquirer-target common owners	0.056 (1.681)	-0.015 (-0.421)
<i>Acquirer characteristics</i>		
Institutional ownership	0.110* (1.711)	-0.092 (-1.289)
Market-to-book	-0.004 (-0.221)	0.006 (0.291)
Ln (size)	0.030 (1.606)	0.002 (0.112)
ROA	-0.346 (-1.280)	0.329 (1.302)
Market leverage	-0.085 (-0.565)	0.086 (0.648)
Cash holdings	-0.174 (-1.467)	0.203 (1.362)
<i>Target characteristics</i>		
Institutional ownership	-0.203*** (-2.790)	0.217*** (3.271)
Market-to-book	0.032* (1.829)	-0.041** (-2.355)
Ln (size)	-0.026 (-0.862)	-0.019 (-0.609)
ROA	0.186 (1.552)	-0.200 (-1.545)
Market leverage	0.185* (1.806)	-0.060 (-0.513)
Cash holdings	0.142 (1.454)	-0.173* (-1.811)
Constant	0.263 (1.278)	0.527*** (2.741)
Observations	929	929
Adjusted R^2	0.056	0.029

Panel B. Interaction Effect Between Deal Initiation and Common Ownership

Sample	Dependent Variable: Auction		
	Target-Initiated 1	Acquirer-Initiated 2	All M&As 3
# Common owners	0.110** (1.722)	0.266*** (3.248)	0.258*** (3.497)
Target-initiated			0.242*** (4.900)

(continued on next page)

TABLE 6 (continued)
Common Ownership Among Acquirers and Deal Initiation

Panel B. Interaction Effect Between Deal Initiation and Common Ownership (continued)

Sample	Dependent Variable: Auction		
	Target-Initiated	Acquirer-Initiated	All M&As
	1	2	3
# Common owners × Target-initiated			-0.128* (-1.862)
Control variables	Yes	Yes	Yes
Observations	386	543	929
Adjusted R ²	0.087	0.023	0.114

terminate or threaten to terminate the deal. To test this possibility, we supplement our sample of completed deals with withdrawn deals over the sample period (1993–2016) that satisfy the other two sample criteria used in the study: Deal value must be at least \$150 million, and the relative size must be at least 1%. The regression results in column 1 of Table 7 Panel A reveal that common ownership among acquirers is insignificantly associated with the likelihood of deal completion.

We also examine whether common ownership among acquirers affects the four other M&A deal outcomes related to the target's bargaining strength: the bid premium, the medium of payment proxied by an indicator for an all-cash payment, the length of the firm selling process from initiation to consummation, and the target's relative gain as constructed by Ahern (2012). The target's relative gain is the difference in the cumulative abnormal dollar return between the target and the bidder over days (-1, +1) around the deal announcement, divided by the acquirer's and the target's total market value of equity 50 trading days prior to the announcement. We construct two versions of bid premium, one based on the target's stock price 42 days prior to the deal announcement and the other based on the target's stock price on the deal initiation day following Eaton, Liu, and Officer (2021). A longer deal tenor from deal initiation to consummation could indicate that the target bargains hard against acquirers. A common owner among acquirers has incentives to underpay the target firm, for example, by paying the target firm with overvalued equity of its cross-owned firm (Eckbo, Makaew, and Thorburn (2018)). The selling firm would bargain for cash payment to prevent the common owner's opportunistic behavior.

The last 5 columns of Table 7 Panel A present the regression results for these four deal outcomes. We observe that common ownership among acquirers is insignificantly associated with the target's relative gain or bid premium but is positively associated with the likelihood of an all-cash payment and with deal tenor from deal initiation to consummation.⁸

⁸Table A3 in the Supplementary Material shows that target firms receive lower bid premiums and relative gains when they initiate the selling process, which is consistent with the model of Gorbenko and Malenko (2004) that the signal of the initiating bidder is drawn from a more optimistic valuation of the target firm.

