Institutional Cross-ownership and Corporate Strategy: The Case of Mergers and Acquisitions*

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Abstract

This article provides new evidence on the important role of institutional investors in affecting corporate strategy. Institutional cross-ownership between two firms not only significantly increases the probability of them merging, but also affects the performance and outcomes of mergers and acquisitions. Deals with more institutional cross-ownership experience lower announcement cumulative abnormal returns, a measure of the market perceived deal quality. However, institutional cross-ownership reduces deal premiums, lowers the probability of completion of bad deals, and leads to more stock than cash in the deal payment. Furthermore, we find that deals with high institutional cross-ownership have lower transaction costs, disclose more transparent financial statement information, and are more likely to be non-diversifying. The long-run performance of acquirers is positively related to independent institutional cross-ownership. Overall, our results suggest that the growth of institutional cross-holdings in U.S. stock markets may greatly change corporate strategies and decision making processes.

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1 Introduction

The majority of retail investors not only have small amounts of money directly invested in equities, but they also typically hold low numbers of stocks.[1] Therefore, when they make decisions about whether to support an acquisition that has been proposed by the firm's senior managers, they are likely to do so in isolation based only the anticipated effect on the price of the stock which they hold. The same is not necessarily true for institutional shareholders, however.

Institutional ownership in U.S. stock markets has increased markedly over the past three decades. Collectively, such investors, sometimes known as blockholders, held 66.2% of the market value of NYSE stocks and 71.6% of the market value of NASDAQ stocks in 2010 (Blume and Keim, 2012). Previous studies of institutional investors (e.g., Gompers and Metrick, 2001; Rydqvist et al., 2014; McCahery et al., 2015) suggest that institutional ownership keeps growing in U.S. stock markets and has an important role in both corporate strategy and equity pricing. Institutions manage portfolios that are not only very much greater in financial terms than those of most retail investors, but also contain much larger numbers of stocks.[2] Therefore, purely by chance alone (and possibly by design), there is a much higher probability that blockholders will be owners of the stocks on both sides of a proposed merger deal – i.e., they hold shares in both the acquirer and the target. In the context of mergers and acquisitions (M&As), this is termed an "institutional cross-holding". Harford et al. (2011) argue that the growth of institutional cross-holdings in U.S. stock markets is mainly due to the rise in the number and value of index tracking and quasi-index tracking funds. However, the growth of institutional cross-holdings may lead to the concern that there could be conflicts of interest between cross-owners and non cross-owners. Institutional cross-owners may also affect corporate strategy differently than non cross-owners, because cross-owners have their feet on both sides of the deal. Yet very

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[1]According to Barber and Odean (2000), the median household held 2.61 stocks worth $16,210 in 1997. Although these figures are now somewhat dated, there is no reason to believe that neither the typical number of stocks held nor their value has risen disproportionately.

[2]Over the 1980-2010 period, on average, a representative institution held 219 stocks in a portfolio with the market value of $2.5 billion (Zeng, 2016).

little prior academic research has documented the significant effect of cross-holdings on corporate strategies.

In this paper, we investigate the externality of institutional cross-holdings on corporate strategies through an important corporate event: M&As. We define institutional cross-owners as institutional investors who hold both acquirer and target stocks before the announcement of the merger or acquisition. The externality of institutional cross-ownership is examined in the context of M&As because these events have substantial impacts on the wealth of both acquirers and targets, and require complex decision making on the part of firm managers and shareholders. In addition, empirically observing the effects of institutional cross-holdings on intercorporate activities is extremely difficult because the bulk of these activities takes place behind closed doors. Moreover, it is difficult to separate the impact of institutional investor activism from the myriad of other factors that could have caused the same outcomes.[3] M&A events, therefore, present a natural arena within which to test the effect of cross-holdings on corporate strategy since they represent identifiable events, and the literature concerning the other factors affecting M&A deal outcomes and various measures of post-deal performance, which we use as control variables, is well developed.

Unlike the situation where an investor holds the stock of only one of the companies on either side of a merger deal, cross-holders will make decisions from a broader perspective that nets off any potential losses from one side (usually the acquirer) with gains made on the other (usually the target) and will consider how the newly formed joint entity would sit within their portfolios compared with the two existing separate stocks. Therefore, cross-holders may have different information sets, different incentive structures and may make different choices than would have arisen for single stock holders of either acquirers or targets. Furthermore, institutional cross-owners may have an important governance role

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[3]For example, activist shareholders often take the credit for improvements in a firm's environmental performance following a disaster, but it appears likely that such a firm, when faced with negative publicity, severe reputation damage and a variety of unhappy stakeholders, would have taken positive steps to fix the problem anyway (e.g., Haigh and Hazelton, 2004).

in the M&A process, reducing information asymmetry and mitigating the bargaining and transaction costs that would normally arise between entirely independent parties. Understanding whether and how institutional cross-ownership affects M&A decision making and deal outcomes are, by themselves, of particular importance.

This paper provides direct answers to two main research questions. We first examine whether institutional cross-ownership increases the likelihood of two given firms merging in the first place. One possibility is that institutional cross-ownership establishes the connection between two firms and facilitate them merging, similar to the mechanism of the board member social connection (Ishii and Xuan, 2014) or common auditors Cai et al. (2016) between the acquirer and target documented in recent M&A studies. The other possibility is that cross-ownership between two firms may deter them from merging. Cross-owners may benefit from the diversification of their investment among different firms. In addition, Azar et al. (2015) document that common ownership in the U.S. airline industry increases market concentration and deters competition. If common-owners can affect the product prices of their holding firms and already benefit from less product market competition, they may have less incentive to say yes if one of their holding firms tries to take over the other in their portfolio.

We next test how institutional cross-ownership affects actual M&A deal outcomes and performance. One hypothesis is that institutional cross-holdings are mainly due to the rise of institutional investors (Gompers et al., 2003) and the growth of index or quasi-index tracking funds (Harford et al., 2011) in U.S. stock markets. Additionally, a single institutional cross-owner may not act differently from other institutional non cross-owners because its holdings of acquirer and target stocks may be asymmetric (Harford et al., 2011). Under this view, institutional cross-ownership should have no effect at all on M&A deal outcomes.

An alternative hypothesis is that the extensive institutional cross-ownership between acquirers and targets leads to worse M&A deal outcomes, such as lower acquirer announcement returns, for several reasons. First, the conflict of interest between institutional cross-

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owners and other institutional owners who hold either acquirer or target stocks alone may have negative externalities for corporate strategies. The M&A deals that maximize the wealth of institutional cross-owners may not be those that maximize the wealth of institutional non cross-owners. Second, acquiring firm managers may build their empires and choose targets with high institutional cross-ownership only because they will encounter less resistance in deal negotiations and not because these targets are the most appropriate when viewed from other perspectives. Third, institutional cross-ownership may create negative managerial behavioral traits, such as familiarity biases or predisposition to the availability heuristic,[4] under which acquirers choose familiar firms to bid for and forgo other potential targets. For example, it has been widely documented that investors have a home bias and prefer to invest more in local stocks (Coval and Moskowitz, 1999).

The second alternative hypothesis is that there is a positive association between institutional cross-ownership and M&A deal outcomes. This viewpoint also receives intuitive support from several perspectives. First, institutional cross-owners may act as an information bridge between acquirers and targets and foster an enhanced information flow. Information asymmetry between acquirer and target shareholders has been argued to be a primary determinant of M&A deal failure (Dong et al., 2006). One example of institutional investors helping to reduce information asymmetry is that "foreign institutional investors act as facilitators in the international market for corporate control; they build bridges between firms and reduce transactions costs and information asymmetry between bidder and target"(Ferreira et al., 2009). It is therefore possible that institutional cross-owners use their superior dual information sources to similarly engender these positive characteristics and build bridges within the domestic market, facilitating the progress of good deals and weeding out the bad ones.

Second, institutional cross-owners can monitor the managers of both acquirers and targets. More broadly, the effective functioning of the equity market is built on the premise

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[4]Tversky and Kahneman (1973), for example, provide evidence on the availability heuristic based on several experiments.

that shareholders possess an important role in corporate governance, ensuring that firms are run efficiently and maximize the interests of shareholders. Yet the literature highlights that different shareholder groups may have divergent incentives and may fulfill this monitoring role to varying degrees of effectiveness. Individual investors are argued to typically free ride on the effort of institutional investors, the former being too small and uncoordinated to have any real effect on corporate policy (Grossman and Hart, 1986). Institutional investors, on the other hand, may either seek to encourage changes within the firm (activism) and to facilitate appropriate takeovers (Shleifer and Vishny, 1986), thus mitigating the principal-agent problem to some extent (Black, 1992). Or they may simply bail out if they are unhappy with the performance of the company's senior management team (Parrino et al., 2003).[5] Blockholders who engage in monitoring activities will have the ability to influence management directly and will also have access to superior and timelier information (e.g., Martin, 1996; Carleton et al., 1998; Chen et al., 2007), but monitoring is not free and its costs will be inversely proportional to the size of the blockholding. Compared to other institutional investors, institutional cross-owners have lower information collection costs and better incentives to monitor M&A deals because they have their feet on both the acquirer and the target camps.

Third, the existence of institutional cross-owners impacts upon M&A deal negotiations. There is already evidence to suggest that close connections between the boards of the acquirer and the target (where, for example, there is a board member in common), helps acquirers to reduce their takeover premiums due to reduced information asymmetry and reduced competition from less informed potential outside bidders (e.g., Cai and Sevilir, 2012; Guo et al., 2015). Acquiring firm shareholders who also cross-hold shares in the targets may be able to facilitate deal negotiations, obtain better terms for acquirers and better enable the integration of the constituent firms. In addition, it is likely that institutional cross-owners know more about deal quality than other investors in the market. Therefore

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[5]Large institutional investors, notably pension funds such as CalPERS in the U.S., have been increasingly active in engaging senior corporate managers to bring about changes in specific aspects of the way that the company is run (e.g., Brav et al., 2008; Becht et al., 2010).

institutional cross-owners may prefer certain deal characteristics to others – for example, regarding the method of payment.

In our sample of 2,604 mergers between U.S. public firms over 1984–2014, we observe that institutional cross-ownership is pervasive between acquirers and targets. On average, 18% of acquirer stocks are held by target institutional owners and 21% of target stocks are held by acquirer institutional owners. Moreover, some institutional cross-owners hold a large amount of both acquirer and target stocks. Among the top 10 acquirer institutional owners and top 10 target institutional owners, the average number of institutional cross-owners is 2. To examine the role of institutional cross-owners in M&As, we first show that the presence of institutional cross-ownership between two firms increases the probability of a merger pair formation. Institutional cross-ownership measures are higher in our actual M&A sample than those in matched firms selected by bootstrapping with replacement from the sample acquirer or target's industry. In addition, potential firms with large institutional cross-ownership with sample targets (acquirers) are more likely to become acquirers (targets).

We next find that institutional cross-ownership is negatively associated with the market expectation of deal quality. The average acquirer abnormal return from one day before to one day after the acquisition announcement (CAR3) decreases by 54 basis points if the institutional cross-ownership of acquirers increases by one standard deviation. The acquirer CAR3 decreases by 30 basis points if one more institutional cross-owner is among the top 10 institutional owners of the acquirer and target. Despite the negative relationship between institutional cross-ownership and acquirer CARs, we find that acquirers with higher institutional cross-ownership do not overpay for targets. Using the takeover premium estimated by the transaction value in excess of target market value or by the target CARs, our results indicate that there is a negative and statistically significant relationship between institutional cross-ownership and deal premiums. We also find that acquirers with high institutional cross-ownership tend to use more stocks and less cash as the method of payment. Firms that have more institutional cross-ownership with each other may have

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better information on the combined firms' long term performance. Furthermore, we find that the existence of top institutional cross-ownership may reduce the completion probability of deals with negative acquirer abnormal returns, but has no effect on the completion probability of deals with positive acquirer abnormal returns. These results favor the possibility that institutional cross-owners know more about deal quality than outside investors at the announcements. Taken together, we find evidence that institutional cross-ownership plays an important role in the corporate merger and acquisition activities.

An important concern for our analysis is that institutional cross-ownership is positively related to institutional ownership which could affect M&A outcomes independently. To address this concern, we control for acquirer institutional ownership in our regression framework and show that institutional ownership and cross-ownership affect deal outcomes in a different way. Next, we examine the relation between institutional cross-ownership and other deal characteristics and the combined firm's long term performance. We show that acquirers and targets pay lower financial advisory fees to investment banks in the deals with high institutional cross-ownership, suggesting that institutional cross-owners facilitate deal negotiations and reduce transactions costs. We also find that the merging firm is less likely to restate its earnings if institutional cross-ownership between the acquirer and the target is higher, suggesting that institutional cross-owners may reduce deal uncertainty by deterring the chance of misreporting earnings before M&As. Furthermore, we find that institutional cross-ownership is higher in our non-diversifying deal sample than in our diversifying deal sample. Given the diversification discount documented in previous studies, our finding further justifies the positive effect of institutional cross-ownership in M&As. Finally, we find that both deal synergies and the post-deal long-run performance of the combined firms are positively related to institutional cross-ownership.

Our paper aims to extend the literature regarding the effect of institutional cross-holdings on the performance of M&A deals. We contribute to two main strands of literature. First, there exists a substantive body of work on the impact of institutional ownership on corporate strategy and behavior, which can be viewed as an extension of the research

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on shareholders' monitoring roles. The evidence suggests that large institutional investors are able to exert considerable influence on a whole raft of corporate policies, including CEO compensation (e.g., Hartzell and Starks, 2003; Almazan et al., 2005) and the scale of R&D investment (Bushee, 2001), so that they can align the goals of senior managers to increasing firms' fundamental and long-term value (Edmans, 2009). But overall, Chen et al. (2007) highlight the inconclusive nature of extant research on the effectiveness of shareholder monitoring. Thus the evidence regarding whether institutional investors have good or bad effects on senior management is conflicting. The presumption is that shareholders exert a positive controlling influence, but there exist conflicts of interest among different investor groups and managers. For example, certain groups of institutional investors may have shorter horizons than managers and may care even less about long term value creation. Bushee (2001) indicates that the early literature in essence viewed institutions as a homogeneous group with similar objectives and approaches to controlling the actions of corporate managers. But more recently, in academic research institutional investors are typically separated into bank trusts and pensions and endowments; insurance companies; and financial advisors including mutual funds (Abarbanell et al., 2003). Institutional investors also exhibit a preference for particular styles of stocks, and this influences their decision-making during spinoffs (Abarbanell et al., 2003) and in other areas of corporate activity. We investigate one of the key factors determining whether institutional investors can affect corporate behavior in an even more drastic way, namely in influencing whether M&A deals will be concluded or not and if so, how successful they will be. And we focus on institutional cross-owners, a certain type of institutional investor, who may have different information sets and objective functions from other blockholders in M&A deals.

