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Institutional cross-holdings and their effect on acquisition decisions ☆

Jarrad Harford [a,*], Dirk Jenter [b,1], Kai Li [c,2]

[a] Foster School of Business, University of Washington, Seattle, WA 98195-3200, USA
[b] Stanford University and NBER, Graduate School of Business, 518 Memorial Way, Stanford, CA 94305-5015, USA
[c] Sauder School of Business, University of British Columbia, 2053 Main Mall, Vancouver, BC V6T 1Z2, USA

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ABSTRACT

Cross-holdings are created when a shareholder of one firm holds shares in other firms as well, and cross-holdings alter shareholder preferences over corporate decisions that affect those other firms. Prior evidence suggests that such cross-holdings explain the puzzle of why shareholders allow acquisitions that reduce the value of the bidder. Conducting a shareholder-level analysis of cross-holdings, we instead find that cross-holdings are too small to matter in most acquisitions and that bidders do not bid more aggressively even in the few cases in which cross-holdings are large. We conclude that cross-holdings do not explain value-reducing acquisitions. Beyond acquisitions, we find that institutional cross-holdings between large firms have, in fact, increased rapidly over the last 20 years, but mostly due to indexing and quasi-indexing. As in acquisitions, cross-holdings by active investors are typically too small to matter.

1. Introduction

Institutional ownership of equity has risen to the point where two firms frequently have several institutional investors in common. Matvos and Ostrovsky (2008) hypothesize that such cross-holdings can explain the vexing puzzle of why bidder shareholders regularly allow value-destroying acquisitions. Specifically, they argue that gains on target shares held by the bidder's institutional investors more than offset their losses on bidder shares in such transactions. This conclusion, while appealing, is rejected when we examine cross-holdings at the shareholder level. The observed effects of cross-holdings are much too small to explain the persistence of bidder value-reducing mergers.

Matvos and Ostrovsky treat all cross-held shares in the target as a consolidated block, implicitly assuming that all bidder shareholders with cross-holdings agree on the relative importance of bidder and target value.

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* Corresponding author. Tel.: +1 206 543 4796.
E-mail addresses: jarrad@uw.edu (J. Harford), djenter@stanford.edu (D. Jenter), kai.li@sauder.ubc.ca (K. Li).
[1] Tel.: +1 650 498 4411.
[2] Tel.: +1 604 822 8353.

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Our shareholder-by-shareholder analysis shows that this assumption is incorrect. Empirically, influential investors with large bidder stakes tend to have only small stakes in the target and, thus, care little about target value. Investors with large target stakes, meanwhile, tend to have only small stakes in the bidder and are unlikely to affect bidder behavior. Simply adding up bidder shareholders' stakes in the target creates a spurious link between the large target stakes of some shareholders and the large bidder stakes of others, leading to incorrect conclusions about shareholders' objectives.

Examining a comprehensive sample of acquisitions of public targets by public bidders from 1984 to 2006, we find that investors with substantial cross-holdings are not influential enough to impact the characteristics of most bids. In the vast majority of the deals, most institutional shareholders of the bidder have no investment in the target, and bidder shareholders wishing to put large weight on target value tend to control only a small fraction of the bidder's equity. As a result, cross-holdings do little to improve bidder shareholders' returns. In the average acquisition with a negative bidder announcement return, only 4% of the bidder's shares are held by institutions with large enough gains in the target to compensate for their losses in the bidder. Thus, cross-holdings are not an empirically important reason why institutional investors fail to oppose acquisitions that reduce bidder value.

Nonetheless, there is a small subset of acquisitions in which institutional shareholders with large cross-holdings control enough of the bidder's equity to be potentially influential. We carefully examine whether bidder managements react by pursuing targets more aggressively. We find no evidence that large cross-holdings are associated with more negative bidder announcement returns, a lower bidder share of synergies, or other changes in bid characteristics. There is some indication of an effect of cross-holdings on target selection, but it is likely attributable to unobserved common factors determining both suitable merger partners and the types of firms each institutional shareholder chooses to invest in.

Thus, in the few acquisitions in which cross-holdings appear large enough to matter, the evidence indicates that bidder management ignores them. This is consistent with the observation that managers are given few incentives to take between-firm externalities into account and with the observation that many cross-holdings are held by passive investors.

Because targets are typically small and as such attract less institutional investment, we explore the possibility that cross-holdings, while small in the merger and acquisition setting, could have risen to potentially influential levels between larger firms. Among Standard & Poor's (S&P) 500 firms, we do find that institutional cross-holdings have increased rapidly over the last 20 years, mostly due to indexing and quasi-indexing. However, even among these firms, we conclude that cross-holdings by active investors, while of growing importance, are typically not large enough to influence corporate policy.

The next section motivates our approach to measuring cross-holdings. Section 3 describes the data. Section 4 analyzes the importance and effects of cross-holdings in acquisitions. Section 5 presents evidence on the size and the evolution of cross-holdings among S&P 500 firms. The last section summarizes and concludes.

2. The role of shareholder cross-holdings

This section examines how cross-holdings affect shareholder preferences over corporate decisions and explains how we measure cross-holdings. We frame the discussion in terms of a corporate acquisition, but the results apply to any corporate action that imposes an externality on other firms in shareholders' portfolios.[3]

2.1. The preferences of shareholders with cross-holdings

Consider a shareholder who owns α_B percent of the equity of a bidder and α_T percent of the equity of its acquisition target. The shareholder's wealth gain (or loss) from the acquisition depends on her stakes in the two firms and on the distribution of takeover gains. Specifically, the shareholder receives α_B percent of any change in bidder value and α_T percent of any change in target value:

$$\Delta W_{pre\text{-}to\text{-}post\text{-}deal} = \alpha_B(\Delta \text{bidder value}) + \alpha_T(\text{takeover premium}) \quad (1)$$

Empirically, the gains to bidders are often negative, while takeover premiums are usually positive and large. Because our bidder shareholder also owns a stake in the target, she shares some of the gains accruing to target shareholders. Thus, as long as her gains in the target exceed her losses in the bidder, she supports a "bad" acquisition that lowers the value of the bidder. In the extreme, if the shareholder owns a larger percentage stake of the target than of the bidder ($\alpha_T > \alpha_B$), then the effect of a higher takeover premium on her wealth becomes positive, and she wants the bidder to overpay.

2.2. Measuring cross-holdings

We use two complementary approaches to capture the cross-holdings of bidder shareholders. The first approach focuses on the ten largest institutional shareholders of each bidder. To capture the strength of their incentives to lobby management, we examine, shareholder by shareholder, the magnitudes of their α_B stake in the bidder and α_T stake in the target. There are two reasons why large shareholders deserve most of our attention. First, large shareholders are more likely to have the ability to influence bidder management. Second, as Eq. (1) makes clear, a shareholder's loss from overpayment increases in her percentage stake in the bidder. As a result, the largest shareholders have the strongest incentives to resist overpayment in acquisitions, and cross-holdings are more

[3] The general result that diversified shareholders prefer corporate policies that maximize portfolio values to policies that narrowly maximize the values of individual firms has been developed in Easterbrook and Fischel (1982), Hansen and Lott (1996), and Rubin (2006). Fama (1978) first highlighted this application of the Coase Theorem in the context of equity and bondholders of the same firm.

likely to weaken shareholder resistance if held by large shareholders.