TABLE 7

Common Ownership Among Acquirers and Bargaining in the Firm Sale Process

Table 7 Panel A presents OLS and linear probability regression results where the dependent variables are deal outcomes related to the target's bargaining in the firm sale process: an indicator for completed deals, the target's relative gain, bid premium, an indicator that the acquirer pays target shareholders with only cash, and deal tenor. Relative gain is the difference between the target's and the acquirer's abnormal dollar return over days $(-1, +1)$ around deal announcement, divided by the sum of the acquirer's and target's market value of equity 50 trading days prior to the announcement (Ahern (2012)). Bid premium is based on the target's stock price 42 days prior to deal announcement or the target's stock price on the deal initiation day following Eaton et al. (2021). Deal tenor is the number of days from deal initiation to deal completion. Panel B reports linear probability regression results where the dependent variable is a dummy variable that takes the value of 1 if the target firm is sold through auction and 0 if it is sold through negotiations with a single acquirer. The main independent variable is the average number of common institutional blockholders between the acquirer and its competitors (# Common Owners) and the interaction variable between the number of common owners and three proxies for the target's bargaining power: i) the Hoberg and Phillips (2010) product similarity score between the acquirer and the target; ii) the acquirer's Fama-French 48-industry concentration measured by the Herfindahl-Hirschman Index (HHI) of firm sales; and iii) the number of SIC3 industry peers of the acquirer. We control for the deal, acquirer, and target characteristics (see Panel A for the list of these control variables) and industry (Fama-French 48 industries) fixed effects in all regressions but do not report the coefficients on the control variables for brevity in Panel B. *t*-statistics are in parentheses; the standard errors are clustered at the industry level. See Appendix B for detailed variable definitions. Statistical significance at the 10%, 5%, and 1% levels is denoted by *, **, and ***, respectively. Columns 3, 4, and 6 of Panel A have fewer than 980 observations because we can identify the deal initiator and the initiation day in SEC filings for only 929 of the 980 sample deals with available deal/acquirer/target characteristics, and the offer price (and hence the bid premium) is missing for 22 of these 980 deals.

Panel A. Common Ownership and Deal Outcomes Related to Target Bargaining

	Dependent Variable					
	Completed	Relative Gain	Bid Premium	Bid Premium, Initiation Day	All Cash	Deal Tenor
	1	2	3	4	5	6
# Common owners	-0.016 (-0.629)	-0.008 (-0.855)	0.004 (0.134)	0.040 (0.693)	0.152** (2.021)	25.538* (1.705)
<i>Deal characteristics</i>						
Acquirer toehold	-0.137** (-2.201)	-0.017** (-2.169)	0.031 (0.409)	0.052 (0.532)	0.316** (2.625)	26.223 (0.724)
Same SIC3 industry	0.004 (0.252)	0.001 (0.147)	0.020 (0.833)	0.039 (0.792)	-0.032 (-1.256)	-7.813 (-1.015)
Target defense dummy	-0.038 (-1.038)	0.012* (1.779)	0.067** (2.211)	0.101 (0.832)	-0.133*** (-3.589)	-10.538 (-1.148)
#Acq-target com. Owners	0.029* (1.872)	-0.004 (-0.488)	0.014 (0.598)	0.011 (0.304)	-0.063** (-2.024)	-4.981 (-0.612)
<i>Acquirer characteristics</i>						
Institutional ownership	0.065** (2.506)	0.002 (0.164)	0.013 (0.255)	0.213** (2.177)	-0.055 (-0.781)	-49.783** (-2.229)
Market-to-book	0.006*** (2.785)	-0.003 (-1.063)	0.014 (0.791)	0.090 (1.102)	-0.052*** (-3.984)	-2.559 (-0.726)
Ln (size)	0.057*** (6.822)	-0.017*** (-11.349)	0.012 (0.916)	0.056* (1.830)	0.099*** (5.069)	-10.273*** (-3.565)
ROA	0.020 (0.395)	-0.046 (-1.143)	0.128 (0.482)	0.383 (1.256)	0.885*** (4.210)	-25.172 (-0.642)
Market leverage	-0.046 (-0.927)	0.006 (0.297)	-0.103 (-0.975)	0.373 (1.291)	-0.282** (-2.334)	24.141 (0.845)
Cash holdings	-0.052 (-0.891)	-0.003 (-0.125)	-0.006 (-0.062)	0.743 (1.431)	0.143* (1.770)	27.996 (0.992)
<i>Target characteristics</i>						
Institutional ownership	0.017 (0.636)	-0.013 (-1.084)	-0.063 (-1.225)	-0.199* (-1.802)	0.280*** (3.394)	-17.712 (-1.140)
Market-to-book	-0.007** (-2.065)	0.002 (0.584)	-0.050*** (-3.725)	-0.086*** (-2.947)	-0.062*** (-4.439)	-2.942 (-0.824)
Ln (size)	-0.058*** (-6.708)	0.012*** (3.173)	-0.147*** (-7.828)	-0.353*** (-4.551)	-0.093*** (-4.004)	16.650** (2.123)
ROA	0.037 (0.936)	-0.014 (-1.043)	-0.178* (-1.933)	-0.532* (-1.793)	0.108 (0.659)	-8.381 (-0.252)
Market leverage	-0.034 (-0.766)	-0.021 (-1.381)	0.572*** (11.030)	0.720*** (3.768)	0.189* (1.807)	10.287 (0.368)
Cash holdings	0.008 (0.146)	0.016 (0.876)	0.066 (0.648)	-0.077 (-0.385)	0.255*** (4.157)	-21.520 (-0.908)