In addition to the literature on institutional investors, our paper also contributes to the recent body of research that investigates how the links between acquirers and targets may impact M&A deal outcomes. For example, acquirer and target industry relatedness (Levy and Sarnat, 1970); acquirers and targets funded by common venture capital (e.g., Gompers and Xuan, 2008; Masulis and Nahata, 2011); supplier and customer relationships

between merging firms (Ahern and Harford, 2014); toeholds (e.g., Betton and Eckbo, 2000; Goldman and Qian, 2005); acquirer-target social ties through board directors and senior executives (e.g., Cai and Sevilir, 2012; Ishii and Xuan, 2014); and common auditors (e.g., Cai et al., 2016; Dhaliwal et al., 2015). Our paper systematically documents that institutional cross-ownership, as a new link between acquirers and targets, has a significant impact on M&A deals. A key difference between institutional cross-ownership and the links documented in the previous literature is that at the outset we are agnostic about the likely sign of the impact of cross-blockholders on M&A deal performance. On the one hand, acquirers with significant cross-holdings in the targets are likely to hold superior information on the true value of the latter and institutional cross-ownership may mitigate principal-agent problems arising from information asymmetries. Also, institutional cross-owners may monitor the managers of both acquirers and targets and offer more negotiation power for acquirers. On the other hand, institutional cross-ownership may lead to more severe conflicts of interests because the changes in institutional cross-owners' wealth are a combination of the changes in acquirer and target firm value at deal announcement. In our paper, we also find that the market reaction at the M&A deal announcements may not correctly represent actual deal quality.

The remainder of the paper is structured as follows. Section 2 discusses the relevant literature and the possible role of institutional cross-ownership in M&As. Section 3 discusses the data collection and provides descriptive statistics. Section 4 presents empirical evidence on the impact of institutional cross-ownership on M&A deal performance and outcomes. Section 5 further explores the role of institutional cross-ownership in M&A and provides robustness test results. Section 6 concludes.

2 Related literature

Our research is most related to that of Matvos and Ostrovsky (2008) and Harford et al. (2011). Matvos and Ostrovsky (2008) show that institutional investors as a whole

do not lose money at M&A deal announcements, because many of them also hold target stocks. Hence the losses due to the decrease in acquirer stock prices will be compensated by the gains due to the rise of target stock prices. Therefore, there is potentially a conflict of interest between an acquirer's institutional cross-owners and other institutional investors. Following Matvos and Ostrovsky (2008), Harford et al. (2011) find that at the individual institutional cross-owner level, cross-holdings are asymmetric so that one institutional cross-owner may only effectively focus on her position in either the acquirer or the target. These two papers examine the change of institutional cross-owners' wealth at deal announcements but hold different views of whether the existence of institutional cross-ownership can explain the negative acquirer announcement returns. In our paper, we use several institutional cross-ownership proxies and study the effect of institutional cross-ownership on the M&A deal occurring probability and deal outcomes using multivariate analyses. We emphasize the importance of the institutional cross-ownership externality in M&A transactions.

Our paper is also related to at least four other strands of the literature. First, Hansen and Lott (1996) show that if cross-holdings impose externalities on stocks in cross-owner portfolios, then cross-owners may push companies to adopt corporate policies that maximize their portfolio values instead of those of the individual companies. Dasgupta and Tsui (2004) show that such an externality does exist when two competing firms with cross-shareholdings compete in an auction. Jung (2013) finds that cross-ownership provides a communication channel among firms and helps facilitate the diffusion of disclosure practices. Masulis et al. (2007) find that venture capital firms (VCs) that have financial relationship with both acquirers and targets show conflicts of interest with other investors in M&A deals.

In addition to the modest literature on institutional cross-holdings, there is also some research investigating the effect of direct inter-company share holdings, where one company holds the shares in another. This practice is common in Germany and Japan, but less so elsewhere including the U.S. (Bøhren and Norli, 1997). One such situation where corporate

cross-holdings occur in the U.S. is in the context of "toehold" bidders, where firms that intend to make an acquisition already hold a small percentage of the equity in the target firm. Toeholding is increasingly rare in the U.S., however, but has been the subject of considerable research (e.g., Betton et al., 2009; Betton and Eckbo, 2000; Goldman and Qian, 2005; McDonald, 1989; Mikkelson and Ruback, 1985; Shleifer and Vishny, 1986).[6] Our empirical evidence demonstrates that the externality of general institutional cross-ownership also exists in M&A deals.

Second, our paper is related to a recently developing literature on the role of institutional investors in corporate strategies and investment decisions. Allen (2001) indicates that institutional investors matter for both asset pricing and corporate finance. Previous studies find that some, but not all, types of institutional investors exert influence on corporate strategies such as anti-takeover amendments, R&D investment decisions, CEO compensation, and corporate spin-offs (e.g., Brickley et al., 1988; Agrawal and Mandelker, 1990; Bushee, 1998; Hartzell and Starks, 2003; Abarbanell et al., 2003). However, recent papers on M&As show mixed evidence. Gaspar et al. (2005) find that institutional investors with high-turnover portfolios exert little influence on managers with regard to acquisition decisions. Chen et al. (2007) find that although the total institutional holdings do not have a positive effect on post-merger performance, concentrated holdings by independent long-term institutions do. Transient institutional investors who have short-term horizons lead to more myopic behavior on the part of managers, with near term earnings maximized at the expense of longer term underlying value (e.g., Jacobs, 1991; Bushee, 2001). Institutional investors may be also forced to take a short-term view by their clients, who themselves focus on short-term performance levels and would withdraw their funds (or not invest them in the first place) if returns unjustifiably fall below expectations (Graves and Waddock, 1990). Long-term institutional investors are more likely to fulfil monitoring roles, whereas those investors holding stocks for less than a year are more likely to

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[6]According to (Betton et al., 2009), only 13% of bidders for U.S. firms in the 1973–2002 period had toeholds.

maintain a distance from the activities of the firm, focusing on merely buying and selling shares to maximize profits. Thus shorter-term investors have been argued to fulfil their monitoring role less effectively, in an M&A context leading weaker deals to proceed, while on the other hand longer-term investors are more inclined to block bad deals so that they have a higher probability of being withdrawn (Chen et al., 2007). Long-term institutional shareholders are able to enhance the success of merger and acquisition deals leading to better post-merger stock returns and better operating performance as measured by the return on assets and earnings per share (Chen et al., 2007). These studies suggest that the extent of the presence of a certain subset of institutional investors may affect corporate strategies, rather than all institutional holdings having a homogeneous effect. Our paper studies whether the variation of another subset of institutions, institutional cross-owners, affects M&A deal performance or not.

Third, our paper is related to several previous studies that examine the role of institutional investors in reducing asymmetric information in cross-border M&As. Usually, cross-border M&As suffer from severe information asymmetry. Ferreira et al. (2009) find that the foreign institutional ownership of acquirers increases the probability of successful cross-border M&A activities worldwide. The results are consistent with the view that foreign institutional investors build bridges between international firms and reduce transaction costs and information asymmetry. Andriosopoulos and Yang (2015) find that in U.K., institutional investors increase the likelihood of an M&A to be a cross-border deal, but the investment horizon has a negative influence on this relationship. Our paper provides evidence that institutional cross-owners may also reduce the information asymmetry between domestic acquirers and targets.

Finally, there are many studies in the social connection literature that investigate the effect of corporate social connections on firm strategies. On the one hand, corporate social ties between acquirers and targets may lower the costs of information collection and reduce information asymmetry, leading to better decision making. For example, Gompers and Xuan (2008) find that acquisition announcement returns are more positive for acqui-

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sitions where both the target and the acquirer are financed by the same venture capital firm. Cai and Sevilir (2012) find that board connections play important roles in corporate investments. Acquirers obtain higher announcement returns in transactions if they share a common director with targets. Acquirers also obtain higher announcement returns if an acquirer director and a target director serve on the same third board. On the other hand, extensive social ties between merging firms may lead to weaker post deal performance for two main reasons. First, the social ties across managers of acquirers and targets could lead firms to lower due diligence standards. In addition, acquirers with social ties to targets may be overconfident and so over-estimate the synergies from acquisitions and underestimate merger adjustment costs (Roll, 1986). High institutional cross-ownership will also reduce the number of independent people effectively engaged in the decision-making process, leading to a heightened likelihood of "group think" where differing perspectives and outside information are systematically ignored (Janis, 1982). Second, a "familiarity bias" (e.g., Uzzi, 1996; McPherson et al., 2001) could lead acquirers and targets with social connections to disregard other, potentially better, candidate firms that exist outside of their network. A manifestation of the "familiarity bias" may arise since cross-shareholders in the acquirer will also by definition already be knowledgeable about the target and vice versa, resulting in a false sense of security and a failure to consider alternative targets or bidders. Ishii and Xuan (2014), for example, argue that social ties between the target and acquirer firms' top executives (such as through alumni networks, charities or clubs) lead to an increased probability of deal completion, but with poorer decision-making and bad deals being more likely to go through, leading to worse post-merger performance.

3   Sample selection and descriptive statistics

In this section, we discuss our sample selection process and sample characteristics.

3.1 M&A sample selection

To conduct our analyses, we first select a sample of M&As from the Thomson Reuters Securities Data Company (SDC) Platinum Mergers and Acquisitions database, following a list of restrictions:

1. We start with all deals having announcement dates between 1984 and 2014. The sample begins in 1984 because the information in the SDC database is less reliable before this date (Chen et al., 2007).

2. Both acquirers and targets are U.S. publicly traded companies.

3. We include deals whose status is either completed or withdrawn.

4. We exclude transactions labelled as a minority stake purchase, acquisitions of remaining interest, privatizations, repurchases, exchange offers, self-tenders, recapitalizations or spinoffs.

5. The transaction value, as reported by the SDC, was above \$1 million, and at least 5%[7] of the value of the acquirer at the announcement.

6. The percentage of target shares held by the acquirer is less than 50% before the transaction and at least 90% if the transaction is completed.

7. The acquirer had accounting data available from Compustat and stock data available from the Centre for Research in Security Prices (CRSP).

To examine the influence of institutional cross-ownership on deal performance, we link our M&A sample with the Thomson Financial CDA/Spectrum Institutional (13F) database. Our final sample includes 2,604 deals in which both acquirers and targets have

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[7]We choose the relative size between acquirers and targets to be 5%, because institutional cross-ownership plays a more important role in M&A when acquirers and targets have similar size. However, our results are qualitatively the same if we choose 1%, 10% or 20% as the relative size.

institutional owners.[8] Panel A of Table 1 provides the distribution of M&A deals by year. The maximum number of deals per annum is 200 and the minimum number of deals per annum is 29. Panel B presents the distribution of M&A deals by Fama–French 10 industries based on acquirers' SIC codes. These two panels show that our sample is fairly representative and well diversified across different industries.

3.2   Sample descriptive statistics

Table 2 presents the descriptive statistics of M&A deals in our sample. All variables are defined in Appendix A. Panel A of Table 2 illustrates the summary statistics for the deal performance-related variables. The acquirer CARs are on average negative around deal announcements. The mean (median) deal premium is 70% (46%) in our sample, and the mean (median) deal synergy gain is 4% (2%). 82% of the deals in our sample are successfully completed after the announcement. On average, the long-run abnormal returns of the completed deals are around zero.

Panel B of Table 2 summarizes the institutional cross-ownership proxy variables used in our empirical analysis. On average, 18% of the acquirer's stock is owned by institutional investors who also own the equity of targets ($Ac\_crossIO$). In untabulated results, we find that on average 21% of the target's equities are owned by institutional investors who also own the equity of acquirers. The market value weighted average of the acquirer and target's institutional cross-ownership ($MVweighted\_crossIO$) has a mean of 19%. The mean number of institutional investors who are within the top five largest institutional owners of both acquirers and targets ($Top5Count$) is 0.6. The mean number of institutional investors who are within the top 10 largest institutional owners of both acquirers and targets ($Top10Count$) is 1.8. The mean number of institutional investors who are within the top 20 largest institutional owners of both acquirers and targets ($Top20Count$) is 4.3. These summary statistics suggest that institutional cross-ownership is pervasive among

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[8]The acquirers and targets of 123 deals in our sample do not share the same institutional owners. The institutional cross-ownership measures for these deals are all therefore defined as zero. Our empirical results are robust to the exclusion of these deals.

deal acquirers and targets in our sample. Harford et al. (2011) argue that because individual institutional cross-owners' holdings are asymmetric between acquirers and targets, the average loss on acquirer announcement returns cannot be simply explained by total institutional cross-holdings. One advantage of our $Top5/10/20Count$ variables is that they can measure the relative importance of institutional cross-owners on both acquirers and targets.[9]

Figure 1 presents the time series of institutional cross-ownership on the acquirers and targets in our sample. The heights of the blue bars represent the average numbers of acquirer institutional owners for all deals in each year. The heights of the green bars represent the average number of target institutional owners for all deals in each year. The heights of the red bars represent the average number of institutional cross-owners for all deals in each year. As a result of the rise of institutional ownership in U.S. stock markets over our sample period, we observe a clear increasing pattern for all three colored bars. Since acquirers are usually larger than the corresponding targets in our sample, the average number of acquirer institutional owners is higher than the average number of target institutional owners. The red (purple) colored line represents the average ratio of institutional cross-owners to the number of target (acquirer) institutional owners in each year. Both lines show that institutional cross-owners account for a significant portion of acquirer and target institutional owners. For targets in particular, cross-owners account for more than 40% of target institutional owners for all the sample period.

Panel C Table 2 presents the descriptive statistics for deal and firm characteristics. Our M&A sample is similar to those used in previous studies of M&As between U.S. public firms.