The second approach extends the analysis to all institutional shareholders of the bidder. To aggregate preferences across shareholders, we re-scale each shareholder's bidder and target stakes and turn them into weights:

$$\Delta W_{pre\text{-}to\text{-}post\text{-}deal} = \alpha_B(\Delta \text{ bidder value}) + \alpha_T(\text{takeover premium})$$
$$= (\alpha_B+\alpha_T)\left[\frac{\alpha_B}{\alpha_B+\alpha_T}(\Delta \text{ bidder value}) + \frac{\alpha_T}{\alpha_B+\alpha_T}(\text{takeover premium})\right] \quad (2)$$

Thus, a shareholder with both bidder and target stakes wants to maximize a weighted average of both firms' values, with weight $\alpha_B/(\alpha_B+\alpha_T)$ on bidder value and weight $\alpha_T/(\alpha_B+\alpha_T)$ on target value.[4] For the empirical analysis, we order each bidder's institutional shareholders by the weights they assign to target value and then report the fraction of bidder shares held by institutions that put more than 0% weight, more than 10% weight, and so on to finally more than 50% weight on target value.

In addition to the cross-holdings themselves, we report the extent to which cross-holdings improve the wealth effects of takeovers on institutional shareholders. Bidder shareholders' incentives to resist overpayment are stronger the more those shareholders lose on their bidder stakes, but are weaker the more they gain on their target stakes (if any). To capture whether shareholder resistance is significantly weakened by cross-holdings, we compare the changes in the values of bidder and target stakes around takeover bids for the largest and for all institutional shareholders of each bidder.

2.3. The Matvos and Ostrovsky approach to measuring cross-holdings

Matvos and Ostrovsky (2008) do not analyze cross-holdings and wealth effects shareholder by shareholder. Instead, they aggregate the holdings of all bidder institutions in the bidder and the target into a representative investor:

$$\Delta W^{aggregate}_{pre\text{-}to\text{-}post\text{-}deal} = \left(\sum_{i=1}^{N}\alpha_{B,i}\right)(\Delta \text{ bidder value}) + \left(\sum_{i=1}^{N}\alpha_{T,i}\right)(\text{takeover premium}) \quad (3)$$

where N is the number of institutional shareholders in the bidder. This approach implicitly assumes that all bidder institutions agree with one another on the relative importance of bidder and target value and act in concert.

Our analysis shows that this assumption is incorrect. In the data, shareholders with large bidder stakes tend to have only small stakes in the target and, thus, care little about target value. Shareholders with large target stakes, however, tend to have only small stakes in the bidder and are thus unlikely to have much influence on bidder management. Simply adding up bidder shareholders' stakes masks this heterogeneity and leads to incorrect conclusions about bidder shareholders' objectives.

3. Sample formation

We employ two different samples in our empirical analysis. The first sample consists of mergers and acquisitions between public firms from 1984 to 2006. Acquisitions create between-firm externalities that are large and easily observable, making acquisitions the most promising setting to find an effect of cross-holdings on corporate behavior. The second sample contains all firms in the S&P 500 index in each of 1985, 1995, and 2005. We analyze S&P 500 firms because of their collective economic importance. Matching with institutional ownership data as well as Center for Research in Security Prices (CRSP) and Compustat leaves fewer than five hundred firms in each year: 447, 446, and 459 firms in 1985, 1995, and 2005, respectively.[5]

The acquisition sample starts with all announced (both completed and canceled) US mergers with announcement dates between January 1, 1984 and December 31, 2006 from Thomson Financial's Securities Data Company (SDC) database. We use all deals in which both the bidder and the target are public firms and the form of deal is coded as a merger, an acquisition of majority interest, or an acquisition of assets (9,260 deals). Next, we match with Compustat and CRSP data and only retain an acquisition if the bidder owns less than 50% of the target prior to the bid and is seeking to own greater than 50% after the bid. For completed deals, we require that the bidder owns more than 90% of the target after the deal completes. These filters yield 3,639 deals. Merging with the CDA/Spectrum 13F data on institutional shareholdings leaves 3,540 merger attempts in which both the bidder and target have data on institutional holdings in the quarter-end prior to the bid announcement.

Ideally, we would also like to measure cross-holdings at the individual investor level. Using data on institutional investors adds a layer of intermediation and masks the extent to which the ultimate owners of the stocks are diversified across firms. However, given the greater size of their stakes, the cross-holdings of institutional investors are more likely to affect company policies than the cross-holdings of individuals. Another complication is that an institutional portfolio reported to the Securities and Exchange Commission (SEC) could be an aggregate of several distinct portfolios run by different asset managers. This would make it less likely that any of the individual

[4] What the weights fail to capture is the magnitude of each shareholder's wealth change. A larger shareholder [i.e., a shareholder with a larger $(\alpha_B+\alpha_T)$] loses or gains more in dollar value from a given deal than a smaller shareholder with the same bidder and target weights.

[5] Institutional ownership data are available because a 1978 amendment to the Securities and Exchange Act of 1934 requires all institutional investors with greater than $100 million of equity securities under discretionary management to report every quarter all common stock positions greater than 10,000 shares or $200,000 using the Securities and Exchange Commission form 13F.

Table 1
Summary statistics on merger bids.

The sample consists of 3,540 acquisition attempts announced during the period January 1, 1984 to December 31, 2006. The bidders and targets are listed in the Securities Data Company's Mergers and Acquisitions database and have institutional holding data in the CDA/Spectrum database. We keep an acquisition if the bidder owns less than 50% of the target prior to the bid and is seeking to own greater than 50% of the target. For completed deals, we require that the bidder owns greater than 90% of the target after the deal completion. All dollar amounts are in 2006 millions of dollars, and all percentages are in real numbers.

In Panel A, Complete, All Cash, All Stock, Competing, and Diversifying are dummy variables that take the value of one for completed acquisitions, if only cash is used to pay for the acquisition, if only equity is used, if there are multiple bids for the same target within one year, and if the bidder and target are from two different industries, respectively, and zero otherwise. Relative Size is the transaction value divided by the market value of bidder assets at the end of the fiscal year prior to the bid announcement. Toehold measures the percentage of the target's shares directly held by the bidder prior to the bid announcement. Premium is the ratio of the final offer price to the target stock price four weeks prior to the original announcement date minus one.

In Panel B, the abnormal announcement period returns (CAR3) are over days (−1, +1), where day 0 is the date of the initial bid announcement by the acquiring firm. Daily abnormal stock returns are computed using the market model and the value-weighted CRSP index. The estimation window is days (−200, −60) prior to the acquisition announcement date. Following Bradley, Desai, and Kim (1988), Synergies (percent) is the percentage synergy gain is defined as the cumulative abnormal return over the (−1, +1) event window for a value-weighted portfolio of the bidder and the target. The weights for the bidder and the target are based on the market value of equity two days prior to the bid announcement. The target weight adjusts for the percentage of target shares held by the bidder prior to the bid announcement, with the adjustment set to zero for missing toehold values. Synergies (dollar) is the dollar value synergy gain is defined as the percentage synergy gain times the sum of the market values of equity for the bidder and target in million dollars, again adjusted for target shares held by the bidder prior to the bid announcement. The bidder share of synergies is the abnormal increase in the bidder's market value of equity over days (−1, +1) divided by the dollar value synergy gain. The bidder share of synergies is calculated for bids with positive synergies only and is winsorized at the 1% level.

Variable	Number of observations	Mean	Median	Standard deviation	5th percentile	95th percentile
Panel A: Deal characteristics						
Complete	3,540	0.758	1.000	0.428	0.000	1.000
All cash	3,540	0.237	0.000	0.425	0.000	1.000
All stock	3,540	0.387	0.000	0.487	0.000	1.000
Competing	3,540	0.123	0.000	0.328	0.000	1.000
Diversifying	3,540	0.465	0.000	0.499	0.000	1.000
Relative size	3,285	0.301	0.104	0.667	0.004	1.090
Toehold	3,540	0.007	0.000	0.043	0.000	0.000
Premium	3,177	0.428	0.346	0.563	−0.054	1.137
Panel B: Abnormal announcement period returns and synergies						
Bidder CAR3	3,540	−0.013	−0.009	0.084	−0.128	0.091
Target CAR3	3,540	0.194	0.147	0.242	−0.067	0.609
Synergies (percent)	3,540	0.019	0.011	0.082	−0.081	0.144
Synergies (dollars)	3,540	47.077	9.443	1683.547	−756.149	1028.233
Bidder share of synergies (percent)	2,129	−0.294	0.266	2.644	−4.483	1.027

managers would lobby firms to take the institution's overall cross-holdings into account.