(continued on next page)

TABLE 7 (continued)

Common Ownership Among Acquirers and Bargaining in the Firm Sale Process

<i>Panel A. Common Ownership and Deal Outcomes Related to Target Bargaining</i>						
	Dependent Variable					
	Completed	Relative Gain	Bid Premium	Bid Premium, Initiation Day	All Cash	Deal Tenor
	1	2	3	4	5	6
Constant	0.761*** (17.234)	0.116*** (5.517)	1.022*** (7.243)	1.464*** (4.593)	0.157 (0.893)	266.585*** (5.483)
Observations	2,447	980	958	908	980	929
Adjusted R^2	0.078	0.141	0.156	0.128	0.312	0.141
<i>Panel B. Interaction Effect Between Target Bargaining Power and Common Ownership</i>						
	Dependent Variable: Auction					
Proxy for Bargaining Power	High HP Score	High HHI	High Number of Peers			
	1	2	3			
# Common owners	0.243** (3.139)	0.189*** (3.517)	0.227*** (2.789)			
Bargaining power proxy	-0.027 (-0.882)	-0.051 (-1.154)	-0.028 (-0.645)			
# Common owners × Bargaining power proxy	-0.053 (-0.607)	0.048 (0.493)	-0.031 (-0.305)			
Control variables	Y	Y	Y			
Observations	980	980	980			
Adjusted/pseudo R^2	0.074	0.074	0.073			

In addition, we examine whether the target's bargaining strength affects the relationship between common ownership and the likelihood that the target is sold through auction. To this end, we construct three proxies for the target's bargaining strength based on the product market structure before deal announcement following Ahern (2012). These proxies are: i) the Hoberg and Phillips (2010) product similarity score between the acquirer and the target; ii) the acquirer's Fama–French 48-industry concentration proxied by the Herfindahl–Hirschman Index (HHI) of firm sales; and iii) the number of SIC3 industry peers of the acquirer firm. Note that here we do not employ proxies for the target's bargaining strength based on ex post-deal outcomes due to concerns over the direction of causation. The regression results reported in Table 7 Panel B suggest that these proxies of the target's bargaining power do not affect the relation between common ownership among acquirers and the likelihood of auction.

On balance, selling firms do not seem to respond to common ownership among acquirers by terminating the deal. Proxies for the target's ex ante bargaining strength also do not alter the relation between common ownership of acquirers and the likelihood that the target is sold through auction. However, we observe evidence that selling firms bargain hard when there are common owners among acquirers: they extend the selling process and are more likely to bargain for cash payment.