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[9]On average, top 5 institutional cross-owners hold 3.6% of acquirer stocks and 3.7% target stocks; top 10 institutional cross-owners hold 6.6% of acquirer stocks and 6.7% of target stocks; top 20 institutional cross-owners hold 10.3% of acquirer stocks and 10.3% target stocks.

4 Main results

4.1 Institutional cross-ownership and M&A likelihood

In this section, we implement both univriate and multivariate analyses to study the effect of institutional cross-ownership on the likelihood of two firms participating in M&As.

4.1.1 Institutional cross-ownership and M&A likelihood: Univariate tests

If the presence of institutional cross-ownership between an acquirer and a target could have an impact on the probability of a merger occurring in the first place, then the acquisition may be more or less likely to occur between two firms that have a high institutional cross-ownership. Panel B of Table 2 presents the average institutional cross-ownership between the acquirers and the targets in our sample. We next compare these averages to the ones estimated in bootstrapped deal samples.

Following Ishii and Xuan (2014), we pair the acquirer of each sample deal with a random firm drawn from the sample target's industry in the year of the deal announcement. We bootstrap five hundred targets with replacement for each deal and report the average institutional cross-ownership calculated for these simulated parings in Panel A of Table 3. Across six different institutional cross-ownership measures, we show that the observed level of institutional cross-ownership between our sample acquirers and sample targets is higher than one would expect from pairing actual acquirers with randomly drawn targets. Panel B of Table 3 reports the average institutional cross-ownership between random acquirers and sample targets which we construct by pairing each sample target with a random firm drawn (with replacement) from the sample acquirer's industry in the year of the deal announcement and repeat the procedure five hundred times. The observed level of institutional cross-ownership in our sample is higher than one would expect from randomly pairing potential acquirers with actual targets. Panel C of Table 3 reports the average institutional cross-ownership between random acquirers and random targets which we construct by pairing one randomly drawn (with replacement) firm from the actual ac-

quirer's industry with one randomly drawn firm (with replacement) from the actual target's industry. The observed level of institutional cross-ownership in our sample is higher than one would expect from randomly pairing potential acquirers with potential targets. To be consistent with our sample selection criterion, we restrict the relative size between any pair of acquirers and targets to be above 5% in our bootstrapped sample. Fama–French 10 industry classification is used our univariate analysis.[10]

In summary, the univariate test results based on the bootstrapped samples suggest that two firms are more likely to merge together in the presence of higher institutional cross-ownership. However, the probability of a firm being an acquirer or a target may also depend on firm characteristics that are not controlled for in our univariate tests. It is necessary to use multivariate analyses to study the role of institutional cross-ownership in M&As.

4.1.2   Probability of firms being acquirers/targets: Multivariate tests

Following Bodnaruk et al. (2009), Bena and Li (2014) and Cai et al. (2016), we estimate the selection models of firms becoming acquirers or target firms. We start by investigating the relation between institutional cross-ownership and the probability of a firm being a takeover acquirer. For each sample acquirer, we define the set of all firms in the same Fama–French 10 industry category of similar size (within a 20% band of market capitalization). Then we use cross-sectional data as of the fiscal year-end before the deal announcement and run a conditional logit regression in which the dependent variable is equal to one if a firm is a sample acquirer and zero otherwise. The explanatory variables are institutional cross-ownership measures and a set of acquirer firm characteristics. For each deal, there is one observation for the sample acquirer and multiple observations for the control acquirers. We control for deal fixed effects in all regressions. Panel A of Table 4 indicates that institutional cross-ownership between all potential acquirers and sample targets is positively related to the probability of a firm becoming an acquirer. All

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[10]Our results are robust to all other Fama–French industry classifications.

coefficients of institutional cross-ownership measures are positive and strongly statistically significant. The results are also economically significant: a 1% rise in Ac_crossIO increases the probability of a firm becoming an acquirer by 2.8%; one extra institutional top 10 cross-owner increases the probability of a firm becoming a target by 41.2%. Panel B of Table 4 shows that our results are robust if we exclude matched acquirers which do not have any institutional cross-ownership with the sample targets. Panels C and D of Table 4 indicate that alternative matching based on the Fama–French 10 industry category, size (within a 20% band of market capitalization), and B/M (within a 20% band of B/M ratio), delivers similar results.

Table 5 presents coefficient estimates from the conditional logit regression to predict target firms. We use the same four matching procedures as in Table 4. We show that there is a positive and statistically significant relation between institutional cross-ownership and the probability of a firm becoming a target. The results are also economically significant. Using Panel A of Table 5 as an example, a 1% rise in Ta_crossIO increases the probability of a firm becoming a target by 2.5%; one extra institutional top 10 cross-owner increases the probability of a firm becoming a target by 37.3%.

Overall, the results provide answers to our first research question that institutional cross-ownership increases the likelihood of two firms merging in the first place compared to other potential firms with similar characteristics. In the rest of this paper, we will study our second research question as to whether institutional cross-ownership has any effect on M&A deal outcomes and performance.

4.2 Institutional cross-ownership and acquirer CARs

First, we examine the relationship between institutional cross-ownership and acquirer CARs with multivariate ordinary least squares (OLS) regressions. Table 6 presents the regression results. The dependent variables are the three-day, seven-day, and eleven-day acquirer CARs in Panels A, B, and C, respectively. The primary explanatory variables of interest are the institutional cross-ownership proxy variables: institutional ownership by

acquirer institutions that also own shares in the target (Ac_crossIO); firm market value weighted acquirer institutional cross-ownership and target institutional cross-ownership (Mvweighted_crossIO); number of institutions which are both the acquirer top 5/10/20 institutional owners and the target top 5/10/20 institutional cross-owners (Top5/10/20Count). Previous literature has identified a number of deal-related and acquirer-specific factors which have a significant effect on acquirer announcement returns. We control for these variables in all our regressions, as well as year and industry fixed effects. p-values are calculated based on t-statistics adjusted for heteroscedasticity.

Panel A shows that institutional cross-ownership is negatively and significantly associated with acquirer three-day abnormal returns. If acquirer institutional cross-ownership ($Ac\_crossIO$) increases by one standard deviation, the corresponding three-day CARs will be reduced by 54 basis points. The marginal effect of one more institutional top 10 cross-owner on acquirer three-day CARs is -30 basis points. Panels B and C also show that acquirer abnormal returns over seven-day and eleven-day windows are negatively related to institutional cross-ownership proxies. However, the results are weaker in terms of statistical significance.[11]

The first possible explanation of the negative effect of institutional cross-ownership on acquirer CARs is that the losses of institutional cross-owners on acquirer stocks are compensated by gains on target stocks. *Ex post*, we observe that the market reaction to deals with high institutional cross-ownership is worse. Secondly, institutional cross-ownership may lead to flawed decision making based on weaker critical analysis by the management teams of both acquirers and targets, a lower due diligence standard during deal negotiations, or missed opportunities for other potential acquirers and targets. Our finding is consistent with Ishii and Xuan (2014), who find that acquirer abnormal returns are lower when the cross-firm social connection between directors and senior executives at the acquirers and the targets is higher. Finally, we notice that the economic effect of

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[11]In untabulated tests, we calculate acquirer CARs based on the Fama–French three factor model (Fama and French, 1993) and find similar results.

institutional cross-ownership on acquirer CARs are not significant. It might be possible that acquirer CARs only reflect the market perceived deal quality. If institutional cross-owners have any inside information about the deals, then the market perceived deal quality may not be consistent with other deal performance measures.

4.3   Institutional cross-ownership and takeover premiums

The deal takeover premium represents how much an acquirer pays a target in excess of its market value, which is another measure of deal performance. We measure the deal takeover premium as the ratio between transaction value and target market value 4-weeks before the deal announcement subtracting one. Using this takeover premium proxy as the dependent variable and our institutional cross-ownership proxies as key independent variables, Panel A of Table 7 presents the OLS regression results on the relationship between institutional cross-ownership and takeover premiums after controlling for the same acquirer and deal characteristics as those used in the acquirer CAR regressions. We find that the takeover premium is negatively and significantly related to the institutional cross-ownership proxies. Increasing acquirer institutional cross-ownership ($Ac\_crossIO$) by one standard deviation reduces the takeover premium by 16.5%. The marginal effect of one more institutional top 10 cross-owner on the takeover premium is -7.9%. Thus the relationship between institutional cross-ownership and takeover premiums is economically significant. This finding suggests that acquirers actually benefit from institutional cross-ownership and do not overpay targets.

The existence of institutional cross-owners between acquirers and targets may improve information flow and the efficiency of communication between them. Institutional cross-ownership may also increase each firm's knowledge and understanding of the other's operations and corporate culture. The information advantage of acquirers with more institutional cross-ownership may help them to get better deal prices because they may have a bargaining advantage during the negotiations due to their private information about the target firm relative to outside bidders without such a connection. The negative relation-

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ship between institutional cross-ownership and takeover premium is consistent with Betton and Eckbo (2000) who find toeholds to be associated with lower takeover premia. Finally, higher institutional cross-ownership can reduce the probability of bidder competition and target resistance.

To check the robustness of the takeover premium results, we follow Ishii and Xuan (2014) and use target abnormal returns around the acquisition announcement as an alternative proxy for takeover premiums. Compared to the takeover premium calculated by transaction value, target CARs are adjusted for market returns and the market expectation on deal completion probability. Panel B of Table 7 presents the OLS regression results. Using target three-day CARs as the dependent variable, we find negative and statistically significant coefficients on all the institutional cross-ownership proxy variables. If acquirer institutional cross-ownership ($Ac\_crossIO$) increases by one standard deviation, target CARs will be reduced by 2.8%. The marginal effect of one more institutional top 10 cross-owner on target CARs is -1.2%.

4.4   Institutional cross-ownership and M&A method of payment

The method of payment in M&A deals usually is cash, acquirer stock, or a combination of the two. Exotic payment structures or option-like payment methods may also be included in M&A deals, but they are not considered in this study. In Panel A of Table 8, we test the relationship between institutional cross-ownership and the percentage of cash payment involved in the total payment of the transaction, controlling for deal and firm characteristics, as well as year and industry fixed effects. We employ tobit regressions since the dependent variable – the percentage of cash payment involved in the total payment of the transaction – is left-censored at zero.

The negative and significant coefficients on institutional cross-ownership proxy variables in Panel A show that cash is used less in deals with more institutional cross-ownership. Similarly, we investigate the relationship between institutional cross-ownership and the percentage of stock payment involved in the total payment of the transaction in Panel B of

Table 8. The same control variables are used as in Panel A, and tobit regressions are again estimated because the dependent variables are also left censored at zero. Because stock and cash are substitutes as M&A methods of payment, all coefficients on the institutional cross-ownership proxy variables are positive and statistically significant. Increasing acquirer institutional cross-ownership ($Ac\_crossIO$) by one standard deviation reduces cash payment by 6.1% and raises stock payment by 6.7%. An increase of one institutional top 10 cross-owner will reduce cash payment by 4.9% and raise stock payment by 4.3% on average.[12]

The results in Table 8 suggest that with more institutional cross-ownership, targets are more likely to share the risk of merged companies, which is consistent with the explanation that the existence of institutional cross-ownership reduces information asymmetry in merger deals. From the perspective of target shareholders, the payment of acquirer stocks is more risky when deal information asymmetry is high. When a target's shareholders know that the M&A deal is good, they are willing to accept the stock of the new company and to ride on the future growth opportunities. From the acquirer's point of view, its institutional owners may be reluctant to use stock to finance acquisitions because it will dilute their control of the acquirer. This concern is mitigated if some institutional owners of acquirers are also the owners of targets, especially when they hold a large percentage of target shares. Martin (1996) finds that the likelihood of stock financing decreases with an acquirer's higher institutional blockholdings. Our results indicate that because institutional cross-owners and non cross-owners have different objective functions in M&As, they may affect corporate decisions differently.

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[12]In untabulated tests, we use either Pure Cash or Pure Stock binary variables as the dependent variable in logit regressions and find similar results.

4.5 Institutional cross-ownership and deal completion probability

In this section, we investigate whether deals with more institutional cross-owners have higher completion rates. On the one hand, institutional cross-owners may help facilitate deal negotiations and have a positive effect on bid success. On the other hand, they may play a monitoring role in deal negotiations, leading to a higher likelihood that deals of bad quality will be withdrawn. To test these two possibilities, we separate our sample into one group of deals with positive acquirer CARs and the other group with negative acquirer CARs. In Panel A of Table 9, we run probit regressions of the M&A deal completion on the institutional cross-ownership proxy variables in the sub-sample of deals with negative CARs, controlling for deal characteristics, firm characteristics, industry fixed effects and year fixed effects. All coefficients on the institutional cross-ownership proxy variables are negative and statistically significant. Increasing acquirer institutional cross-ownership ($Ac\_crossIO$) by one standard deviation reduces the completion probability of negative CAR deals by 3.2%. The marginal effect of one more institutional top 10 cross-owner is a 1.3% drop in the completion probability of negative CAR deals. In Panel B of Table 9, we run probit regressions of M&A deal completion on the institutional cross-ownership proxy variables for the sub-sample of deals with positive CARs, using the same control variables as in A. The coefficients on the institutional cross-ownership proxy variables are positive but not statistically significant, indicating that there is no effect of institutional cross-ownership on deal completion for the positive CAR sub-sample. Overall, the findings from this section support the view that institutional cross-owners have a monitoring role in M&A deal negotiations, so that deals with negative CARs will be more likely to be withdrawn.

In an untabulated test, we find that there is no significant relationship between institutional cross-ownership and takeover success for all deals in our sample. This result is different from those of Jennings and Mazzeo (1993) and Betton and Eckbo (2000),

who find that toeholds are associated with a higher completion probability of M&As. This difference further supports the monitoring role of institutional cross-owners, because unlike institutional cross-ownership, toeholds are not related to corporate governance.

5 Further empirical evidence on institutional cross-ownership

In this section, we provide robustness test results and consider further empirical evidence on the characteristics of the mergers.

5.1 Institutional cross-ownership vs. institutional ownership

Our results so far suggest that institutional cross-ownership has a significant effect on M&A deal performance and outcomes after controlling for important acquirer and deal characteristics. To further check the robustness of our main results, we address a concern that institutional cross-ownership is positively correlated with acquirer institutional ownership which could independently affect M&A outcomes. Specifically, we investigate whether our main test results can be explained by acquirer institutional ownership by adding it as a control variable in the previous regressions.