4. Cross-holdings in acquisitions

This section describes institutional shareholders' stakes in bidders and targets and examines whether cross-holdings significantly affect bidder shareholders' returns. We specifically assess whether cross-holdings can explain why bidder institutions allow deals that reduce bidder value.

4.1. Sample overview

Table 1 presents descriptive statistics on the announced merger deals in our sample. Panel A establishes that our acquisition sample is similar to those used in other studies of mergers between public firms. In Panel B, we show that the average three-day abnormal announcement period return (CAR3) for the bidder is −1.3%, and the average CAR3 for the target is 19%. This uneven distribution of takeover gains is typical and the reason for the potential importance of bidder shareholders' cross-holdings in targets. Based on the abnormal announcement returns, the average percentage synergy gain is 1.9%, corresponding to an average dollar value synergy gain of $47 million.[6] This implies that, once we account for the large positive announcement return to the target, mergers in our sample are on average welfare-improving. For mergers with positive synergies, the median bidder share of the synergies is 27%, which means that 73% accrue to target shareholders.

Table 2 summarizes the institutional shareholdings in bidders and targets. On average, institutional investors own 48% of the equity of bidders and 35% of the equity of targets. However, in about one-seventh of the sample bids, institutional investors own less than 20% of the bidder's equity, calling into question their potential to influence bidder management. Focusing on cross-holding institutional shareholders, we find that bidder institutions that also own shares in the target control 16% of all bidder shares, or 33% of the bidder shares owned by institutions. Target institutions that also own shares in the bidder hold 20% of the target's equity, or more than half of the generally smaller institutional holdings in the target.

[6] Following Bradley, Desai, and Kim (1988), we compute the dollar value of the synergistic gains as bidder CAR3 × bidder market capitalization + target CAR3 × (1−toehold) × target market capitalization and the percentage synergy gains as synergy in dollars/(bidder market capitalization + (1−toehold) × target market capitalization).

Table 2
Institutional ownership in bidders and targets.

The sample consists of 3,540 acquisition attempts announced during the period January 1, 1984 to December 31, 2006. The bidders and targets are listed in the Securities Data Company's Mergers and Acquisitions database and have institutional holding data in the CDA/Spectrum database. We keep an acquisition if the bidder owns less than 50% of the target prior to the bid and is seeking to own greater than 50% of the target. For completed deals, we require that the bidder owns greater than 90% of the target after the deal completion. All dollar amounts are in 2006 millions of dollars, and all percentages are in real numbers.

In Panel A, Total Institutional Ownership is the fraction of a bidder's stock that is owned by institutional investors. Ownership by Bidder Institutions That Also Own Shares in Target is the fraction of a bidder's stock that is owned by institutions that also have a stake in the target. Fraction of Bidder Institutional Ownership Owned by Institutions with Shares in Target gives the percentage of the bidder's institutional ownership that is held by institutions that also own shares in the target.

In Panel B, Total Institutional Ownership is the fraction of a target's stock that is owned by institutional investors. Ownership by Target Institutions That Also Own Shares in Bidder is the fraction of a target's stock that is owned by institutions that also have a stake in the bidder. Fraction of Target Institutional Ownership Owned by Institutions with Shares in Bidder gives the percentage of the target's institutional ownership that is held by institutions that also own shares in the bidder.

	Number of observations	Mean	Median	Standard Deviation	5th percentile	95th percentile
Panel A: Institutional ownership in bidders						
Total Institutional Ownership	3,540	0.484	0.501	0.240	0.069	0.869
Ownership by Bidder Institutions That Also Own Shares in Target	3,540	0.162	0.109	0.156	0.003	0.480
Fraction of Bidder Institutional Ownership Owned by Institutions with Shares in Target	3,540	0.330	0.275	0.247	0.016	0.808
Panel B: Institutional ownership in targets						
Total Institutional Ownership	3,540	0.353	0.310	0.251	0.020	0.812
Ownership by Target Institutions That Also Own Shares in Bidder	3,540	0.198	0.138	0.187	0.003	0.583
Fraction of Target Institutional Ownership Owned by Institutions with Shares in Bidder	3,540	0.538	0.553	0.276	0.058	0.970

Again, these descriptive statistics suggest that our sample is similar to the one used by Matvos and Ostrovsky (2008) and many others.

4.2. The effect of cross-holdings on the institutions with the largest bidder stakes

Table 3 reports the ownership stakes and cross-holdings of the ten largest institutional shareholders of each bidder. The results are unequivocal: In most acquisitions, the largest institutional investors in the bidder do not have significant cross-holdings in the target. On average, the bidder's largest institutional shareholder owns 7% of the bidder, owns 1% of the target, and puts less than 10% weight on target value (and thus more than 90% weight on bidder value). The weights assigned to target value increase slightly when looking at the second to tenth largest investors, but they never exceed 15%. The median weights on target value are uniformly zero for each of the ten largest institutional investors, which means that most large bidder institutions have no stakes in the target at all. Extending the analysis to the 50 largest bidder institutions yields similar results (untabulated). This evidence is hard to reconcile with the idea that cross-holdings explain the lack of shareholder resistance against bad acquisitions. Because large shareholders lose the most when a bidder overpays for an acquisition, cross-holdings cannot meaningfully reduce shareholder opposition to overpayment unless held by large investors.

At the bottom of Table 3, we follow Matvos and Ostrovsky (2008) and aggregate bidder shareholders by separately adding up their bidder and their target stakes. This approach implicitly assumes that bidder institutions negotiate side payments with one another and align their preferences. The table reports results for different coalitions of investors, with the bottom row showing a coalition of all bidder institutions, which is the aggregate analyzed by Matvos and Ostrovsky. This aggregate of all institutional shareholders puts an average (median) weight of 26% (25%) on target value. The fact that all institutions combined put substantial weight on the target, while most large bidder institutions put no weight on it, suggests that the group's cross-holdings are predominantly from small bidder shareholders with very large target stakes. The aggregation creates a spurious link between the large target stakes of these shareholders and the large bidder stakes of others. In reality, only a small percentage of bidder shares is controlled by investors with large cross-holdings, and in light of the legal difficulties associated with side-payments between shareholders, their influence is likely to be limited.

Next, we examine whether cross-holdings help improve the returns from acquisitions for the bidders' largest institutional shareholders. The abnormal announcement returns in Table 1 suggest that most takeover gains accrue to target shareholders, with the return to bidder shareholders close to zero or even slightly negative. Hence, a large stake in the target could significantly improve the wealth effect experienced by a bidder shareholder from an acquisition, altering the shareholder's stance toward the deal. To specifically assess whether cross-holdings can reverse the negative wealth effect of bad acquisitions, we restrict the sample to the 2,096 bids with negative abnormal bidder announcement returns.

Table 4 reports the dollar losses on bidder stakes and dollar gains on cross-holdings for the ten largest bidder

Table 3
Cross-holdings of targets by the largest bidder institutional shareholders.