D. The Information-Sharing Role of Common Owners Among Acquirers

The selling firm must disclose confidential information to all interested buyers, which can lower the firm's competitive advantage and value (Hansen (2001)). The cost of disclosing confidential information is greater if a common

owner shares this information with other firms it owns (He, Liang, Wang, and Xia (2024)). On the other hand, the existence of common owners among potential acquirers could remove part of the advantage of negotiated sales, as negotiation is no longer a definitive way to prevent information leakage because a common owner may share the selling firm's information among potential acquirers.

To test the information-sharing role of common owners, we construct two proxies for the target firm's value of confidential information: the target's research and development (R&D) intensity and an indicator for target firms in high-tech sectors. We argue that it is more costly for target firms with more R&D expenditure and for high-tech target firms to disclose confidential information. Table A5 in the in the Supplementary Material shows that the baseline results are similar for target firms with high versus low costs of disclosing confidential information. It appears that the baseline results are not driven by the information-sharing role of common owners of potential acquirers.

VI. Common Owners Among Acquirers and Deal Quality

The preceding sections show that common ownership among acquirers enhances competition in the firm sale process, which in turn can result in better deal quality. In this section, we test this implication using two proxies for deal quality: acquirer–target combined stock returns around deal announcement and postacquisition acquirer operating performance (Duchin and Schmidt (2013), Ellahie, Hshieh, and Zhang (2025)).

A. Common Ownership and Acquirer–Target Combined Announcement Returns

The start of a private sale to its public announcement is usually a months-long process. Prior studies document target firm price runups before deal announcement (Betton et al. (2008)). Eaton et al. (2021) show that stock returns over the short run around deal announcement tend to underestimate actual shareholder gains or losses. We thus compute the target's and the acquirer's cumulative abnormal returns (CARs) over 5 windows around the announcement—days (−42, +1), (−42, +42), (−63, +1), (−63, +63), and (Initiation, +1). We also compute the weighted-average CARs to their shareholders. See Appendix B for detailed variable definitions. The regression results in Table 8 show that common ownership among acquirers is positively and significantly associated with acquirer–target combined CARs over the 5 windows; the only exception is combined CARs over the window (Initiation, +1) for which the relevant *t*-statistic is 1.49. In terms of the economic magnitude, each common owner raises combined CARs by 2.5% to 6%, depending on the window.⁹

⁹Panel B of Table A4 in the in the Supplementary Material shows that the coefficient on acquirer–target common ownership is largely insignificant. This result is consistent with the finding of Harford et al. (2011) and suggests that common ownership between the acquirer and the target does not affect acquirer–target combined announcement returns.

TABLE 8
Common Ownership Among Acquirers and Acquirer–Target Combined
Announcement Returns

Table 8 reports OLS regression results where the dependent variable is acquirer–target combined abnormal returns around deal announcement over various windows: days (−42, +1), (−42, +42), (−63, +1), (−63, +63), and (initiation, +1), where day 0 is the deal announcement day. Daily abnormal returns are computed using the market model with beta estimated over days (−379, −127) before deal announcement. The independent variables are the average number of common institutional blockholders between the acquirer and its competitors (# Common Owners), the deal, acquirer, and target characteristics, and industry (Fama–French 48 industries) fixed effects. *t*-statistics are in parentheses; the standard errors are clustered at the industry level. See Appendix B for detailed variable definitions. Statistical significance at the 10%, 5%, and 1% levels is denoted by *, **, and ***, respectively. Column 5 has fewer observations because we can identify the deal initiator and the initiation day in SEC filings for only 929 of the 980 sample deals with available deal/acquirer/target characteristics.