The four panels of Table 10 show that the relationship between institutional cross-ownership and M&A deal outcomes continue to hold after controlling for acquirer institutional ownership. Panels A and C show that acquirer institutional ownership does not affect acquirer CARs and deal completion probability. Interestingly, we find that institutional ownership is positively and significantly related to takeover premium, which is the opposite to institutional cross-ownership. Similarly, we find that institutional ownership is positively and significantly related to the percentage of cash payment, which is also the opposite to institutional cross-ownership. All these results suggest that institutional cross-ownership plays a different role from institutional ownership in undertaking deals. We

check the variance inflation factors (VIF) of institutional cross-ownership variables and institutional ownership variable in our regressions. All VIF values are less than 4 which is lower than the standard collinearity tolerance level of 10.

5.2   Institutional cross-ownership and deal profitability

In this subsection, we proceed with the analysis of combined announcement return as a measure of value creation from the deal around the announcement date. The dependent variable in the multivariate analysis is $Synergy$, which is calculated as the weighted average of both acquirer and target three-day CARs. The key independent variable of interest is the number of institutional top cross-owners. We include the same set of control variables as in the acquirer CAR regressions of Table 6. Table 11 shows that $Synergy$ is positively related to the numbers of top institutional cross-owners, and the coefficients are statistically significant for $Top5Count$ and $Top10Count$. The marginal effect of one more top 10 institutional cross-owner is a 2.0% increase in deal synergy.

As an alternative method to examine whether institutional cross-ownership leads to better M&A performance, we also study the relationship between institutional cross-ownership and the merged firm's long-run performance. We focus on the number of top independent institutional cross-owners in our empirical analysis because it is more likely that independent institutional cross-owners will have a monitoring role in corporate governance (Chen et al., 2007). Table 12 shows that the number independent institutional investors who are among the top 10 institutional cross-owners have positive and significant coefficients in all the acquirer long-run performance specifications.

5.3   Institutional cross-ownership and transaction costs

Investment banks are generally hired by acquiring firms to identify potential deals with high synergy, facilitate M&A transactions (McLaughlin, 1990, 1992), and provide professional advice such as fairness opinions (Kisgen et al., 2009). Golubov et al. (2012)

also find that for deals with both public acquirers and targets, investment banks with better reputation may deliver higher acquirer announcement returns. If firms connected by institutional cross-owners have greater information and better knowledge about deal long-term profitability, their need for hiring investment banks to provide professional advice might be lower. Therefore, we predict that M&A advisory fees are lower for deals with high institutional cross-ownership.

Table 13 presents the results of OLS regressions for advisory fees. The M&A financial advisory fees paid by acquirers and targets are collected from SDC. In Panel A of Table 13, the dependent variable is the ratio of total advisory fees paid by the acquirers to deal value. We find that the existence of institutional cross-owners is associated with significantly lower advisory fees paid by the acquirers. A one standard deviation increase in the acquirer institutional cross-ownership is associated with 0.17% decrease in the percentage advisory fees paid by the acquirers. Given the average deal value of $1,541 million in our sample, this translates to a $2.6 million reduction in fees paid by acquirers. The marginal effect of one more top 10 institutional cross-owner is a 0.055% decrease in the percentage advisory fees paid by the acquirers, equivalent to a $0.85 million reduction. In Panel B of Table 13, the dependent variable is the ratio of total advisory fees paid by the targets to deal value. Similarly, we find that targets pay lower advisory fees in the presence of institutional cross-ownership. One more top 10 institutional cross-owner may reduce the percentage advisory fees paid by the targets by 0.081%, translating to a $1.2 million reduction. Our results are consistent with Cai and Sevilir (2012) who find that firms with current board connections pay less M&A financial advisory fees.

5.4   Institutional cross-ownership and earnings misreporting

Before the M&A announcement, both acquirers (Louis, 2004; Gong et al., 2008) and targets (Anilowski et al., 2009) have an incentive to actively manage their earnings. But financial statement misreporting only benefits one side of the deal and creates greater uncertainty in M&As. A deal with institutional cross-ownership may have less information

asymmetry because cross-owners have their feet on both sides of the deal. In addition, institutional cross-owners may have a greater incentive to monitor both firms and reduce misreporting activities ex ante, leading to more transparent financial information and more accurate bidding prices. Following Bens et al. (2012) and Cai et al. (2016), we use the restatements of financial reports as a proxy for misreporting and investigate whether the probability of a merging firm restating its earnings is negatively related to the institutional cross-ownership between the acquirer and the target. The earnings restatement data are collected from Audit Analytics. We eliminate all clerical application errors that are mainly due to unintentional reporting mistakes (Bens et al., 2012). Similarly to Cai et al. (2016), we define the earnings misreporting dummy to be equal to one if the beginning date of the misstatement period is within a two-year window before the deal completion date, and zero otherwise.

Table 14 reports the coefficient estimates from the probit regressions of the earnings misreporting dummy on the institutional cross-ownership measures. Because Audit Analytics has only covered restatement data since 1996, the deal numbers drop to 1,497 with the sample period of 1996-2014. We control for acquirer firm characteristics, target firm characteristics, and deal characteristics in all regressions. All the coefficients of institutional cross-ownership measures are negative and statistically significant. The change in probability of misreporting decreases by 10.5% for one instant increase in the market value weighted institutional cross-ownership (Mvweighted_crossIO). The marginal effect of one more institutional top 10 cross-owner is a 1.1% drop in the probability of earnings restatements. The results in Table 14 suggest that the existence of institutional cross-ownership establishes an information bridge between acquirers and targets, leading to reduced information asymmetry and deal uncertainty.

5.5 Institutional cross-ownership and diversifying deals

Many previous studies document a diversification discount (e.g., Lang and Stulz, 1994; Berger and Ofek, 1995; Servaes, 1996; Santos et al., 2008). Morck et al. (1990)

also find that diversifying deals have a negative effect on acquirer announcement returns. In this subsection, we use deal diversification as a proxy for deal quality. We separate our sample into a diversifying deal sample and a non-diversifying deal sample. Table 15 tabulates the five institutional cross-ownership proxies for these two samples. On average, institutional cross-ownership is higher for the non-diversifying deals than for diversifying deals. The differences in institutional cross-ownership are significant at 5% or 1% levels. The Wilcoxon rank-sum test confirms that the distributions of the institutional cross-ownership for diversifying deals and non-diversifying deals are statistically different. These results suggest that deals with high institutional cross-ownership are more likely to be non-diversifying.

6 Conclusions

Institutional investors have been demonstrated to play an important role in the financial markets and have an impact on a variety of corporate strategies. But few studies have shown how institutional investors affect firms' acquisition behavior and performance. We investigate the impact of institutional cross-ownership, where the same set of institutional blockholders has significant stakes in both acquirers and targets, on various aspects of deal outcomes in M&As. Two types of institutional cross-ownership measures are studied in our empirical analysis: the percentage of shareholdings and the number of cross-owners.

We first show that institutional cross-ownership between two firms increases the likelihood of them merging. Then we show that institutional cross-ownership affects deal performance and various deal outcomes. We find that a higher level of cross-ownership slightly reduces acquirer cumulative abnormal returns. However, institutional cross-ownership also reduces deal premiums, thus leading to better value for acquirers. Deals with high institutional cross-ownership tend to involve more stocks as the method of payment. Cross-ownership diminishes the likelihood of bad deal completion, enhances deal synergies, and is positively related to the long run performance of the merged entities from both fundamental

(operating) and stock market perspectives. We also find a negative relationship between institutional cross-ownership and deal transaction costs. Institutional cross-owners help reduce deal uncertainty by limiting earnings misreporting. In addition, we show that deals with high institutional cross-ownership are more likely to be non-diversifying. Our results suggest that institutional cross-owners benefit acquirers by providing them with an information advantage about the true value of the target firm and more bargaining power in deal negotiations. Thus overall we conclude that cross-ownership improves the quality of mergers, a finding which we attribute to the superior two-sided information, better monitoring role, and stronger negotiating power of such investors compared with those who operate only on one side of the deal.

Our work contributes to the literature on the effect of institutional investors on corporate activities. More specifically, we demonstrate the impact of cross-firm institutional ownership in the context of one important corporate event: mergers and acquisitions. The evidence presented in our paper is consistent with the view that different interests among shareholder groups within a firm have externalities for firm performance. We also contribute to a growing literature on the effect of firm connections in the business world. Hence the rise of institutional cross-holdings in U.S. stock markets has a significant effect on corporate strategies and decision making processes. This paper has shed light on the importance of inter-corporate links through institutional cross-ownership. Following on from our study, two promising extensions exist for future research. One would be to examine the trading activities of institutional cross-owners before and after M&As, and in particular to investigate whether cross-owners are able to use their two-sided information to earn higher returns. Another, and more general, item on the research agenda would be to investigate the impact of institutional cross-ownership on other corporate strategies and policies.

Appendix A

Table A1: Variable definitions

This table provides variable definitions and the corresponding data sources. CRSP refers to the Centre for Research in Security Prices, FF refers to Kenneth French's web site at Dartmouth, SDC refers to the Thomson Reuters Securities Data Company, and 13F refers to the Thomson Reuters 13F Database.

Variable	Definition	Source
Dependent variables of interest		
CAR3	Cumulative abnormal return on the acquirer/target stock over the event window (-1, 1) surrounding the announcement date, using the market model with the CRSP value-weighted index as the benchmark. The model is estimated using at least 30 non-missing daily returns over the (-300, -91) period prior to the announcement.	CRSP
Premium	(transaction value/market value of target) $- 1$	SDC/CRSP
Percent of Cash	The percentage of cash payment involved in the total payment of the transaction	SDC
Percent of Stock	The percentage of stock payment involved in the total payment of the transaction	SDC
Completion	Indicator variable: one for deals that are completed, zero for withdrawn deals.	SDC
Synergy	(acquirer CAR * acquirer market value + target CAR * (1-toehold)*target market value)/ (acquirer market value + (1-toehold)* target market value)	CRSP/SDC
AROA	Acquirer abnormal return on asset with the benchmark being the median return on asset of a group of Compustat firms with the same industry (2-digit SIC code), similar size ($\pm$30% of book value of asset) and similar operating performance ($\pm$10% ROA) in the fiscal year preceding the deal announcement.	Compustat
BHAR (FF25 Size/BEME)	Acquirer buy-and-hold abnormal return using the return of corresponding Fama–French 25 size and book-to-market portfolios as the benchmark.	Compustat/CRSP /FF

Variable	Definition	Source
BHAR (Control Firm)	Acquirer buy-and-hold abnormal stock return with the benchmark being the return of a control firm stock in the same industry (2-digit SIC code), of similar size ($\pm 10\%$) and the nearest book-to-market ratio.	Compustat/CRSP /FF
Ac(Ta)_fees	Total investment bank fees paid by acquirers (targets)	SDC
Restatement	Indicator variable: one for merging firms that restate earnings within a two year window before deal completion, zero otherwise.	Audit Analytics

Deal characteristics

Variable	Definition	Source
Pure_cash	Indicator variable: one for deals financed fully with cash, zero otherwise.	SDC
Pure_stock	Indicator variable: one for deals financed fully with stock, zero otherwise.	SDC
Toehold	Indicator variable: one if the acquirer already holds a certain percentage of the target shares at the announcement, zero otherwise.	SDC
Hostile	Indicator variable: one for hostile deals, zero otherwise.	SDC
Tender_offer	Indicator variable: one for tender offers, zero otherwise.	SDC
Diversifying	Indicator variable: one if the target and acquirer have different two-digit SIC Codes, zero otherwise	SDC
Competition	Indicator variable: one if more than one firm is bidding for the target, zero otherwise	SDC
Relative_size	The ratio of transaction value to acquirer market value at the end of the fiscal year before the deal announcement.	SDC/Compustat
Deal Value	Value of transaction, in millions of dollars.	SDC

Acquirer and target firm characteristics

Variable	Definition	Source
Size	The natural log of book value of assets at the end of the fiscal year before the announcement.	Compustat
B/M	Book value of assets over market value of assets at the end of the fiscal year before the deal announcement.	Compustat

Variable	Definition	Source
Leverage	Book value of debt over book value of assets at the end of the fiscal year before the deal announcement	Compustat
Cash/Asset	Cash holdings, including cash and marketable securities, normalized by book value of assets.	Compustat
Cash Flow/Equity	Income before extraordinary items plus depreciation minus dividends on common and preferred stocks divided by firm market value at the end of the fiscal year before the deal announcement	Compustat
Runup	Market adjusted buy-and-hold stock return over the (-205, -6) window (Golubov et al., 2012).	CRSP
Sigma	The standard deviation of the market-adjusted daily return over the (-205, -6) window (Golubov et al., 2012).	CRSP
Collateral	The value of the property, plant and equipment over book value of assets at the end of the fiscal year before the deal announcement	Compustat
IO	Institutional ownership at the quarter end before deal announcement.	13F
ROA	Operating cash flows over book value of assets.	Compustat
Sales_growth	Percentage change in sales from the previous year.	Compustat

Institutional cross-ownership variables

Variable	Definition	Source
Ac_crossIO	Ownership by acquirer institutions that also own shares in the target	13F
Ta_crossIO	Ownership by target institutions that also own shares in the acquirer	13F
Mvweighted_crossIO	Ac_crossIO*acquirer market value/(acquirer market value + target market value) + Ta_crossIO*target market value/(acquirer market value + target market value)	13F/Compustat
Top5/10/20Count	Number of institutions that are within both acquirer's and target's top 5/10/20 largest institutional owners	13F

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Table 1: Sample distribution

Panel A. Distribution of M&As by year. This panel presents the sample distribution of completed and withdrawn U.S. M&A deals between 1984 and 2014 by announcement year. Both the acquirers and the targets are public firms with complete information in the CRSP and Compustat databases. We also require that both the acquirers and the targets have institutional ownership information from the Thomson Financial CDA/Spectrum Institutional (13F) database.