The base sample consists of 3,540 acquisition attempts announced during the period January 1, 1984 to December 31, 2006. The bidders and targets are listed in the Securities Data Company's Mergers and Acquisitions database and have institutional holding data in the CDA/Spectrum database. We keep an acquisition if the bidder owns less than 50% of the target prior to the bid and is seeking to own greater than 50% of the target. For completed deals, we require that the bidder owns greater than 90% of the target after the deal completion. For each of the ten largest institutional shareholders of the bidder, we calculate the weight she puts on the takeover target in her objective function as the ratio of her percentage ownership in the target divided by the sum of her percentage ownerships in the bidder and the target. We report the ten largest bidder institutional shareholders' mean and median ownership stakes, cross-holdings, and weights assigned to target value. We also report the percentage of acquisitions in which one of the ten largest bidder institutions owns a higher percentage stake in the target than in the bidder. Finally, we report the same set of statistics for various coalitions of bidder institutions.

	Number of observations	Mean stake in the bidder	Mean stake in the target	Mean weight on target value	Median stake in the bidder	Median stake in the target	Median weight on target value	Percent with larger stake in target than in bidder
Shareholder rank in the bidder:								
1	3,540	7.28%	1.00%	9.6%	6.23%	0.00%	0.00%	6%
2	3,528	4.40%	0.86%	11.5%	3.96%	0.00%	0.00%	9%
3	3,512	3.28%	0.72%	12.3%	2.99%	0.00%	0.00%	9%
4	3,488	2.63%	0.71%	13.6%	2.45%	0.00%	0.00%	10%
5	3,466	2.21%	0.61%	14.1%	2.10%	0.00%	0.00%	11%
6	3,445	1.92%	0.58%	14.2%	1.84%	0.00%	0.00%	12%
7	3,425	1.70%	0.55%	14.6%	1.64%	0.00%	0.00%	12%
8	3,398	1.51%	0.51%	14.0%	1.50%	0.00%	0.00%	11%
9	3,380	1.37%	0.46%	14.1%	1.36%	0.00%	0.00%	12%
10	3,354	1.24%	0.42%	14.3%	1.24%	0.00%	0.00%	12%
Coalition of investors 1–10	3,540	27.1%	6.28%	18.1%	25.8%	3.90%	14.4%	4%
Coalition of investors 11–20	3,327	8.23%	3.22%	24.7%	8.31%	1.84%	21.5%	13%
Coalition of investors 21–30	3,102	4.68%	2.16%	25.3%	4.68%	0.99%	20.6%	16%
Coalition of investors 31–40	2,908	3.06%	1.62%	26.4%	3.14%	0.69%	21.9%	19%
Coalition of investors 41–50	2,756	2.15%	1.38%	28.0%	2.16%	0.52%	23.3%	22%
Coalition of all institutional investor	3,540	48.4%	19.8%	26.2%	50.1%	13.8%	25.4%	8%

institutional shareholders. The results are again clear. In the vast majority of bad deals, the most influential bidder shareholders do not benefit. On average, the largest (tenth largest) bidder institution loses $27 million ($6 million) on the bidder side but gains only $6 million ($2 million) on the target side. In about two-thirds of the deals, each of the ten largest bidder institutions gains nothing at all from cross-holdings. Similar results obtain when we extend the analysis to the 50 largest bidder institutions and to various investor coalitions, including a coalition of all bidder institutions. Hence, at least for the bidders' largest institutional investors, the notion that bidder shareholders do not lose from bidder-value reducing acquisitions because of their cross-holdings is clearly rejected by the data.[7]

[7] Matvos and Ostrovsky reach the opposite conclusion by adding up all target shares owned by bidder institutions and treating these cross-held shares as owned by a single investor. We follow their approach at the bottom of Table 4 and find that bidder institutions' combined gains on target shares ($95 million) on average offset more than a third of their combined losses on bidder shares (−$268 million). Even with this approach, though, the median offset is small ($3 million target gain versus $27 million bidder loss), and in only 18% of the bids do bidder institutions as a group recover all their losses on bidder shares through gains on target shares.

4.3. The overall effect of cross-holdings on bidder institutions

Next, we extend the analysis beyond large institutions to all institutional shareholders of the bidder. Panel A of Table 5 describes the distribution of bidder institutions' cross-holdings in targets. On average, only 16% of the bidder's shares are held by institutional investors with any cross-holdings in the target, with a median of 11%. Continuing down the mean column, only 9% of the bidder's shares belong to institutions that put more than 30% weight on target value, and only 4% to institutions that favor a wealth transfer to the target (put more than 50% weight on target value). Thus, confirming the results from Table 3, the vast majority of investors in a typical bidder want management to maximize own-firm value, with little regard for the value of the target.

Notably, the table reveals that there are some deals in which a substantial fraction of bidder shareholders puts

Table 4
Wealth improvements from cross-holdings for the largest bidder institutional shareholders in bad deals.

The sample consists of 2,096 acquisition attempts with negative abnormal bidder announcement returns during the period January 1, 1984 to December 31, 2006. The bidders and targets are listed in the Securities Data Company's Mergers and Acquisitions database and have institutional holding data in the CDA/Spectrum database. We keep an acquisition if the bidder owns less than 50% of the target prior to the bid and is seeking to own greater than 50% of the target. For completed deals, we require that the bidder owns greater than 90% of the target after the deal completion. The abnormal announcement period returns are over days (−1, +1), where day 0 is the date of the initial bid announcement by the acquiring firm. Daily abnormal stock returns are computed using the market model and the value-weighted CRSP index. The estimation window is days (−200, −60) prior to the acquisition announcement date. We report dollar gains and losses from bid announcements for the ten largest bidder institutional shareholders. We also report the percentage of deals in which one of the ten largest bidder institutions makes up none, more than 50%, or more than 100% of her loss in the bidder through gains in the target. Finally, we report the same set of statistics for various coalitions of bidder institutions.

	Number of observations	Mean loss on bidder stake (millions)	Mean gain on target stake (millions)	Median loss on bidder stake (millions)	Median gain on target stake (millions)	Deals in which gain on cross-holding compensates for given percentage of loss on bidder stake		
						None	Greater than 50%	Greater than 100%
Shareholder rank in the bidder								
1	2,096	−$27.34	$5.62	−$3.62	$0.00	68%	9%	7%
2	2,091	−$18.33	$4.35	−$2.26	$0.00	69%	12%	8%
3	2,080	−$14.61	$5.48	−$1.75	$0.00	68%	12%	8%
4	2,071	−$11.73	$2.82	−$1.43	$0.00	67%	14%	10%
5	2,055	−$10.05	$2.97	−$1.26	$0.00	66%	14%	10%
6	2,045	−$9.03	$2.09	−$1.10	$0.00	68%	14%	10%
7	2,038	−$8.14	$2.16	−$1.02	$0.00	67%	16%	12%
8	2,023	−$7.32	$1.96	−$0.93	$0.00	67%	16%	11%
9	2,015	−$6.77	$2.26	−$0.85	$0.00	69%	14%	10%
10	2,002	−$6.21	$2.13	−$0.80	$0.00	67%	16%	11%
Coalition of investors 1–10	2,096	−$117.8	$31.32	−$15.07	$0.74	23%	20%	13%
Coalition of investors 11–20	1,991	−$43.46	$13.94	−$5.32	$0.33	25%	27%	17%
Coalition of investors 21–30	1,870	−$26.63	$8.54	−$3.34	$0.24	29%	27%	19%
Coalition of investors 31–40	1,762	−$19.04	$6.93	−$2.38	$0.16	31%	28%	19%
Coalition of investors 41–50	1,678	−$14.51	$5.76	−$1.73	$0.11	34%	30%	20%
Coalition of all institutional investors	2,096	−$268	$95	−$26.6	$2.54	17%	29%	18%

large weight on target value, even though these deals represent the exception, not the rule. The 95th percentile column shows that, in 5% of all deals, one-third of the bidder's shares is held by institutional investors that put at least 20% weight on target value, and one-quarter by institutions that put more than 40% weight on the target. It is worth noting that, even in the extreme, it is rare to see bidder shareholders preferring a wealth-transfer to the target. The 95th percentile of the "Greater than 50%" row shows that, in the most extreme 5% of all deals, still only 15% of the bidder's ownership put more weight on target than bidder value.