Dependent Variable	Combined CARs				
	(−42, +1) 1	(−42, +42) 2	(−63, +1) 3	(−63, +63) 4	(Initiation, +1) 5
# Common owners	0.026** (2.251)	0.042*** (2.753)	0.032* (2.016)	0.060** (2.538)	0.029 (1.486)
<i>Deal characteristics</i>					
Acquirer toehold	0.041 (0.994)	0.042 (0.666)	0.039 (0.666)	0.062 (0.707)	−0.005 (−0.066)
Same SIC3 industry	0.001 (0.087)	0.017 (1.285)	0.003 (0.226)	0.012 (0.767)	0.013 (0.624)
Target defense dummy	0.006 (0.492)	0.005 (0.218)	0.007 (0.350)	0.002 (0.065)	0.007 (0.276)
# acquirer–target COs	0.011 (0.812)	−0.003 (−0.206)	−0.003 (−0.166)	−0.030 (−1.378)	0.016 (0.787)
<i>Acquirer characteristics</i>					
Institutional ownership	−0.043* (−1.793)	−0.077** (−2.611)	−0.064** (−2.250)	−0.125*** (−3.670)	−0.061 (−1.293)
Market-to-book	−0.006 (−0.890)	−0.015* (−1.906)	−0.021** (−2.122)	−0.029*** (−2.989)	−0.019 (−1.397)
Ln (size)	−0.013** (−2.566)	−0.006 (−0.856)	−0.013* (−1.867)	−0.004 (−0.447)	−0.015* (−2.017)
ROA	0.071 (0.967)	0.154 (1.467)	0.089 (0.678)	0.192 (1.170)	0.020 (0.118)
Market leverage	0.059* (1.871)	0.082 (1.473)	0.081* (1.841)	0.101 (1.489)	0.126* (1.797)
Cash holdings	−0.034 (−0.955)	−0.026 (−0.464)	0.049 (1.346)	0.046 (0.725)	−0.091 (−1.374)
<i>Target characteristics</i>					
Institutional ownership	0.007 (0.266)	−0.005 (−0.120)	0.021 (0.675)	0.025 (0.581)	0.045 (1.006)
Market-to-book	−0.014** (−2.257)	−0.018 (−1.639)	−0.018** (−2.394)	−0.020 (−1.616)	0.002 (0.162)
Ln (size)	−0.008 (−1.103)	−0.009 (−0.871)	−0.023** (−2.698)	−0.024** (−2.032)	−0.043** (−2.557)
ROA	−0.024 (−0.542)	−0.040 (−0.916)	0.016 (0.335)	−0.009 (−0.123)	−0.115 (−1.085)
Market leverage	0.038 (1.026)	0.049 (1.096)	0.050 (1.205)	0.096 (1.507)	0.160** (2.094)
Cash holdings	−0.041 (−1.251)	−0.068 (−1.414)	−0.040 (−0.963)	−0.058 (−1.022)	−0.076 (−0.590)
Constant	0.198*** (3.472)	0.151* (1.717)	0.294*** (3.907)	0.221** (2.311)	0.320** (2.543)
Observations	980	980	980	980	929
Adjusted <i>R</i> ²	0.055	0.061	0.052	0.041	0.024

Besides acquirer–target combined announcement returns, we also examine whether common ownership among acquirers is significantly associated with acquirer announcement returns. Table A6 in the Supplementary Material reveals that the number of common owners is positively associated with the acquirer’s announcement CARs, which is consistent with the results based on acquirer–

target combined announcement returns. This result remains qualitatively unchanged after controlling for the acquirer–rival cross-ownership constructed by Antón et al. (2022), which is all the acquirer shareholders' ownership in all industry rivals of the acquirer. Unlike Antón et al. (2022), we focus on cross-ownership of large shareholders with at least 5% ownership in both the acquirer and its industry peers rather than cross-ownership of all acquirers' shareholders. We do so because Harford et al. (2011) show that only large acquirer shareholders could influence the acquirer's merger decisions. Note that our results are robust to alternative cutoff ownerships (1%, 2%, 3%, 10%) when identifying large common owners (see Panel D of Table A1 in the in the Supplementary Material).¹⁰

B. Common Ownership and Postacquisition Accounting Performance

We also examine the acquirer's postacquisition accounting performance following the method of Harford, Humphery-Jenner, and Powell (2012). Specifically, we compute each acquirer's average industry-adjusted ROA over the 3 years prior to deal completion and over the 3 years after. Following these studies, we regress the average postacquisition ROA on pre-acquisition ROA, the number of common owners among acquirers, and deal and acquirer characteristics. The regression results showcased in Table 9 reveal that common ownership among acquirers is positively and significantly associated with postacquisition acquirer ROA. In terms of the economic magnitude, each common owner raises ROA by about 0.8% points.