Year	Deal number	Percent	Year	Deal number	Percent
1984	41	1.57	2000	152	5.84
1985	51	1.96	2001	128	4.92
1986	63	2.42	2002	56	2.15
1987	55	2.11	2003	96	3.69
1988	59	2.27	2004	95	3.65
1989	48	1.84	2005	84	3.23
1990	29	1.11	2006	88	3.38
1991	38	1.46	2007	87	3.34
1992	30	1.15	2008	69	2.65
1993	68	2.61	2009	49	1.88
1994	109	4.19	2010	59	2.27
1995	134	5.15	2011	43	1.65
1996	145	5.57	2012	55	2.11
1997	200	7.68	2013	60	2.3
1998	174	6.68	2014	59	2.27
1999	180	6.91	Total	2,604	100

Panel B. Distribution of M&As by industry. This panel presents the sample distribution of completed and withdrawn U.S. M&A deals between 1984 and 2014 by acquirer industry. We assign acquirers into the Fama–French 10 industries based on acquirer SIC codes. Both the acquirers and the targets are public firms with complete information in the CRSP and Compustat databases. We also require that both the acquirers and the targets have institutional ownership information the from Thomson Financial CDA/Spectrum Institutional (13F) database.

Fama–French 10 industries	Frequency	Percent
Consumer Nondurables	977	37.52
Consumer Durables	549	21.08
Manufacturing	280	10.75
Oil, Gas, and Coal Extraction and Production	216	8.29
Business Equipment	167	6.41
Telephone and Television Transmission	105	4.03
Wholesale, Retail, and Some Services	96	3.69
Healthcare, Medical Equipment, and Drug	90	3.46
Utilities	73	2.80
Other – Mines, Constr, BldMt, Trans, etc.	51	1.96
Total	2,604	100

Table 2: Descriptive statistics

Panel A. Deal outcome and performance related variables. This panel presents the descriptive statistics of deal outcome and performance related variables for 2,604 M&A deals in our sample. The sample period is between 1984 and 2014. Both the acquirer and the target are public firms with complete information in CRSP and Compustat. We also require that both the acquirer and the target have institutional ownership information from the Thomson Financial CDA/Spectrum Institutional (13F) database. The number of observations, mean, standard deviation, 25th percentile, median, and 75th percentile are reported from left to right in sequence for each variables. Detailed definitions of all variables can be found in Appendix A.

Variable	Obs.	Mean	S.D.	p25	p50	p75
CAR3_ac	2,588	-0.02	0.08	-0.05	-0.01	0.02
CAR3_ta	2,590	0.2	0.22	0.06	0.17	0.3
Premium	2,372	0.7	1.3	0.25	0.46	0.81
Percent of Cash	2,604	35.2	42.3	0	0	84.8
Percent of Stock	2,604	53.7	44.2	0	60.6	100
Completion	2,604	0.82	0.38	1	1	1
Synergy	2,554	0.04	0.81	-0.02	0.02	0.06
aroa_change_0y3y	1,646	-0.01	0.14	-0.03	-0.00	0.02
bhars_cf30sic_36m	1,977	-0.00	0.04	-0.02	-0.00	0.01
bhar_ff25_36m	1,978	-0.00	0.03	-0.02	-0.01	0.01
bhars_cf30_36m	1,977	-0.00	0.05	-0.02	-0.00	0.01
bhars_cf10_36m	1,977	-0.00	0.04	-0.02	-0.00	0.01
Advisory Fee_ac	777	0.66%	0.67%	0.26%	0.48%	0.82%
Advisory Fee_ta	1,636	0.89%	0.80%	0.40%	0.77%	1.14%
Restatement	1,879	0.07	0.26	0	0	0

Panel B. Institutional cross-ownership proxy variables. This panel presents summary statistics of institutional cross-ownership proxy variables for 2,604 M&A deals in our sample. The sample period is between 1984 and 2014. Both the acquirer and the target are public firms with complete information in the CRSP and Compustat databases, and they have institutional ownership information from the Thomson Financial CDA/Spectrum Institutional (13F) database. The number of observations, mean, standard deviation, 25th percentile, median, and 75th percentile are reported from left to right in sequence for each variables. Detailed definitions of all variables can be found in Appendix A.

Variable	Obs.	Mean	S.D.	p25	p50	p75
Ac_crossIO	2,604	0.18	0.18	0.04	0.12	0.30
Ta_crossIO	2,604	0.21	0.20	0.05	0.14	0.33
Mvweighted_crossIO	2,604	0.19	0.18	0.04	0.13	0.30
Top5Count	2,604	0.83	0.90	0	1	1
Top10Count	2,604	2.06	1.51	1	2	3
Top20Count	2,604	4.59	2.73	3	4	6

Panel C. Deal and firm characteristic variables. This panel presents the descriptive statistics of deal and firm characteristic variables for 2,604 M&A deals in our sample. The sample period is between 1984 and 2014. Both the acquirer and the target are public firms with complete information in the CRSP and Compustat databases. We also require that both the acquirer and the target have institutional ownership information from the Thomson Financial CDA/Spectrum Institutional (13F) database. The number of observations, mean, standard deviation, 25th percentile, median, and 75th percentile are reported from left to right in sequence for each variables. Detailed definitions of all variables can be found in Appendix A.

Variable	Obs.	Mean	S.D.	p25	p50	p75
Deal characteristics						
Pure_cash	2,604	0.24	0.42	0	0	0
Pure_stock	2,604	0.39	0.49	0	0	1
Toehold	2,604	0.06	0.24	0	0	0
Hostile	2,604	0.05	0.22	0	0	0
Tender_offer	2,604	0.16	0.37	0	0	0
Diversifying	2,604	0.3	0.46	0	0	1
Competition	2,604	0.1	0.29	0	0	0
Relative_size	2,604	0.62	1.29	0.14	0.32	0.69
Acquirer firm characteristics						
Size	2,595	7.18	1.98	5.82	7.19	8.50
B/M	2,560	2.05	3.38	1.06	1.31	2.00
Leverage	2,595	58.92	26.99	38.35	58.12	85.79
Cash/Asset	2,592	0.15	0.18	0.03	0.07	0.20
Cash Flow/Equity	2,594	0.05	0.27	0.03	0.06	0.10
Runup	2,601	1.15	0.51	0.90	1.08	1.27
Sigma	2,601	0.02	0.02	0.01	0.02	0.03
Collateral	2,517	0.21	0.23	0.02	0.13	0.33
IO	2,604	0.51	0.27	0.30	0.51	0.73
ROA	2,601	0.10	0.14	0.03	0.10	0.16
Sales_growth	2,596	0.29	0.87	0.02	0.13	0.31
Target firm characteristics						
Size	2,601	5.23	1.77	3.94	5.08	6.44
B/M	2,503	1.76	2.09	1.02	1.20	1.76
Leverage	2,563	58.48	29.56	34.71	57.66	85.97
Cash/Asset	2,555	0.16	0.20	0.02	0.06	0.22
Runup	2,595	1.12	1.48	0.82	1.04	1.29
Sigma	2,595	0.03	0.02	0.02	0.03	0.04
IO	2,604	0.39	0.28	0.15	0.34	0.61
ROA	2,339	0.20	0.65	-0.01	0.10	0.23
Sales_growth	2,437	0.06	0.19	0.02	0.08	0.15

Table 3: Probability of acquisition and institutional cross-ownership: Univariate tests

This table examines whether a M&A deal is more likely to occur between two firms that have a high institutional cross-ownership. Panel A reports the average institutional cross-ownership measures between sample acquirers and random targets, which we construct by pairing each sample acquirer with a random firm drawn from the sample target's industry in the deal announcement year. We restrict the relative size between the random target and sample acquirer to be above 5%. Following this procedure, we bootstrap five hundred random targets. Panel B reports the average institutional cross-ownership measures between random acquirers and sample targets, which we construct by pairing each sample target with a random firm drawn from the sample acquirer's industry in the deal announcement year. We restrict the relative size between the sample target and random acquirer to be above 5%. Following this procedure, we bootstrap five hundred random acquirers. Panel C reports the average institutional cross-ownership measures between random acquirers and random targets, which we construct by drawing one random firm from the sample acquirer's industry and one random firm from the sample target's industry in the deal announcement year for each acquisition in our sample. We restrict the relative size between the random target and random acquirer to be above 5%. We repeat the procedure five hundred times. All institutional cross-ownership measures are calculated at the quarter end before the deal announcement. ∗∗∗, ∗∗, and ∗ denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A. Sample acquirers and random targets					
	Real Sample		**Simulated Sample**		**Difference**
	Mean	**S.D.**	**Mean**	**S.D.**	**Real−Simulated**
Ac_totalcrossIO	0.18	0.18	0.17	0.14	0.01**
Ta_totalcrossIO	0.21	0.21	0.19	0.14	0.02***
Mvweighted_crossIO	0.19	0.18	0.17	0.13	0.02***
Top5Count	0.83	0.90	0.58	0.41	0.25***
Top10Count	2.07	1.51	1.58	0.78	0.49***
Top20Count	4.59	2.73	3.78	1.54	0.81***

Panel B. Random acquirers and sample targets					
	Real Sample		**Simulated Sample**		**Difference**
	Mean	**S.D.**	**Mean**	**S.D.**	**Real−Simulated**
Ac_totalcrossIO	0.18	0.18	0.11	0.11	0.07***
Ta_totalcrossIO	0.21	0.21	0.11	0.11	0.10***
Mvweighted_crossIO	0.19	0.18	0.11	0.10	0.08***
Top5Count	0.83	0.90	0.51	0.35	0.32***
Top10Count	2.07	1.51	1.36	0.68	0.71***
Top20Count	4.59	2.73	3.03	1.42	1.56***

Panel C. Random acquirers and random targets					
	Real Sample		**Simulated Sample**		**Difference**
	Mean	**S.D.**	**Mean**	**S.D.**	**Real−Simulated**
Ac_totalcrossIO	0.18	0.18	0.09	0.06	0.09***
Ta_totalcrossIO	0.21	0.20	0.09	0.06	0.12***
Mvweighted_crossIO	0.19	0.18	0.09	0.06	0.10***
Top5Count	0.83	0.90	0.46	0.19	0.37***
Top10Count	2.07	1.51	1.20	0.41	0.87***
Top20Count	4.59	2.73	2.64	0.90	1.95***

Table 4: Probability of firms being acquirers and institutional cross-ownership

Panel A. All acquirers: industry and size. This panel reports the coefficients estimates from conditional logit models. The dependent variable is equal to one for the sample acquirer, and zero for the matched acquirers in the control group. The matched acquirers are the firms in the sample acquirer's industry (Fama–French 10 industries) and of similar size (within a 20% band of market capitalization). The relative size between the sample target and matched acquirers is above 5%. Detailed definitions of acquirer control variables can be found in Appendix A. Deal fixed effects are controlled for all regressions. Robust standard errors are clustered at the deal level. P-values are reported in parentheses. Significance at the 0.01, 0.05, and 0.10 levels is indicated by $***$, $**$, and $*$.

	1	2	3	4	5	6
Ac_crossIO	2.798***					
	(0.000)					
Ta_crossIO		9.317***				
		(0.000)				
Mvweighted_crossIO			5.947***			
			(0.000)			
Top5Count				0.592***		
				(0.000)		
Top10Count					0.412***	
					(0.000)	
Top20Count						0.277***
						(0.000)
Size	1.750***	1.596***	1.757***	1.795***	1.815***	1.805***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
B/M	0.042***	0.012	0.041***	0.043***	0.043***	0.039***
	(0.000)	(0.346)	(0.000)	(0.000)	(0.000)	(0.000)
Leverage	0.006***	0.008***	0.007***	0.005***	0.005***	0.005***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
ROA	-0.525***	-0.797***	-0.602***	-0.341	-0.234	-0.170
	(0.008)	(0.000)	(0.002)	(0.106)	(0.271)	(0.422)
Cash/Asset	0.092	-0.041	0.023	0.228	0.256*	0.224
	(0.552)	(0.794)	(0.881)	(0.141)	(0.098)	(0.151)
Sales_growth	-0.000**	-0.000	-0.000**	-0.000*	-0.000**	-0.000**
	(0.024)	(0.102)	(0.037)	(0.059)	(0.046)	(0.036)
Runup	0.218***	0.203***	0.186***	0.225***	0.227***	0.239***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Sigma	-24.323***	-22.488***	-22.575***	-25.171***	-24.732***	-24.148***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Deal Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	92,678	92,678	92,678	92,678	92,678	92,678
Actual Acquirer No.	2,209	2,209	2,209	2,209	2,209	2,209
Control Acquirer No.	90,469	90,469	90,469	90,469	90,469	90,469
Pseudo R-squared	0.033	0.079	0.054	0.044	0.053	0.061

Panel B. Acquirers with positive institutional cross-ownership: industry and size. This panel reports the coefficients estimates from conditional logit models. The dependent variable is equal to one for the sample acquirer, and zero for the matched acquirers in the control group. The matched acquirers are the firms in the sample acquirer's industry (Fama–French 10 industries) and of similar size (within a 20% band of market capitalization). The relative size between the sample target and matched acquirers is above 5%. The institutional cross-ownership between matched acquirers and sample targets are positive. Detailed definitions of acquirer control variables can be found in Appendix A. Deal fixed effects are controlled for all regressions. Robust standard errors are clustered at the deal level. P-values are reported in parentheses. Significance at the 0.01, 0.05, and 0.10 levels is indicated by $***$, $**$, and $*$.