Panel B of Table 5 extends the analysis of investors' returns to all bidder institutions. Focusing again on the 2,096 bids with negative bidder announcement returns, we find that the wealth effects remain negative for the vast majority of the bidders' ownership even after cross-holdings are taken into account. On average, only 14% of the bidder's shares belong to institutional investors with any gains from cross-holdings, consistent with the Table 4 results for the largest institutional shareholders. Only 6% of the bidder's equity is held by institutions that see more than half of their losses on bidder shares offset by target gains.

Overall, the results here and in subsection 4.2 unequivocally show that cross-holdings cannot explain why bidder institutions allow acquisitions with negative bidder returns. Even accounting for cross-holdings, we find that the vast majority of the bidders' institutional shares are held by investors that continue to lose money from bids that lower bidder value.

4.4. The effect of unusually large cross-holdings on bidder behavior

While the observed cross-holdings are clearly too small to have any effect in most acquisitions, Table 5 shows a subset of deals in which shareholders with large cross-holdings control enough of the bidder's equity to be

Table 5
Cross-holdings of targets by bidder institutional shareholders.

The base sample consists of 3,540 acquisition attempts announced during the period January 1, 1984 to December 31, 2006. The bidders and targets are listed in the Securities Data Company's Mergers and Acquisitions database and have institutional holding data in the CDA/Spectrum database. We keep an acquisition if the bidder owns less than 50% of the target prior to the bid and is seeking to own greater than 50% of the target. For completed deals, we require that the bidder owns greater than 90% of the target after the deal completion. For each institutional shareholder of the bidder, we calculate the weight she puts on the takeover target in her objective function as the ratio of her percentage ownership in the target divided by the sum of her percentage ownerships in the bidder and the target. We report the fraction of the bidder's shares that is held by institutional investors who want to put greater than 0%, 10%, 20%, 30%, 40%, and 50% weight on target value.

The sample is further limited to the 2,096 bids with negative abnormal bidder announcement returns. The abnormal announcement period returns are over days $(-1, +1)$, where day 0 is the date of the initial bid announcement by the acquiring firm. Daily abnormal stock returns are computed using the market model and the value-weighted CRSP index. The estimation window is days $(-200, -60)$ prior to the acquisition announcement. A bidder shareholders' relative return improvement is defined as the abnormal dollar gain on her target stake divided by the absolute value of the abnormal dollar loss on her bidder stake. The relative return improvement thus measures the percentage of the dollar loss on the bidder stake that is compensated for by the shareholder's gain on her target stake.

Panel A: Cross-holdings in targets by bidder institutional shareholders

Weight on target value	Number of observations	Percent of bidder shares held by institutions that put the given weight on the value of the target				
		Mean	Median	75th percentile	90th percentile	95th percentile
None	3,540	32%	31%	46%	59%	67%
Greater than 0%	3,540	16%	11%	24%	40%	48%
Greater than 10%	3,540	13%	8%	19%	31%	39%
Greater than 20%	3,540	11%	7%	16%	27%	34%
Greater than 30%	3,540	9%	6%	13%	23%	29%
Greater than 40%	3,540	7%	4%	10%	18%	24%
Greater than 50%	3,540	4%	3%	6%	11%	15%

Panel B: Return improvements from cross-holdings for bidder institutional shareholders in bad deals

Percentage of loss on bidder stake compensated by gain on cross-holding	Number of observations	Percent of bidder shares held by institutions that receive the given relative return improvement				
		Mean	Median	75th percentile	90th percentile	95th percentile
None	2,096	34%	33%	48%	63%	72%
Greater than 0%	2,096	14%	9%	22%	39%	47%
Greater than 10%	2,096	10%	5%	15%	28%	38%
Greater than 20%	2,096	8%	4%	12%	25%	34%
Greater than 50%	2,096	6%	2%	8%	18%	26%
Greater than 75%	2,096	5%	1%	6%	16%	23%
Greater than 100%	2,096	4%	1%	5%	13%	20%

influential. In this subsection, we search for evidence that bidder management changes its behavior in such cases. If managers believe that cross-holdings weaken shareholder resistance to aggressive bids, then acquisitions with high cross-holdings should on average be worse deals for bidder shareholders (disregarding any gains on cross-holdings).

To test this hypothesis, Table 6 examines whether unusually large cross-holdings are associated with lower bidder announcement returns or a smaller share of the synergies going to the bidder. We use dummy variables to identify the small subset of deals in which a large percentage of bidder shares is held by institutions with significant cross-holdings. We do this by ranking the deals by the fraction of the bidder's shares held by institutions that put more than 10%, 30%, or 50% weight on target value and identifying, for each weight, the most extreme decile of deals. The dependent variable is the bidder announcement return in the first three columns and the bidder share of synergies in the last three.

Table 6 shows that the estimated coefficients on the high cross-holdings dummies are all insignificant. A wide variety of alternative specifications and robustness checks yield similar results (untabulated). We conclude that cross-holdings have no observable effect on either bidder returns or the bidder share of synergies. There is thus no evidence that acquisitions with high cross-holdings are worse deals for bidder shareholders, which suggests that bidder management does not change its bidding strategy when its shareholders' cross-holdings are large.[8]

Next, we examine whether bidder managers consider their shareholders' cross-holdings when selecting acquisition targets. We pair each bidder with both its actual target and a control target, chosen by matching on total institutional ownership from similarly sized firms in the

[8] In untabulated tests, we also find that cross-holdings have no effect on target announcement returns or on the likelihood of deal completion.

Table 6
The effect of cross-holdings on abnormal bidder announcement returns and bidder shares of synergies.

The sample consists of 3,540 acquisition attempts announced during the period January 1, 1984 to December 31, 2006. The bidders and targets are listed in the Security Data Company's Mergers and Acquisitions database and have institutional holding data in the CDA/Spectrum database. We keep an acquisition if the bidder owns less than 50% of the target prior to the bid and is seeking to own greater than 50% of the target. For completed deals, we require that the bidder owns greater than 90% of the target after the deal completion. Because of missing control variables, only 3,271 bids are used in the regressions. For each institutional shareholder of the bidder, we calculate the weight she puts on the takeover target in her objective function as the ratio of her percentage ownership in the target divided by the sum of her percentage ownerships in the bidder and the target. Columns 1 to 3 regress abnormal bidder announcement returns on dummy variables identifying the 10% of deals with the highest fraction of the bidder's shares held by institutional investors putting more than 10%, 30%, or 50% weight on target value, respectively. The bidder announcement return (Bidder CAR3) is over days $(-1, 1)$, where day 0 is the date of the initial bid announcement. Daily abnormal stock returns are computed using the market model and the value-weighted CRSP index. The estimation window is days $(-200, -60)$ prior to the announcement date. Columns 4 to 6 regress the bidder share of synergies on dummy variables identifying the 10% of deals with the highest fraction of the bidder's shares held by institutional investors putting more than 10%, 30%, or 50% weight on target value, respectively. For bids with positive synergies, the Bidder Share of Synergies is the abnormal increase in bidder value over days $(-1, +1)$ divided by the dollar value synergy gain. For bids with negative synergies, the Bidder Share of Synergies is one minus the abnormal increase in bidder value over days $(-1, +1)$ divided by the dollar value synergy gain. Synergy (dollars) is the sum of the abnormal increases in bidder and target value over the same window, adjusted for any target shares held by the bidder before the bid announcement. All Cash, All Stock, Competing, and Diversifying are dummy variables that take the value of one for completed acquisitions, if only cash is used to pay for the acquisition, if only equity is used, if there are multiple bids for the same target within one year, and if the bidder and target are from two different industries, respectively, and zero otherwise. Relative Size is the transaction value divided by the market value of bidder assets at the end of the fiscal year prior to the bid announcement. Bidder (Target) Total Institutional Ownership is the fraction of the bidder's (target's) shares held by institutional investors. All accounting values are obtained at the fiscal year-end prior to the announcement of the bid. All regressions include year and industry fixed effects. ***, **, and * correspond to statistical significance at the 1%, 5%, and 10% level respectively. Robust *p*-values are reported in brackets.