Taken together, these results indicate that common ownership among acquirers is associated with better deal quality, which is consistent with our finding that common ownership among acquirers enhances competition in the firm sale process. These findings are in line with recent work suggesting common ownership could improve corporate governance. Edmans et al. (2019) show that the exit decision of a common owner is informative because it sells low-quality portfolio firms first. To avoid being sold, managers of cross-owned firms endeavor to improve firm performance. Similarly, He et al. (2019) show that institutional investors have stronger incentives to monitor cross-owned firms in the presence of corporate governance externalities.

¹⁰Antón et al. (2022) document that their acquirer-rival cross-ownership measure is negatively associated with the acquirer's 3-day announcement returns. In Table A7 in the Supplementary Material, we replicate their result in column 1 and show that the coefficient on the acquirer-rival cross-ownership becomes insignificant once the acquirer-target cross-ownership is excluded from the regression in column 2. Yet, the coefficient on the acquirer-target cross-ownership remains positive and statistically significant when we exclude the acquirer-rival cross-ownership from the regression in column 3. These results indicate that the acquirer-rival cross-ownership alone is not significantly associated with the acquirer's 3-day announcement returns; the negative coefficient on the acquirer-rival cross-ownership in column 1 is driven by the high correlation (0.59) between the acquirer-rival cross-ownership and the acquirer-target cross-ownership. The coefficient on the acquirer-rival cross-ownership remains statistically insignificant when we extend the announcement return window to more than 3 days (columns 3–15 of Table A7).

TABLE 9
Common Ownership Among Acquirers and Post-Acquisition
Acquirer Operating Performance

Table 9 reports OLS regression results where the dependent variable is the acquirer's average industry-adjusted return on asset (ROA) over the 3 years after deal completion. The independent variables are the average number of common institutional blockholders between the acquirer and its competitors (# Common Owners), the acquirer's average industry-adjusted ROA over the 3 years before deal completion, the deal and acquirer characteristics, and industry (Fama–French 48 industries) fixed effects. ROA is winsorized at the 5% level to exclude outliers. The model specifications are similar to Harford, Humphery-Jenner, and Powell (2012). *t*-statistics are in parentheses; the standard errors are clustered at the industry level. See Appendix B for detailed variable definitions. Statistical significance at the 10%, 5%, and 1% levels is denoted by *, **, and ***, respectively. There are fewer than 1,009 observations in the first 3 columns because of missing ROA data; there are fewer observations in column 4 than in the first 3 columns because we cannot confirm the identity of the deal initiation in SEC filings for some deals.

	Dependent Variable: Post-Acquisition ROA			
	1	2	3	4
# Common owners	0.010** (2.066)	0.013** (2.529)	0.008** (2.296)	0.014** (2.187)
Target-initiated				-0.000 (-0.111)
# Common owners × Target-initiated				-0.012 (-1.442)
Pre-Acquisition ROA	0.663*** (10.292)	0.661*** (10.384)	0.495*** (4.766)	0.489*** (4.828)
<i>Deal characteristics</i>				
Acquirer toehold		0.019* (1.896)	0.023* (1.977)	0.023** (2.043)
Same SIC3 industry		-0.006* (-1.731)	-0.003 (-0.761)	-0.003 (-0.773)
Target defense dummy		0.010 (1.287)	0.009 (1.316)	0.008 (1.363)
# Acquirer-target common owners		-0.003 (-0.652)	-0.000 (-0.098)	-0.000 (-0.022)
<i>Acquirer characteristics</i>				
Institutional ownership			0.004 (0.306)	0.006 (0.398)
Market-to-book			0.008** (2.554)	0.008** (2.632)
Ln (size)			0.008*** (2.860)	0.008*** (2.807)
ROA			0.184** (2.451)	0.202** (2.571)
Market leverage			0.016 (0.790)	0.011 (0.531)
Cash holdings			0.007 (0.214)	-0.002 (-0.053)
Constant	-0.007*** (-6.263)	-0.006** (-2.653)	-0.103*** (-3.187)	-0.099*** (-3.072)
Observations	981	981	981	931
Adjusted R^2	0.356	0.358	0.393	0.400