	1	2	3	4	5	6
Ac_crossIO	3.073***					
	(0.000)					
Ta_crossIO		10.694***				
		(0.000)				
Mvweighted_crossIO			6.582***			
			(0.000)			
Top5Count				0.566***		
				(0.000)		
Top10Count					0.396***	
					(0.000)	
Top20Count						0.268***
						(0.000)
Size	1.773***	1.591***	1.775***	1.808***	1.836***	1.824***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
B/M	0.041***	0.007	0.041***	0.041***	0.042***	0.038***
	(0.000)	(0.629)	(0.000)	(0.000)	(0.000)	(0.000)
Leverage	0.006***	0.009***	0.007***	0.004***	0.004***	0.005***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
ROA	-0.495**	-0.836***	-0.597***	-0.285	-0.179	-0.109
	(0.021)	(0.000)	(0.005)	(0.212)	(0.427)	(0.623)
Cash/Asset	0.118	-0.042	0.030	0.268*	0.296*	0.265*
	(0.455)	(0.801)	(0.851)	(0.090)	(0.062)	(0.098)
Sales_growth	-0.000**	-0.000	-0.000**	-0.000**	-0.000**	-0.000**
	(0.017)	(0.125)	(0.030)	(0.042)	(0.034)	(0.026)
Runup	0.214***	0.196***	0.177***	0.226***	0.228***	0.240***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Sigma	-24.129***	-22.289***	-22.180***	-25.087***	-24.771***	-24.192***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Deal Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	84,336	84,336	84,336	84,336	84,336	84,336
Actual Acquirer No.	2,137	2,137	2,137	2,137	2,137	2,137
Control Acquirer No.	82,199	82,199	82,199	82,199	82,199	82,199
Pseudo R-squared	0.035	0.092	0.060	0.042	0.050	0.057

Panel C. All acquirers: industry, size, and B/M. This panel reports the coefficients estimates from conditional logit models. The dependent variable is equal to one for the sample acquirer, and zero for the matched acquirers in the control group. The matched acquirers are firms in the sample acquirer's industry (Fama–French 10 industries), of similar size (within a 20% band of market capitalization) and of similar B/M ratio (within a 20% band of B/M). The relative size between the sample target and matched acquirers is above 5%. Detailed definitions of acquirer control variables can be found in Appendix A. Deal fixed effects are controlled for all regressions. Robust standard errors are clustered at the deal level. P-values are reported in parentheses. Significance at the 0.01, 0.05, and 0.10 levels is indicated by ∗ ∗ ∗, ∗∗, and ∗.

	1	2	3	4	5	6
Ac_crossIO	2.815***					
	(0.000)					
Ta_crossIO		8.707***				
		(0.000)				
Mvweighted_crossIO			5.442***			
			(0.000)			
Top5Count				0.578***		
				(0.000)		
Top10Count					0.401***	
					(0.000)	
Top20Count						0.282***
						(0.000)
Size	1.882***	1.777***	1.915***	1.961***	2.002***	1.983***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
B/M	0.996***	0.898***	1.005***	1.026***	1.045***	1.054***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Leverage	0.005***	0.008***	0.006***	0.004***	0.004***	0.004***
	(0.000)	(0.000)	(0.000)	(0.004)	(0.006)	(0.006)
ROA	-0.779***	-0.631**	-0.803***	-0.594**	-0.548**	-0.497*
	(0.003)	(0.018)	(0.003)	(0.026)	(0.043)	(0.065)
Cash/Asset	-0.143	0.001	-0.138	-0.022	-0.014	-0.030
	(0.459)	(0.995)	(0.477)	(0.909)	(0.943)	(0.877)
Sales_growth	-0.001	-0.000	-0.001	-0.003	-0.002	-0.001
	(0.807)	(0.923)	(0.812)	(0.452)	(0.683)	(0.859)
Runup	0.277***	0.241***	0.255***	0.287***	0.292***	0.299***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Sigma	-25.065***	-23.997***	-24.151***	-26.035***	-25.687***	-25.273***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Deal Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	36,944	36,944	36,944	36,944	36,944	36,944
Actual Acquirer No.	2,177	2,177	2,177	2,177	2,177	2,177
Control Acquirer No.	34,767	34,767	34,767	34,767	34,767	34,767
Pseudo R-squared	0.043	0.085	0.061	0.057	0.065	0.074

Panel D. Acquirers with positive institutional cross-ownership: industry, size, and B/M. This panel reports the coefficients estimates from conditional logit models. The dependent variable is equal to one for the sample acquirer, and zero for the matched acquirers in the control group. The matched acquirers are firms in the sample acquirer's industry (Fama–French 10 industries), of similar size (within a 20% band of market capitalization) and of similar B/M ratio (within a 20% band of B/M). The relative size between the sample target and matched acquirers is above 5%. The institutional cross-ownership between matched acquirers and sample targets are positive. Detailed definitions of acquirer control variables can be found in Appendix A. Deal fixed effects are controlled for all regressions. Robust standard errors are clustered at the deal level. P-values are reported in parentheses. Significance at the 0.01, 0.05, and 0.10 levels is indicated by $***$, $**$, and $*$.

	1	2	3	4	5	6
Ac_crossIO	3.194***					
	(0.000)					
Ta_crossIO		10.547***				
		(0.000)				
Mvweighted_crossIO			6.254***			
			(0.000)			
Top5Count				0.551***		
				(0.000)		
Top10Count					0.384***	
					(0.000)	
Top20Count						0.271***
						(0.000)
Size	1.890***	1.755***	1.921***	1.957***	2.003***	1.996***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
B/M	0.990***	0.874***	1.003***	1.013***	1.036***	1.049***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Leverage	0.005***	0.008***	0.006***	0.003**	0.003**	0.003**
	(0.000)	(0.000)	(0.000)	(0.018)	(0.023)	(0.022)
ROA	-0.832***	-0.676**	-0.884***	-0.614**	-0.580**	-0.525*
	(0.003)	(0.019)	(0.002)	(0.032)	(0.044)	(0.067)
Cash/Asset	-0.173	-0.011	-0.181	-0.024	-0.021	-0.037
	(0.385)	(0.959)	(0.366)	(0.903)	(0.919)	(0.854)
Sales_growth	-0.001	-0.000	-0.001	-0.003	-0.002	-0.001
	(0.850)	(0.951)	(0.845)	(0.430)	(0.670)	(0.858)
Runup	0.269***	0.224***	0.243***	0.283***	0.289***	0.297***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Sigma	-24.660***	-23.775***	-23.737***	-25.576***	-25.452***	-25.077***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Deal Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	33,485	33,485	33,485	33,485	33,485	33,485
Actual Acquirer No.	2,077	2,077	2,077	2,077	2,077	2,077
Control Acquirer No.	31,408	31,408	31,408	31,408	31,408	31,408
Pseudo R-squared	0.045	0.101	0.068	0.054	0.060	0.069

Table 5: Probability of firms being targets and institutional cross-ownership

Panel A. All targets: industry and size. This panel reports the coefficients estimates from conditional logit models. The dependent variable is equal to one for the sample target, and zero for the matched targets in the control group. The matched targets are the firms in the sample target's industry (Fama–French 10 industries) and of similar size (within a 20% band of market capitalization). The relative size between the matched targets and sample acquirers is above 5%. Detailed definitions of target control variables can be found in Appendix A. Deal fixed effects are controlled for all regressions. Robust standard errors are clustered at the deal level. P-values are reported in parentheses. Significance at the 0.01, 0.05, and 0.10 levels is indicated by $***$, $**$, and $*$.

	1	**2**	**3**	**4**	**5**	**6**
Ac_crossIO	5.497*** (0.000)					
Ta_crossIO		2.521*** (0.000)				
Mvweighted_crossIO			5.364*** (0.000)			
Top5Count				0.553*** (0.000)		
Top10Count					0.373*** (0.000)	
Top20Count						0.223*** (0.000)
Size	1.316*** (0.000)	1.464*** (0.000)	1.324*** (0.000)	1.479*** (0.000)	1.459*** (0.000)	1.424*** (0.000)
B/M	-0.177*** (0.000)	-0.097*** (0.000)	-0.166*** (0.000)	-0.078*** (0.002)	-0.086*** (0.001)	-0.107*** (0.000)
Leverage	0.015*** (0.000)	0.013*** (0.000)	0.015*** (0.000)	0.012*** (0.000)	0.012*** (0.000)	0.013*** (0.000)
ROA	-0.439*** (0.002)	-0.431*** (0.001)	-0.468*** (0.001)	-0.316** (0.027)	-0.257* (0.071)	-0.222 (0.123)
Cash/Asset	-0.124 (0.397)	-0.089 (0.538)	-0.155 (0.289)	-0.014 (0.921)	-0.033 (0.818)	-0.056 (0.699)
Sales_growth	-0.018*** (0.010)	-0.018*** (0.008)	-0.019*** (0.005)	-0.017** (0.015)	-0.018*** (0.003)	-0.017*** (0.009)
Runup	0.076** (0.016)	0.079*** (0.006)	0.073** (0.018)	0.087*** (0.001)	0.091*** (0.001)	0.095*** (0.001)
Sigma	-7.063*** (0.000)	-7.085*** (0.000)	-6.819*** (0.000)	-7.546*** (0.000)	-7.045*** (0.000)	-6.404*** (0.000)
Deal Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	118,054	118,054	118,054	118,054	118,054	118,054
Actual Target No.	2,152	2,152	2,152	2,152	2,152	2,152
Control Target No.	115,902	115,902	115,902	115,902	115,902	115,902
Pseudo R-squared	0.041	0.031	0.042	0.039	0.044	0.046

Panel B. Targets with positive institutional cross-ownership: industry and size.
This panel reports the coefficients estimates from conditional logit models. The dependent variable is equal to one for the sample target, and zero for the matched targets in the control group. The matched targets are the firms in the sample target's industry (Fama–French 10 industries) and of similar size (within a 20% band of market capitalization). The relative size between the matched targets and sample acquirers is above 5%. The institutional cross-ownership between sample acquirers and matched targets are positive. Detailed definitions of target control variables can be found in Appendix A. Deal fixed effects are controlled for all regressions. Robust standard errors are clustered at the deal level. P-values are reported in parentheses. Significance at the 0.01, 0.05, and 0.10 levels is indicated by $***$, $**$, and $*$.

	1	2	3	4	5	6
Ac_crossIO	5.497***					
	(0.000)					
Ta_crossIO		2.521***				
		(0.000)				
Mvweighted_crossIO			5.364***			
			(0.000)			
Top5Count				0.553***		
				(0.000)		
Top10Count					0.373***	
					(0.000)	
Top20Count						0.223***
						(0.000)
Size	1.316***	1.464***	1.324***	1.479***	1.459***	1.424***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
B/M	-0.177***	-0.097***	-0.166***	-0.078***	-0.086***	-0.107***
	(0.000)	(0.000)	(0.000)	(0.002)	(0.001)	(0.000)
Leverage	0.015***	0.013***	0.015***	0.012***	0.012***	0.013***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
ROA	-0.439***	-0.431***	-0.468***	-0.316**	-0.257*	-0.222
	(0.002)	(0.001)	(0.001)	(0.027)	(0.071)	(0.123)
Cash/Asset	-0.124	-0.089	-0.155	-0.014	-0.033	-0.056
	(0.397)	(0.538)	(0.289)	(0.921)	(0.818)	(0.699)
Sales_growth	-0.018***	-0.018***	-0.019***	-0.017**	-0.018***	-0.017***
	(0.010)	(0.008)	(0.005)	(0.015)	(0.003)	(0.009)
Runup	0.076**	0.079***	0.073**	0.087***	0.091***	0.095***
	(0.016)	(0.006)	(0.018)	(0.001)	(0.001)	(0.001)
Sigma	-7.063***	-7.085***	-6.819***	-7.546***	-7.045***	-6.404***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Deal Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	118,054	118,054	118,054	118,054	118,054	118,054
Actual Target No.	2,152	2,152	2,152	2,152	2,152	2,152
Control Target No.	115,902	115,902	115,902	115,902	115,902	115,902
Pseudo R-squared	0.041	0.031	0.042	0.039	0.044	0.046

Panel C. All targets: industry, size and B/M. This panel reports the coefficients estimates from conditional logit models. The dependent variable is equal to one for the sample target, and zero for the matched targets in the control group. The matched targets are the firms in the sample target's industry (Fama–French 10 industries), of similar size (within a 20% band of market capitalization) and of similar B/M ratio (within a 20% band of B/M). The relative size between the matched targets and sample acquirers is above 5%. Detailed definitions of target control variables can be found in Appendix A. Deal fixed effects are controlled for all regressions. Robust standard errors are clustered at the deal level. P-values are reported in parentheses. Significance at the 0.01, 0.05, and 0.10 levels is indicated by $***$, $**$, and $*$.

	1	2	3	4	5	6
Ac_crossIO	6.023***					
	(0.000)					
Ta_crossIO		2.394***				
		(0.000)				
Mvweighted_crossIO			5.717***			
			(0.000)			
Top5Count				0.520***		
				(0.000)		
Top10Count					0.347***	
					(0.000)	
Top20Count						0.220***
						(0.000)
Size	1.410***	1.590***	1.428***	1.611***	1.585***	1.515***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
B/M	0.485***	0.604***	0.508***	0.597***	0.607***	0.564***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Leverage	0.017***	0.014***	0.017***	0.013***	0.013***	0.015***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
ROA	-0.281	-0.351*	-0.333	-0.226	-0.139	-0.091
	(0.178)	(0.092)	(0.110)	(0.281)	(0.511)	(0.662)
Cash/Asset	0.010	0.024	-0.010	0.063	0.046	0.069
	(0.949)	(0.882)	(0.950)	(0.703)	(0.781)	(0.671)
Sales_growth	-0.018***	-0.018***	-0.019***	-0.016**	-0.018***	-0.017**
	(0.007)	(0.008)	(0.004)	(0.014)	(0.005)	(0.012)
Runup	0.037	0.042*	0.037	0.058**	0.058**	0.059*
	(0.105)	(0.076)	(0.106)	(0.016)	(0.038)	(0.067)
Sigma	-10.308***	-9.914***	-10.069***	-10.310***	-10.003***	-9.836***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Deal Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	44,388	44,388	44,388	44,388	44,388	44,388
Actual Target No.	2,145	2,145	2,145	2,145	2,145	2,145
Control Target No.	42,243	42,243	42,243	42,243	42,243	42,243
Pseudo R-squared	0.051	0.035	0.051	0.044	0.048	0.051

Panel D. Targets with positive institutional cross-ownership: industry, size and B/M. This panel reports the coefficients estimates from conditional logit models. The dependent variable is equal to one for the sample target, and zero for the matched targets in the control group. The matched targets are the firms in the sample target's industry (Fama–French 10 industries), of similar size (within a 20% band of market capitalization) and of similar B/M ratio (within a 20% band of B/M). The relative size between the matched targets and sample acquirers is above 5%. The institutional cross-ownership between sample acquirers and matched targets are positive. Detailed definitions of target control variables can be found in Appendix A. Deal fixed effects are controlled for all regressions. Robust standard errors are clustered at the deal level. P-values are reported in parentheses. Significance at the 0.01, 0.05, and 0.10 levels is indicated by $***$, $**$, and $*$.