	Bidder CAR3 (1)	Bidder CAR3 (2)	Bidder CAR3 (3)	Bidder share of synergies (4)	Bidder share of synergies (5)	Bidder share of synergies (6)
Dummy: fraction of bidder shares held by institutions that put at least 10% weight on target value is in the highest decile across deals	0.007 [0.261]			0.119 [0.664]		
Dummy: fraction of bidder shares held by institutions that put at least 30% weight on target value is in the highest decile across deals		0.002 [0.739]			0.214 [0.445]	
Dummy: fraction of bidder shares held by institutions that put at least 50% weight on target value is in the highest decile across deals			0.004 [0.475]			−0.017 [0.953]
Synergy (dollars)				6.229 [0.000]**	6.236 [0.000]**	6.235 [0.000]**
All Cash	0.012 [0.001]**	0.012 [0.001]**	0.012 [0.001]**	0.448 [0.006]**	0.448 [0.006]**	0.444 [0.007]**
All Stock	−0.009 [0.028]*	−0.009 [0.028]*	−0.009 [0.027]*	−0.032 [0.860]	−0.032 [0.859]	−0.031 [0.865]
Competing	0.001 [0.887]	0.001 [0.899]	0.001 [0.905]	−0.026 [0.894]	−0.026 [0.895]	−0.027 [0.889]
Diversifying	−0.002 [0.715]	−0.001 [0.733]	−0.001 [0.748]	−0.036 [0.800]	−0.035 [0.803]	−0.034 [0.812]
Bidder Total Institutional Ownership	−0.017 [0.040]*	−0.016 [0.054]	−0.016 [0.054]	0.27 [0.515]	0.274 [0.503]	0.295 [0.467]
Target Total Institutional Ownership	0.002 [0.823]	0.003 [0.732]	0.002 [0.804]	−0.356 [0.357]	−0.382 [0.317]	−0.323 [0.401]
Bidder Market Capitalization	0.001 [0.721]	0.001 [0.730]	0.001 [0.733]	−0.113 [0.141]	−0.114 [0.137]	−0.113 [0.140]
Target Market Capitalization	−0.005 [0.074]	−0.005 [0.087]	−0.005 [0.083]	0.078 [0.323]	0.075 [0.342]	0.084 [0.281]
Bidder Market Leverage	−0.003 [0.837]	−0.003 [0.828]	−0.003 [0.822]	−0.520 [0.356]	−0.514 [0.361]	−0.524 [0.351]
Target Market Leverage	−0.001 [0.937]	−0.001 [0.927]	−0.001 [0.923]	0.723 [0.085]	0.719 [0.087]	0.721 [0.086]
Bidder Market-to-Book Ratio	−0.002 [0.121]	−0.002 [0.124]	−0.002 [0.123]	0.041 [0.113]	0.041 [0.115]	0.042 [0.109]
Target Market-to-Book Ratio	−0.001 [0.525]	−0.001 [0.514]	−0.001 [0.507]	0.055 [0.097]	0.054 [0.102]	0.055 [0.099]
Bidder Return on Assets	0.001 [0.939]	0.001 [0.944]	0.001 [0.940]	0.373 [0.146]	0.373 [0.146]	0.370 [0.150]
Target Return on Assets	−0.003 [0.818]	−0.003 [0.814]	−0.003 [0.808]	−0.335 [0.229]	−0.332 [0.232]	−0.336 [0.226]
Bidder Prior Year Stock Return	−0.004 [0.175]	−0.004 [0.178]	−0.004 [0.179]	−0.114 [0.111]	−0.114 [0.112]	−0.113 [0.114]
Target Prior Year Stock Return	0.001 [0.495]	0.001 [0.493]	0.001 [0.495]	0.108 [0.116]	0.109 [0.112]	0.108 [0.117]
Intercept	0.04 [0.026]*	0.038 [0.034]*	0.039 [0.030]*	0.557 [0.416]	0.597 [0.388]	0.507 [0.454]
Relative Size Decile Dummies	Yes	Yes	Yes	Yes	Yes	Yes

same industry.[9] We then estimate a conditional logit model predicting which of the two potential targets will be chosen by the bidder. The explanatory variables include a large set of target characteristics that have been shown to predict target selection in the prior literature.[10] To test whether cross-holdings influence target selection, we include cross-holdings by bidder institutions in the actual target and in the control target as explanatory variables. The results in Table 7 show that higher cross-holdings do, in fact, predict which of the two firms is chosen as the target.

This result has two interpretations. First, it could be that, on the margin, bidder managers do consider their shareholders' cross-holdings when selecting merger targets. Second, it could be that some unmodeled firm characteristics make the bidder and the target suitable merger partners and simultaneously lead institutional investors to hold both firms. Given the weight of the rest of the evidence, particularly the evidence that cross-holdings appear to have no effect on bid characteristics or reception, the latter interpretation is more likely the correct one.

5. Institutional cross-holdings between S&P 500 firms

An important reason for the scarcity of significant institutional cross-holdings in acquisitions is the small size of most targets. Small firms attract less institutional ownership, making it less likely that the same institution will hold a stake in both a bidder and its target. However, it is still possible that significant shareholder cross-holdings exist between large firms and that these cross-holdings have important effects on investor and manager incentives.[11] To test this possibility, we examine institutional cross-holdings between S&P 500 firms. Because of high institutional ownership and especially the presence of index funds, S&P 500 firms are likely to have the highest institutional cross-holdings of any large group of U.S. firms and can, therefore, serve as a useful upper bound on the importance of cross-holdings.

Tables 8 and 9 present the magnitude and the evolution of institutional cross-holdings between S&P 500 firms from 1985 to 2005. Using the index in 1985, 1995, and 2005, we form all possible pairs of firms that are in the S&P 500 in the same year. For each firm, we then calculate its institutional shareholders' cross-holdings in every other index firm. For clarity, we call the firm from whose perspective cross-holdings are computed the base firm, and the firm in which the cross-ownership stakes are held the cross-held firm. Thus, when describing the cross-holdings of firm A's institutional shareholders in firm B, we label A the base firm and B the cross-held firm. Because B's cross-holdings in A will not mirror A's cross-holdings in B, each pair of firms appears twice.

Table 8 shows that the holdings and cross-holdings of the five largest institutional shareholders of S&P 500 firms have increased rapidly and have reached remarkably high levels. In 1985, the five largest shareholders of an S&P 500 firm together hold, on average, 17% of that firm and have combined cross-holdings of only 2% in a randomly selected second index firm. By 2005, the five largest shareholders of an S&P 500 firm own, on average, 26% of that firm and 10% of a randomly selected second index firm. So, both institutional holdings and cross-holdings have increased, with the proportional rise in cross-holdings outpacing the increase in holdings and ownership concentration. By 2005, it is also common for some of the largest shareholders in the base firm to assign more than 50% weight to the cross-held firm. In 8% (28%) of the firm pairs, the base firm's largest (fifth largest) institutional shareholder owns an even larger stake in the cross-held firm.