VII. Conclusions

Motivated by the importance of the firm sale process and the ubiquity of common ownership, we examine the role of common owners among acquirers in the firm sale process. Our setting differs from prior studies of common ownership because selling firms, unlike consumers, are not passive price takers. A selling firm has both the incentive and the ability to enhance competition in the firm sale process when there exist common owners among acquirers.

We find that one common owner among acquirers raises the likelihood that the target firm is sold through auction (vs. negotiation with a single buyer) by 21.5%, which is consistent with the hypothesis that common ownership among acquirers enhances competition in the firm sale process. Consistent with enhanced competition, common ownership among acquirers is also associated with better deal quality.

We explore four economic channels through which common ownership among acquirers affects the firm sale process. First, we observe that target firms prevent the anticompetitive effects of cross-owners by avoiding cross-owned acquirers. Second, selling firms are more likely to be sold through auction when cross-owned acquirers initiate the deal. Third, we observe evidence that selling firms bargain hard when there exist common owners among acquirers. Lastly, we observe no evidence that the target firm chooses to be sold through auction to lower the cost of sharing confidential information with cross-owned acquirers.

By highlighting the selling firm's active roles in the firm sale process, our study offers a new approach to examining the anticompetitive role of common ownership. We hope our study will inspire more research into the factors that alleviate or strengthen the anticompetitive effects of common ownership. For policymakers, our findings suggest that policies that raise consumers' bargaining power may alleviate or nullify possible anticompetitive effects of common ownership on product market competition.

Appendix A. Sample Selection

Selection Criteria	Source	Number of Exclusions	Sample Size
Completed and withdrawn acquisition bids between U.S. public acquirers and U.S. public targets during the period from Jan. 1993 to Dec. 2016, with deal form of Merger (M) or Acquisition of Majority Interest (AM)	SDC		6,878
Deal value is greater than \$150 million and deal value relative to the acquirer's market capitalization is at least 1%	SDC	4,101	2,777
The acquirer's financial data is available for the year-end before the announcement	Compustat	563	2,214
Market value of equity is available for the quarter before the announcement and the share code is 10 or 11	CRSP	456	1,758
Share price in the preoffer period is greater than \$1	CRSP	249	1,509
No missing daily returns and less than 120 daily zero returns in the preoffer period	CRSP	225	1,284
Information for the private sale process is available from SEC Filings	EDGAR	275	1,009
Final sample			1,009

Appendix B. Variable Definitions

Dependent Variables

Auction A binary variable equal to 1 if the target firm is privately or publicly auctioned, and 0 otherwise. A firm is privately auctioned if more than one firm signed a confidentiality agreement with the target and/or showed interest in acquiring the target in the private sale process. It is publicly auctioned if the acquisition bid is preceded or followed by another acquisition bid for the same target within 365 calendar days. Source: SEC EDGAR filings and SDC.

Completed A binary variable equal to 1 if the deal is completed, and 0 otherwise. Source: SDC.

Bid premium The ratio of the final offer price (from SDC) to the target's share price 42 trading days prior to the bid announcement (from CRSP), minus 1.

Bid premium, initiation day The ratio of the final offer price to the target's share at the time of deal initiation, minus 1. Source: SEC EDGAR filings, SDC, and CRSP.