	1	2	3	4	5	6
Ac_crossIO	6.023***					
	(0.000)					
Ta_crossIO		2.394***				
		(0.000)				
Mvweighted_crossIO			5.717***			
			(0.000)			
Top5Count				0.520***		
				(0.000)		
Top10Count					0.347***	
					(0.000)	
Top20Count						0.220***
						(0.000)
Size	1.410***	1.590***	1.428***	1.611***	1.585***	1.515***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
B/M	0.485***	0.604***	0.508***	0.597***	0.607***	0.564***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Leverage	0.017***	0.014***	0.017***	0.013***	0.013***	0.015***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
ROA	-0.281	-0.351*	-0.333	-0.226	-0.139	-0.091
	(0.178)	(0.092)	(0.110)	(0.281)	(0.511)	(0.662)
Cash/Asset	0.010	0.024	-0.010	0.063	0.046	0.069
	(0.949)	(0.882)	(0.950)	(0.703)	(0.781)	(0.671)
Sales_growth	-0.018***	-0.018***	-0.019***	-0.016**	-0.018***	-0.017**
	(0.007)	(0.008)	(0.004)	(0.014)	(0.005)	(0.012)
Runup	0.037	0.042*	0.037	0.058**	0.058**	0.059*
	(0.105)	(0.076)	(0.106)	(0.016)	(0.038)	(0.067)
Sigma	-10.308***	-9.914***	-10.069***	-10.310***	-10.003***	-9.836***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Deal Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	44,388	44,388	44,388	44,388	44,388	44,388
Actual Target No.	2,145	2,145	2,145	2,145	2,145	2,145
Control Target No.	42,243	42,243	42,243	42,243	42,243	42,243
Pseudo R-squared	0.051	0.035	0.051	0.044	0.048	0.051

Table 6: Institutional cross-ownership and acquirer announcement returns

This table presents the ordinary least squares (OLS) regression results of the acquirer three-day CARs on the institutional cross-ownership proxy variables. Our sample consists of 2,604 M&A deals between 1984 and 2014 in which both acquirers and targets are U.S. public firms. The dependent variable is the acquirer CAR over the three-day event window (-1, +1), where day 0 is the announcement day. The benchmark is estimated by the market model with the CRSP value-weighted index over the pre-announcement window (-300, -91). Detailed definitions of the independent variables are described in Appendix A. Year and Fama–French 10 industry fixed effects are controlled for in all regressions. Regression standard errors are adjusted for heteroscedasticity (White, 1980). p-values are reported in parentheses. ∗∗∗, ∗∗, and ∗ denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	1	2	3	4	5
Ac_crossIO	-0.030**				
	(0.031)				
Mvweighted_crossIO		-0.026*			
		(0.063)			
Top5Count			-0.003		
			(0.156)		
Top10Count				-0.003***	
				(0.008)	
Top20Count					-0.002***
					(0.004)
Pure_cash	0.021***	0.021***	0.022***	0.021***	0.021***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Pure_stock	-0.009**	-0.009**	-0.009**	-0.008**	-0.009**
	(0.028)	(0.029)	(0.040)	(0.046)	(0.039)
Toehold	-0.007	-0.007	-0.007	-0.006	-0.006
	(0.440)	(0.436)	(0.455)	(0.461)	(0.483)
Hostile	-0.005	-0.005	-0.006	-0.006	-0.006
	(0.446)	(0.444)	(0.366)	(0.375)	(0.436)
Tender_offer	0.014***	0.014***	0.014***	0.014***	0.013***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Diversifying	-0.003	-0.003	-0.003	-0.003	-0.003
	(0.502)	(0.498)	(0.468)	(0.440)	(0.422)
Competition	-0.002	-0.002	-0.003	-0.002	-0.002
	(0.784)	(0.778)	(0.665)	(0.735)	(0.777)
Premium	-0.002**	-0.002**	-0.002*	-0.002**	-0.002**
	(0.037)	(0.042)	(0.061)	(0.041)	(0.034)
Relative_size	-0.001	-0.001	-0.001	-0.001	-0.001
	(0.789)	(0.754)	(0.654)	(0.723)	(0.790)
Size	-0.003**	-0.003**	-0.005***	-0.004***	-0.003***

Continued on next page

Table 6 – continued from previous page

	1	2	3	4	5
	(0.030)	(0.025)	(0.000)	(0.001)	(0.009)
B/M	0.000	0.000	0.000	0.000	0.000
	(0.715)	(0.719)	(0.773)	(0.769)	(0.711)
Leverage	0.000	0.000	0.000	0.000	0.000
	(0.724)	(0.685)	(0.350)	(0.404)	(0.539)
Ac_cashholding	-0.052***	-0.052***	-0.053***	-0.052***	-0.051***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)
Cash/Equity	-0.019	-0.019	-0.020	-0.020	-0.020
	(0.161)	(0.159)	(0.147)	(0.146)	(0.141)
Runup	-0.013***	-0.014***	-0.014***	-0.014***	-0.014***
	(0.004)	(0.004)	(0.003)	(0.003)	(0.003)
Sigma	-0.073	-0.068	-0.053	-0.053	-0.059
	(0.749)	(0.765)	(0.817)	(0.816)	(0.797)
Intercept	0.062***	0.063***	0.074***	0.074***	0.072***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Industry fixed effects	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes
Observations	2,322	2,322	2,322	2,322	2,322
Adj R-squared	0.112	0.112	0.111	0.113	0.113

Table 7: Institutional cross-ownership and takeover premium

Panel A. Takeover premium measured by transaction value. This panel presents the ordinary least squares (OLS) regression results of the target takeover premium on the institutional cross-ownership proxy variables. Our sample consists of 2,604 M&A deals between 1984 and 2014 in which both acquirers and targets are U.S. public firms. The dependent variable is Premium calculated as the ratio between transaction value and target share price 4 weeks prior to the deal announcement subtracting one. Detailed definitions of the independent variables are described in Appendix A. Year and Fama–French 10 industry fixed effects are controlled for in all regressions. Regression standard errors are adjusted for heteroscedasticity (White, 1980). p-values are reported in parentheses. ∗∗∗, ∗∗, and ∗ denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	1	2	3	4	5
Ac_crossIO	-0.912***				
	(0.000)				
Mvweighted_crossIO		-0.913***			
		(0.000)			
Top5Count			-0.127***		
			(0.000)		
Top10Count				-0.079***	
				(0.000)	
Top20Count					-0.050***
					(0.000)
Pure_cash	-0.503***	-0.502***	-0.478***	-0.483***	-0.497***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Pure_stock	-0.505***	-0.504***	-0.485***	-0.483***	-0.489***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Toehold	-0.263**	-0.266**	-0.256**	-0.252**	-0.244**
	(0.030)	(0.028)	(0.033)	(0.035)	(0.040)
Hostile	-0.171**	-0.166**	-0.201**	-0.200**	-0.180**
	(0.044)	(0.049)	(0.023)	(0.022)	(0.037)
Tender_offer	0.309**	0.310**	0.301**	0.307**	0.304**
	(0.014)	(0.014)	(0.017)	(0.015)	(0.016)
Diversifying	-0.102**	-0.103**	-0.112**	-0.112**	-0.114**
	(0.031)	(0.030)	(0.021)	(0.020)	(0.017)
Competition	0.105	0.107	0.074	0.091	0.099
	(0.262)	(0.254)	(0.427)	(0.329)	(0.285)
Relative_size	0.053*	0.052*	0.043	0.046	0.051*
	(0.082)	(0.094)	(0.128)	(0.114)	(0.095)
Size	0.044*	0.045*	0.005	0.013	0.029
	(0.065)	(0.064)	(0.786)	(0.517)	(0.195)
B/M	0.005	0.006	0.004	0.005	0.006
	(0.265)	(0.248)	(0.336)	(0.317)	(0.236)

Table 7 – continued from previous page

	1	2	3	4	5
Leverage	-0.002	-0.003	-0.001	-0.001	-0.002
	(0.111)	(0.104)	(0.585)	(0.490)	(0.292)
Ac_cashholding	-0.189	-0.204	-0.212	-0.191	-0.160
	(0.159)	(0.128)	(0.117)	(0.153)	(0.228)
Cash/Equity	0.133*	0.134*	0.119	0.108	0.098
	(0.081)	(0.081)	(0.116)	(0.137)	(0.160)
Runup	0.096***	0.096***	0.088**	0.083**	0.080**
	(0.007)	(0.007)	(0.014)	(0.020)	(0.028)
Sigma	2.939	3.032	3.635	3.566	3.384
	(0.300)	(0.284)	(0.202)	(0.209)	(0.233)
Intercept	0.814	0.811	1.181*	1.172*	1.112
	(0.242)	(0.245)	(0.086)	(0.084)	(0.101)
Industry fixed effects	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes
Observations	2,331	2,331	2,331	2,331	2,331
Adj R-squared	0.089	0.089	0.087	0.088	0.090

Panel B. Takeover premium measured by target CARs. This panel presents the ordinary least squares (OLS) regression results of the target takeover premium on the institutional cross-ownership proxy variables. Our sample consists of 2,604 M&A deals between 1984 and 2014 in which both acquirers and targets are U.S. public firms. The dependent variable is the target CAR over the three-day event window at announcement. Detailed definitions of the independent variables are described in Appendix A. Year and Fama–French 10 industry fixed effects are controlled for in all regressions. Regression standard errors are adjusted for heteroscedasticity (White, 1980). p-values are reported in parentheses. ∗ ∗ ∗, ∗∗, and ∗ denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	1	2	3	4	5
Ac_crossIO	-0.157***				
	(0.000)				
Mvweighted_crossIO		-0.159***			
		(0.000)			
Top5Count			-0.015***		
			(0.002)		
Top10Count				-0.012***	
				(0.000)	
Top20Count					-0.008***
					(0.000)
Pure_cash	0.031**	0.031***	0.036***	0.035***	0.032***
	(0.010)	(0.010)	(0.003)	(0.004)	(0.007)
Pure_stock	-0.013	-0.013	-0.010	-0.009	-0.010
	(0.209)	(0.214)	(0.331)	(0.370)	(0.337)
Toehold	0.013	0.012	0.013	0.014	0.015
	(0.450)	(0.468)	(0.429)	(0.408)	(0.365)
Hostile	0.038**	0.039**	0.033*	0.034**	0.037**
	(0.028)	(0.023)	(0.055)	(0.047)	(0.033)
Tender_offer	0.068***	0.068***	0.067***	0.067***	0.067***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Diversifying	-0.002	-0.002	-0.003	-0.004	-0.004
	(0.827)	(0.817)	(0.745)	(0.719)	(0.679)
Competition	-0.041***	-0.041***	-0.046***	-0.044***	-0.042***
	(0.002)	(0.003)	(0.001)	(0.001)	(0.002)
Relative_size	-0.010***	-0.010***	-0.012***	-0.011***	-0.011***
	(0.007)	(0.005)	(0.005)	(0.006)	(0.007)
Size	0.009**	0.009**	0.002	0.003	0.006*
	(0.020)	(0.017)	(0.613)	(0.321)	(0.092)
B/M	0.001	0.001	0.001	0.001	0.001
	(0.283)	(0.266)	(0.400)	(0.387)	(0.297)
Leverage	-0.000	-0.000	0.000	0.000	0.000
	(0.759)	(0.718)	(0.354)	(0.456)	(0.704)

Table 7 – continued from previous page

	1	**2**	**3**	**4**	**5**
Ac_cashholding	0.052	0.050	0.049	0.052	0.057
	(0.140)	(0.160)	(0.170)	(0.146)	(0.109)
Cash/Equity	0.009	0.009	0.006	0.005	0.003
	(0.596)	(0.588)	(0.727)	(0.779)	(0.845)
Runup	-0.010	-0.010	-0.012	-0.012	-0.013
	(0.264)	(0.263)	(0.203)	(0.182)	(0.160)
Sigma	-1.126**	-1.115**	-1.023**	-1.035**	-1.063**
	(0.026)	(0.027)	(0.043)	(0.040)	(0.035)
Intercept	0.154***	0.152***	0.212***	0.213***	0.204***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Industry fixed effects	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes
Observations	2,541	2,541	2,541	2,541	2,541
Adj R-squared	0.108	0.108	0.103	0.104	0.106

Table 8: Institutional cross-ownership and method of payments

Panel A. Cash. This panel presents the tobit regression results of the acquirer method of payment on the institutional cross-ownership proxy variables. Our sample consists of 2,604 M&A deals between 1984 and 2014 in which both acquirers and targets are U.S. public firms. The dependent variable is the percentage of cash defined as the percentage of cash payment involved in the total payment of the transaction as reported by the Securities Data Company database. The tobit regression adjusts for the left-censoring observations at 0. Detailed definitions of the independent variables are described in Appendix A. Year and Fama–French 10 industry fixed effects are controlled for in all regressions. Robust standard errors are estimated and p-values are reported in parentheses. ∗ ∗ ∗, ∗∗, and ∗ denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	1	2	3	4	5
Ac_crossIO	-33.868***				
	(0.001)				
Mvweighted_crossIO		-32.771***			
		(0.002)			
Top5Count			-7.009***		
			(0.000)		
Top10Count				-4.897***	
				(0.000)	
Top20Count					-3.335***
					(0.000)
Toehold	3.465	3.329	3.291	3.505	4.107
	(0.589)	(0.604)	(0.606)	(0.582)	(0.519)
Hostile	9.110	9.271	8.058	8.249	9.481
	(0.185)	(0.177)	(0.245)	(0.230)	(0.173)
Tender_offer	69.067***	69.122***	68.334***	68.439***	68.131***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Diversifying	7.749**	7.749**	7.091**	7.230**	7.019**
	(0.011)	(0.011)	(0.020)	(0.018)	(0.021)
Competition	13.263***	13.272***	12.266***	13.012***	13.587***
	(0.005)	(0.005)	(0.010)	(0.006)	(0.004)
Premium	0.379	0.386	0.220	0.214	0.173
	(0.664)	(0.657)	(0.802)	(0.810)	(0.845)
Relative_size	0.140	0.073	-0.149	0.029	0.371
	(0.872)	(0.933)	(0.866)	(0.973)	(0.637)
Size	-3.241***	-3.264***	-4.495***	-3.965***	-2.865***
	(0.007)	(0.007)	(0.000)	(0.000)	(0.008)
B/M	-4.617***	-4.621***	-5.143***	-5.057***	-4.628***
	(0.001)	(0.001)	(0.000)	(0.000)	(0.001)
Leverage	-0.147*	-0.145*	-0.096	-0.103	-0.130*
	(0.069)	(0.073)	(0.223)	(0.190)	(0.097)
Ac_cashholding	-1.332	-1.779	-2.292	-0.362	1.498
	(0.904)	(0.872)	(0.836)	(0.974)	(0.893)
Cash/Equity	11.751*	11.756*	11.776*	10.838	10.207