For the same firm pairs, Table 9 presents summary statistics for the cross-holdings of all institutional investors as well as for the number of institutional investors per firm. The message is the same as in Table 8: Institutional cross-holdings have become large. In 1985, 25% of the shares in an average S&P 500 firm are held by institutions that put positive weight on externalities imposed on a randomly selected second index firm. By 2005, that fraction has increased to 54%. Looking further at 2005, almost one-quarter of the shares belongs to institutions that put more than 40% weight on the other firm's value and fully 15% belong to institutions that put more than 50% weight on the other firm. Investors with a higher percentage stake in the cross-held than in the base firm benefit when value is transferred from the base to the cross-held firm. Thus, in a hypothetical conflict between two S&P 500 firms in 2005, 15% of the equity in either firm would on average be held by institutional investors that prefer the other side to win.

While surprising in its magnitude, the rise in cross-holdings is consistent with the increasing role of institutional investors in stock markets shown by Gompers and Metrick (2001) and with the rise of index and quasi-index investing as an investment style (see, for example, Cremers and Petajisto (2009). To assess the importance of indexing in creating cross-holdings, we use the Cremers and Petajisto Active Share measure to identify index funds. Briefly, the Active Share measures the proportion of an institution's portfolio that deviates from its benchmark index [see p. 3335 of Cremers and Petajisto (2009) for the details]. We define an "indexer" as an institution with an Active Share of less than 30%.

In untabulated results, we find that excluding indexers from the analysis results in much smaller cross-holdings between S&P 500 firms. For example, in an average S&P 500 firm in 2005, only 28% of the shares are held by nonindexing institutional shareholders that have any cross-holdings in a randomly selected second index firm (compared with 54% when all institutional investors are

[9] We require the control firm's institutional ownership and market capitalization to be within 25% of the sample firm's and exclude control firms involved in mergers in the same quarter, producing 2,815 matches.

[10] See, for example, Palepu (1986). We also control for total institutional ownership and for differences in target and bidder characteristics that could affect both cross-holdings and merger likelihood.

[11] Matvos and Ostrovsky (2008) emphasize that cross-holdings are higher in acquisitions with large targets. We find the same pattern using our approach to measure cross-holdings. Almost all the acquisitions with large cross-holdings presented in Table 5 involve large targets.

Table 7
The effect of cross-holdings on target selection.

The sample consists of 2,815 acquisition attempts announced during the period January 1, 1984 to December 31, 2006 and 2,815 actual bidder–control target pairs. The bidders and targets are listed in the Securities Data Company's Mergers and Acquisitions database and have institutional holding data in the CDA/Spectrum database. We keep an acquisition if the bidder owns less than 50% of the target prior to the bid and is seeking to own greater than 50% of the target. For completed deals, we require that the bidder owns greater than 90% of the target after the deal completion. Because of missing control variables, only 2,768 bids are used in the regressions. For each institutional shareholder of the bidder, we calculate the weight she puts on the (actual or control) takeover target in her objective function as the ratio of her percentage ownership in the target divided by the sum of her percentage ownerships in the bidder and the target. We then determine the fraction of the bidder's shares that is held by institutional investors who want to put at least 10%, 20%, 30%, 40%, or 50% weight on target value. Columns 1–5 present results from conditional logit regression using these fractions as the key explanatory variable. The dependent variable takes the value of one for an actual target and zero for a control target. All absolute differences in firm characteristics are between the actual bidder and the actual or control target. ***, **, and * correspond to statistical significance at the 1%, 5%, and 10% level respectively. Robust *p*-values are reported in brackets.

	(1)	(2)	(3)	(4)	(5)
Fraction of bidder shares held by institutions that put at least 10% weight on target value	8.380*** [0.000]				
Fraction of bidder shares held by institutions that put at least 20% weight on target value		8.190*** [0.000]			
Fraction of bidder shares held by institutions that put at least 30% weight on target value			8.230*** [0.000]		
Fraction of bidder shares held by institutions that put at least 40% weight on target value				7.654*** [0.000]	
Fraction of bidder shares held by institutions that put at least 50% weight on target value					7.018*** [0.000]
Target Total Institutional Ownership	4.340*** [0.000]	4.298*** [0.000]	3.934*** [0.001]	3.942*** [0.001]	3.858*** [0.001]
Target Market Capitalization	2.148*** [0.000]	2.121*** [0.000]	2.118*** [0.000]	2.272*** [0.000]	2.278*** [0.000]
Target Market Leverage	0.191 [0.399]	0.236 [0.296]	0.215 [0.344]	0.185 [0.415]	0.15 [0.507]
Target Market-to-Book Ratio	0.023 [0.618]	0.019 [0.676]	0.019 [0.677]	0.017 [0.706]	0.019 [0.688]
Target Earnings-to-Price Ratio	−0.163* [0.066]	−0.172* [0.061]	−0.176* [0.057]	−0.196** [0.032]	−0.191** [0.033]
Target Asset Liquidity	0.367* [0.057]	0.431** [0.025]	0.412** [0.032]	0.406** [0.034]	0.382** [0.044]
Target Return on Assets	−0.894*** [0.001]	−0.894*** [0.001]	−0.923*** [0.001]	−0.925*** [0.001]	−1.008*** [0.000]
Target Prior Year Stock Return	0.312*** [0.000]	0.323*** [0.000]	0.321*** [0.000]	0.319*** [0.000]	0.315*** [0.000]
Absolute Difference in Total Institutional Ownership	−1.528 [0.235]	−1.729 [0.176]	−1.497 [0.242]	−1.482 [0.240]	−1.347 [0.281]
Absolute Difference in Market Capitalization	−1.529*** [0.003]	−1.620*** [0.002]	−1.623*** [0.002]	−1.510*** [0.004]	−1.577*** [0.002]
Absolute Difference in Market-to-Book Ratio	−0.357*** [0.000]	−0.355*** [0.000]	−0.363*** [0.000]	−0.367*** [0.000]	−0.373*** [0.000]
Absolute Difference in Return on Assets	−1.417*** [0.000]	−1.415*** [0.000]	−1.438*** [0.000]	−1.457*** [0.000]	−1.513*** [0.000]
Absolute Difference in Prior Stock Return	−0.200** [0.013]	−0.213*** [0.007]	−0.208*** [0.009]	−0.223*** [0.004]	−0.230*** [0.003]
Bidder Fixed Effects	Yes	Yes	Yes	Yes	Yes
Number of observations	5,536	5,536	5,536	5,536	5,536
Pseudo R^2	0.137	0.132	0.129	0.121	0.113

included). Only 5% of the shares are held by nonindexers that put more than 50% weight on such externalities, again much less than the 15% when all institutions are included (see Table 9).

We conclude that, by 2005, most institutional investors in S&P 500 firms do not want corporate managers to narrowly maximize the value of their own firm. Instead, investors would see their portfolio values maximized if managers internalized a large percentage of any externalities imposed on other index firms. However, this change in investor objectives is to a substantial extent driven by the rise of index investors. Because index and quasi-index funds tend to be passive, this lessens the chance that the increase in cross-holdings will change firm behavior. Further, the fact that the rise in cross-holdings is largely due to indexing suggests that cross-holdings will be smaller in firm pairs outside the most popular indexes, a fact confirmed in the acquisition sample.

6. Summary and conclusion

Diversified shareholders prefer corporate policies that maximize their portfolio values to policies that narrowly maximize the values of individual firms. This observation, along with the rising holdings of institutional investors, creates the possibility that influential shareholders with

Table 8
Cross-holdings between S&P 500 firms by the largest institutional shareholders.