Combined CAR ($-t, k$) Weighted average cumulative abnormal return (CAR) to the acquirer's and the target's stocks over days ($-t, +k$, where day 0 is the bid announcement date). The weight for the acquirer is the acquirer's market value of equity t days before the bid announcement; the weight for the target is the fraction of the target's stocks the acquirer intends to acquire times the target's market value of equity t days before the bid announcement, following Moeller, Schlingemann, and Stulz (2004). Source: CRSP, SDC, and Authors' calculations.

Relative gain The difference between the target's and the bidder's abnormal dollar returns over days ($-1, +1$) around deal announcement, divided by the sum of the acquirer's and target's market value of equity 50 trading days prior to the announcement following Ahern (2012).

Deal tenor The number of calendar days from deal initiation to deal completion. Source: SEC EDGAR filings and SDC.

All cash A binary variable equal to 1 if the acquirer pays only cash to the target shareholders, and 0 otherwise. Source: SDC.

Real acquirer-target pair A binary variable equal to 1 if the acquirer-target pair corresponds to an actual deal, and 0 if the acquirer in the acquirer-target pair is a random (or industry-size matched) firm (i.e., not the actual acquirer), following Bena and Li (2014).

Target/acquirer initiated A binary variable equal to 1 if the target/acquirer initiated the firm sale process, and 0 otherwise. Source: SEC EDGAR filings.

Post-acquisition ROA Acquirer's average industry-adjusted return on asset over the 3 years after deal completion.

Pre-acquisition ROA Acquirer's average industry-adjusted return on asset over the 3 years before deal completion.

Independent Variables

Common owners For each acquirer, we identify five competitors in the same 3-digit SIC industry with the closest market capitalizations to the acquirer as of the quarter

before the deal announcement. For each acquirer–competitor pair, we count the number of common institutional investors that own at least 5% of the shares of both the acquirer and the competitor, and then take the average across the five pairs. This measure is based on He and Huang (2017).

Acquirer toehold Acquirer’s ownership in the target firm at the time of deal announcement. Source: SDC.

Same SIC3 industry A binary variable equal to 1 if the acquirer and the target have the same primary 3-digit SIC code, and 0 otherwise. Source: CRSP.

Target defense dummy A binary variable equal to 1 if the target has a defensive tactic (such as poison pills, lock-ups, greenmail, etc.) in place at the time of deal announcement, and 0 otherwise. Source: SDC.

Acquirer-target common owners The number of common institutional blockholders that own at least 5% of the shares of both the acquirer and the target firm as of the quarter before the deal announcement.

Institutional ownership The number of shares held by institutional investors is divided by the total number of outstanding shares of the firm. Source: Thomson Financial CDA/Spectrum.

Market-to-book The ratio of the market value of total assets to the book value of total assets (data item *at* in Compustat). Market value of total assets equals liabilities (*lt*) minus balance sheet deferred taxes tax and investment tax credit (*txditi*) plus preferred stock plus market capitalization of common equity (*cshe* times *prcc_f*). The value of preferred stock equals the liquidation value (*pstkl*) if available, the redemption value (*pstkrv*) if it is available but the liquidation value is unavailable, or the carrying value (*pstk*) if both the liquidation value and the redemption value are unavailable. Source: Compustat.

Ln (size) Natural logarithm of the book value of total assets (*at*). Source: Compustat.

ROA Net income (*ni*) divided by the book value of total assets (*at*). Source: Compustat.

Market leverage Book value of debt (*lt* – *txditi* – preferred stock) divided by the market value of total assets.

Cash holdings Cash and short-term investments (*che*) divided by the book value of total assets (*at*).

High HP Score A binary variable equal to 1 if the acquirer and target’s Hoberg and Phillips (2010) product similarity score is above sample median, and 0 otherwise.

High HHI A binary variable equal to 1 if the acquirer’s Fama–French 48 industry Herfindahl–Hirschman Index (HHI) based on firm sales is above sample median, and 0 otherwise.

High number of peers A binary variable is equal to 1 if the acquirer’s number of SIC3 industry peers is above the sample median, and 0 otherwise.

Supplementary Material

To view supplementary material for this article, please visit <http://doi.org/10.1017/S0022109024000899>.

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