This table reports the ownership stakes and cross-holdings of the five largest institutional investors in S&P 500 firms in 1985, 1995, and 2005. We use all constituent firms of the index with available data from CRSP/Compustat and institutional holding data from the CDA/Spectrum database. The final sample consists of 447, 446, and 459 firms in 1985, 1995, and 2005, respectively. We next form all possible pairs of firms that are in the index in the same year. Specifically, if there are n firms with available data in the S&P 500 in one of the three sample years, then we form $n*(n-1)$ unique pairs for that year. We denote one firm out of each pair the base firm and the other firm the cross-held firm. For each of the five largest institutional shareholders of the base firm, we calculate the weight she puts on the cross-held firm in her objective function as the ratio of her percentage ownership in the cross-held firm divided by the sum of her percentage ownerships in the base firm and the cross-held firm. We report these five largest shareholders' mean and median ownership stakes, cross-holdings, and the weights assigned to the value of the cross-held firm. We also report the percentage of firm pairs in which one of the five largest base-firm institutions owns a higher percentage stake in the cross-held than in the base firm.

Shareholder rank in the base firm	Mean stake in the base firm	Mean stake in the cross-held firm	Mean weight on cross-held firm value	Median stake in the base firm	Median stake in the cross-held firm	Median weight on cross-held firm value	Larger stake in cross-held than in base firm	Number of firms	Number of firm pairs
1985									
1	6.47%	0.45%	7.3%	4.92%	0.00%	0.0%	3%	447	199,362
2	3.48%	0.50%	10.9%	3.17%	0.02%	0.5%	6%	447	199,362
3	2.68%	0.48%	12.7%	2.43%	0.01%	0.3%	8%	447	199,362
4	2.20%	0.49%	15.4%	2.01%	0.03%	1.4%	10%	447	199,362
5	1.88%	0.53%	17.8%	1.74%	0.08%	3.9%	12%	447	199,362
Coalition of investors 1–5	16.71%	2.44%		15.05%	1.79%				
1995									
1	7.36%	1.44%	13.8%	6.58%	0.25%	3.4%	8%	446	198,470
2	4.49%	1.14%	16.6%	3.98%	0.16%	3.4%	12%	446	198,470
3	3.38%	1.05%	18.5%	3.01%	0.17%	4.5%	15%	446	198,470
4	2.75%	1.07%	22.7%	2.50%	0.44%	13.8%	18%	446	198,470
5	2.37%	0.99%	22.6%	2.28%	0.32%	12.1%	19%	446	198,470
Coalition of investors 1–5	20.34%	5.70%		19.48%	4.64%				
2005									
1	8.98%	2.16%	17.3%	8.30%	0.81%	9.0%	8%	459	210,222
2	5.86%	1.98%	21.1%	5.38%	0.76%	12.0%	13%	459	210,222
3	4.53%	1.97%	24.8%	4.06%	1.03%	18.4%	19%	459	210,222
4	3.71%	2.19%	30.6%	3.45%	2.23%	38.5%	27%	459	210,222
5	3.19%	2.07%	31.9%	3.08%	2.16%	40.5%	28%	459	210,222
Coalition of investors 1–5	26.27%	10.38%		25.27%	9.60%				

cross-holdings will support policies that lower firm value, if these policies create positive externalities on other firms. Matvos and Ostrovsky (2008) propose this idea as an explanation for why large shareholders do not oppose bidder-value destroying mergers.

We show how to correctly measure shareholder preferences when shareholders hold shares in other firms as well, and we show the prevalence and size of institutional cross-holdings in samples of mergers and acquisitions and of S&P 500 firms. In acquisitions, we find that most institutional shareholders of the bidder have no investment in the target and that bidder shareholders with large cross-holdings tend to control only a small fraction of the bidder's equity. Consequently, cross-holdings cannot explain why bidder shareholders allow deals that reduce the value of the bidder. There is also no evidence that acquirers bid more aggressively in the small subset of deals in which bidder shareholders put large weight on target value. We conclude that shareholder cross-holdings have little effect on firm behavior in acquisitions. This makes it unlikely that cross-holdings affect other corporate decisions in which externalities are generally smaller and harder to assess.

Because cross-holdings are naturally smaller when at least one of the two firms is small, as is typical in an acquisition, we also assess their potential for influence in a sample of large firms—the S&P 500. We find that cross-holdings between index firms have increased rapidly over time. By 2005, more than half the shares in an average S&P 500 firm are held by institutions that put some weight on externalities imposed on a randomly selected second index firm, almost a third of the shares belong to institutions that put more than 30% weight on the other firm's value, and fully 15% of the shares belong to institutions that put more than 50% weight on the other firm. These are large deviations from the standard objective of firm value maximization. However, we also find that most of the increase in cross-holdings is due to the rise of index and quasi-index funds. As a result, the cross-holdings of active investors still appear to be too small to influence corporate policy in most index firms.

Although our evidence indicates that institutional cross-holdings are a nonissue in the preponderance of corporate mergers, our findings also suggest that they could occasionally become an issue in mergers of prominent firms (e.g., those in the S&P 500), which

Table 9
Institutional cross-holdings between S&P 500 firms.

In Panel A, we report summary statistics for each year for the number of institutional investors per S&P 500 firm. In Panel B, we summarize institutional shareholder cross-holdings between pairs of S&P 500 firms in 1985, 1995, and 2005. We use all constituent firms of the index with available data from CRSP/Compustat and institutional holding data from the CDA/Spectrum database. The final sample consists of 447, 446, and 459 firms in 1985, 1995, and 2005, respectively. We next form all possible pairs of firms that are in the index in the same year. Specifically, if there are n firms with available data in the S&P 500 in one of the three sample years, then we form $n*(n-1)$ unique pairs for that year. We denote one firm out of each pair the base firm and the other firm the cross-held firm. For each institutional shareholder of the base firm, we calculate the weight she puts on the cross-held firm in her objective function as the ratio of her percentage ownership in the cross-held firm divided by the sum of her percentage ownerships in the base firm and the cross-held firm. We report the fraction of the base firm's shares that is owned by institutional investors who want to put greater than 0%, 10%, 20%, 30%, 40%, and 50% weight on the value of the corresponding cross-held firm. The final sample consists of 199,362, 198,470, and 210,222 firm pairs in 1985, 1995, and 2005, respectively

Panel A	Number of institutions per firm			
	Mean	Median	Min	Max
1985	173.1	148	14	634
1995	284.3	244.5	47	881
2005	454.4	373	155	1409

Panel B weight on cross-held firm value	Fraction of the base firm's shares held by institutions that put the given weight on the value of the cross-held firm				
	Mean	Median	75th percentile	90th percentile	95th percentile
1985					
None	23%	22%	32%	41%	46%
Greater than 0%	25%	23%	32%	41%	46%
Greater than 10%	17%	16%	21%	27%	31%
Greater than 20%	14%	13%	17%	22%	26%
Greater than 30%	12%	11%	14%	18%	21%
Greater than 40%	9%	9%	12%	15%	17%
Greater than 50%	6%	5%	7%	10%	11%
1995					
None	20%	19%	26%	34%	38%
Greater than 0%	39%	38%	47%	55%	60%
Greater than 10%	27%	26%	32%	38%	41%
Greater than 20%	22%	21%	26%	31%	35%
Greater than 30%	19%	18%	22%	26%	29%
Greater than 40%	16%	15%	18%	22%	24%
Greater than 50%	9%	9%	12%	15%	16%
2005					
None	20%	19%	27%	35%	40%
Greater than 0%	54%	53%	62%	70%	75%
Greater than 10%	42%	41%	48%	55%	59%
Greater than 20%	36%	35%	41%	47%	51%
Greater than 30%	31%	30%	35%	40%	43%
Greater than 40%	25%	24%	28%	33%	36%
Greater than 50%	15%	15%	18%	22%	24%

typically have large amounts of institutional ownership and substantial cross-holdings by index funds. Index funds are generally passive investors, but one can envision scenarios in which public pressure from RiskMetrics, the Corporate Library, and other corporate governance specialists motivate fund managers to exert their influence when there is significant doubt that a given merger proposal truly maximizes the joint value of the bidder and target firms.

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