Table 8 – continued from previous page

	1	2	3	4	5
	(0.097)	(0.096)	(0.090)	(0.130)	(0.160)
Runup	-9.395**	-9.405**	-9.645**	-9.695**	-10.236***
	(0.013)	(0.013)	(0.011)	(0.011)	(0.007)
Sigma	-1123.3***	-1119.0***	-1097.297***	-1097.113***	-1104.558***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Collateral	15.299*	15.652*	12.595	13.842*	15.178*
	(0.059)	(0.054)	(0.119)	(0.085)	(0.060)
Intercept	87.922***	88.046***	105.188***	104.335***	99.706***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Industry fixed effects	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes
Observations	2,257	2,257	2,257	2,257	2,257
Pseudo R-squared	0.067	0.066	0.067	0.067	0.068

Panel B. Stock. This panel presents the tobit regression results of the acquirer method of payment on the institutional cross-ownership proxy variables. Our sample consists of 2,604 M&A deals between 1984 and 2014 in which both acquirers and targets are U.S. public firms. The dependent variable is the percentage of stock defined as the percentage of stock payment involved in the total payment of the transaction as reported by the Securities Data Company database. The tobit regression adjusts for the left-censoring observations at 0. Detailed definitions of the independent variables are described in Appendix A. Year and Fama–French 10 industry fixed effects are controlled for in all regressions. Robust standard errors are estimated and p-values are reported in parentheses. $***$, $**$, and $*$ denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	1	2	3	4	5
Ac_crossIO	37.440***				
	(0.000)				
Mvweighted_crossIO		36.992***			
		(0.000)			
Top5Count			4.834***		
			(0.000)		
Top10Count				4.297***	
				(0.000)	
Top20Count					3.044***
					(0.000)
Toehold	-12.609*	-12.463*	-13.401*	-13.472*	-13.590**
	(0.074)	(0.077)	(0.056)	(0.053)	(0.050)
Hostile	-10.392	-10.456	-8.687	-9.088	-9.985
	(0.198)	(0.195)	(0.292)	(0.264)	(0.221)
Tender_offer	-81.119***	-81.162***	-80.785***	-80.554***	-79.872***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Diversifying	-5.010*	-4.997*	-4.438*	-4.283	-4.173
	(0.059)	(0.059)	(0.094)	(0.105)	(0.113)
Competition	-6.586	-6.633	-5.104	-5.789	-6.500
	(0.179)	(0.176)	(0.299)	(0.237)	(0.183)
Premium	-3.304**	-3.307**	-3.301**	-3.183**	-3.070*
	(0.039)	(0.039)	(0.045)	(0.047)	(0.051)
Relative_size	-1.744	-1.681	-1.309	-1.591	-1.951
	(0.158)	(0.178)	(0.239)	(0.188)	(0.137)
Size	1.366	1.343	3.031***	2.383***	1.218
	(0.143)	(0.156)	(0.000)	(0.003)	(0.158)
B/M	0.640*	0.631*	0.666*	0.645*	0.585*
	(0.059)	(0.061)	(0.071)	(0.083)	(0.085)
Leverage	0.139**	0.139**	0.078	0.087	0.117*
	(0.033)	(0.033)	(0.213)	(0.167)	(0.061)
Ac_cashholding	10.152	10.681	12.122	10.863	8.150
	(0.218)	(0.195)	(0.143)	(0.188)	(0.323)

Table 8 – continued from previous page

	1	2	3	4	5
Cash/Equity	-10.238**	-10.241**	-9.529**	-9.151**	-8.496**
	(0.019)	(0.018)	(0.031)	(0.039)	(0.041)
Runup	8.155***	8.166***	8.581***	8.752***	8.905***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Sigma	701.7***	697.7***	671.397***	666.487***	671.594***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Collateral	-21.815***	-22.141***	-19.022***	-19.758***	-21.329***
	(0.003)	(0.003)	(0.009)	(0.007)	(0.003)
Intercept	21.859*	21.981*	5.075	5.495	10.344
	(0.072)	(0.072)	(0.665)	(0.638)	(0.380)
Industry fixed effects	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes
Observations	2,257	2,257	2,257	2,257	2,257
Pseudo R-squared	0.062	0.062	0.061	0.062	0.062

Table 9: Institutional cross-ownership and deal completion probability

Panel A. Negative CARs. This panel presents the probit regression results of the M&A deal completion on the institutional cross-ownership proxy variables (marginal effect reported). Our sample consists of 1,405 M&A deals between 1984 and 2014 that had negative acquirer three-day cumulative abnormal returns. Both acquirers and targets are U.S. public firms. The dependent variable is the binary variable that takes the value of 1 if the deal was completed and 0 otherwise. Detailed definitions of the independent variables are described in Appendix A. Year and Fama–French 10 industry fixed effects are controlled for in all regressions. Robust standard errors are estimated and p-values are reported in parentheses. ∗∗∗, ∗∗, and ∗ denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	1	2	3	4	5
Ac_crossIO	-0.176***				
	(0.008)				
Mvweighted_crossIO		-0.180***			
		(0.007)			
Top5Count			-0.006		
			(0.496)		
Top10Count				-0.013**	
				(0.026)	
Top20Count					-0.007*
					(0.061)
Pure_cash	-0.037	-0.036	-0.031	-0.033	-0.035
	(0.175)	(0.178)	(0.252)	(0.210)	(0.198)
Pure_stock	0.015	0.015	0.015	0.017	0.016
	(0.464)	(0.444)	(0.450)	(0.388)	(0.419)
ToeHold	-0.051	-0.052	-0.049	-0.049	-0.049
	(0.168)	(0.163)	(0.185)	(0.175)	(0.180)
Hostile	-0.311***	-0.309***	-0.316***	-0.313***	-0.312***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Tender_offer	0.238***	0.239***	0.237***	0.237***	0.237***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Diversifying	-0.042**	-0.043**	-0.044**	-0.046**	-0.045**
	(0.022)	(0.020)	(0.018)	(0.013)	(0.015)
Competition	-0.221***	-0.221***	-0.228***	-0.227***	-0.227***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Premium	-0.025***	-0.025***	-0.031***	-0.029***	-0.028***
	(0.004)	(0.003)	(0.001)	(0.001)	(0.002)
Relative_size	-0.005	-0.005	-0.005	-0.005	-0.005
	(0.308)	(0.307)	(0.389)	(0.329)	(0.339)
Size	0.030***	0.031***	0.020***	0.023***	0.024***
	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)

Table 9 – continued from previous page

	1	2	3	4	5
B/M	0.003	0.003	0.001	0.001	0.002
	(0.604)	(0.579)	(0.834)	(0.806)	(0.758)
Leverage	-0.000	-0.000	0.000	-0.000	-0.000
	(0.518)	(0.480)	(0.936)	(0.950)	(0.874)
Ac_cashholding	-0.092	-0.096	-0.095	-0.091	-0.088
	(0.129)	(0.112)	(0.123)	(0.136)	(0.147)
Cash/Equity	-0.049	-0.048	-0.049	-0.048	-0.051
	(0.158)	(0.161)	(0.153)	(0.131)	(0.134)
Runup	0.073***	0.072***	0.069***	0.069***	0.067***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Sigma	-0.461	-0.455	-0.328	-0.344	-0.356
	(0.602)	(0.606)	(0.709)	(0.693)	(0.684)
Industry fixed effects	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes
Observations	1,405	1,405	1,405	1,405	1,405
Pseudo R-squared	0.293	0.293	0.288	0.290	0.290

Panel B. Positive CARs. This panel presents the probit regression results of the M&A deal completion on the institutional cross-ownership proxy variables (marginal effect reported). Our sample consists of 926 M&A deals between 1984 and 2014 that had positive acquirer three-day cumulative abnormal returns. Both acquirers and targets are U.S. public firms. The dependent variable is the binary variable that takes the value of 1 if the deal was completed and 0 otherwise. Detailed definitions of the independent variables are described in Appendix A. Year and Fama–French 10 industry fixed effects are controlled for in all regressions. Robust standard errors are estimated and p-values are reported in parentheses. ∗ ∗ ∗, ∗∗, and ∗ denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	1	2	3	4	5
Ac_crossIO	0.040				
	(0.665)				
Mvweighted_crossIO		0.031			
		(0.739)			
Top5Count			0.015		
			(0.227)		
Top10Count				0.004	
				(0.629)	
Top20Count					-0.002
					(0.727)
Pure_cash	0.038	0.037	0.038	0.037	0.035
	(0.167)	(0.171)	(0.159)	(0.169)	(0.195)
Pure_stock	0.085***	0.085***	0.084***	0.084***	0.086***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.002)
ToeHold	-0.089**	-0.089**	-0.088**	-0.089**	-0.089**
	(0.030)	(0.030)	(0.032)	(0.030)	(0.030)
Hostile	-0.226***	-0.225***	-0.221***	-0.223***	-0.223***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Tender_offer	0.118***	0.118***	0.118***	0.117***	0.118***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Diversifying	0.006	0.006	0.007	0.006	0.006
	(0.791)	(0.795)	(0.748)	(0.782)	(0.809)
Competition	-0.251***	-0.252***	-0.250***	-0.252***	-0.250***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Premium	-0.043***	-0.042***	-0.043***	-0.042***	-0.039***
	(0.005)	(0.005)	(0.003)	(0.005)	(0.008)
Relative_size	0.058***	0.057***	0.058***	0.057***	0.056***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)
Size	0.009	0.010	0.011	0.011	0.012
	(0.283)	(0.264)	(0.154)	(0.149)	(0.120)
B/M	0.002	0.002	0.003	0.002	0.002
	(0.462)	(0.460)	(0.455)	(0.466)	(0.445)

Table 9 – continued from previous page

	1	2	3	4	5
Leverage	0.000	0.000	0.000	0.000	0.000
	(0.577)	(0.597)	(0.641)	(0.652)	(0.689)
Ac_cashholding	0.019	0.019	0.020	0.019	0.019
	(0.809)	(0.804)	(0.797)	(0.804)	(0.803)
Cash/Equity	-0.084**	-0.084**	-0.084**	-0.083**	-0.083**
	(0.036)	(0.036)	(0.031)	(0.037)	(0.038)
Runup	0.039	0.039	0.038	0.039	0.038
	(0.155)	(0.157)	(0.167)	(0.161)	(0.169)
Sigma	-1.374	-1.396	-1.450	-1.426	-1.486
	(0.148)	(0.139)	(0.120)	(0.129)	(0.115)
Industry fixed effects	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes
Observations	926	926	926	926	926
Pseudo R-squared	0.301	0.300	0.300	0.302	0.300

Table 10: Institutional cross-ownership v.s. institutional ownership

Panel A. Acquirer CARs. This panel presents results of regressions reported in Table 6, with one extra control variable: Ac_IO. Ac_IO represents acquirer institutional ownership at the quarter ended before the deal announcement. Regression standard errors are adjusted for heteroscedasticity (White, 1980). p-values are reported in parentheses. ∗ ∗ ∗, ∗∗, and ∗ denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	1	2	3
Ac_crossIO	-0.035**		
	(0.015)		
Mvweighted_crossIO		-0.029**	
		(0.045)	
Top10Count			-0.003***
			(0.006)
Ac_IO	0.007	0.005	-0.006
	(0.407)	(0.578)	(0.434)
Control variables	Yes	Yes	Yes
Intercept	Yes	Yes	Yes
Industry & Year fixed effects	Yes	Yes	Yes
Observations	2,322	2,322	2,322
Adj R-squared	0.112	0.112	0.114

Panel B. Takeover premium. This panel presents results of regressions reported in Table 7, with one extra control variable: Ac_IO. Ac_IO represents acquirer institutional ownership at the quarter ended before the deal announcement. In Columns (1)-(3), the dependent variables are takeover premiums calculated by transaction value. In Columns (4)-(6), the dependent variables are target CARs over the three-day even window. Regression standard errors are adjusted for heteroscedasticity (White, 1980). p-values are reported in parentheses. ∗ ∗ ∗, ∗∗, and ∗ denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	1	2	3	4	5	6
Ac_crossIO	-1.193***			-0.203***		
	(0.000)			(0.000)		
Mvweighted_crossIO		-1.152***			-0.200***	
		(0.000)			(0.000)	
Top10Count			-0.080***			-0.012***
			(0.000)			(0.000)
Ac_IO	0.363**	0.329**	-0.062	0.060**	0.056**	-0.010
	(0.024)	(0.034)	(0.608)	(0.011)	(0.017)	(0.628)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes
Intercept	Yes	Yes	Yes	Yes	Yes	Yes
Industry & Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2,322	2,322	2,322	2,541	2,541	2,541
Adj R-squared	0.092	0.091	0.088	0.110	0.110	0.104

Panel C. Cash payment. This panel presents results of regressions reported in Table 8, with one extra control variable: Ac_IO. Ac_IO represents acquirer institutional ownership at the quarter ended before the deal announcement. The dependent variable is the percentage of cash payment involved in the total payment of the transaction as reported by the SDC. Robust standard errors are estimated and p-values are reported in parentheses. $***$, $**$, and $*$ denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	1	2	3
Ac_crossIO	-49.741***		
	(0.000)		
Mvweighted_crossIO		-45.677***	
		(0.000)	
Top10Count			-4.785***
			(0.000)
Ac_IO	21.550***	19.456***	2.985
	(0.004)	(0.009)	(0.654)
Control variables	Yes	Yes	Yes
Intercept	Yes	Yes	Yes
Industry & Year fixed effects	Yes	Yes	Yes
Observations	2,331	2,331	2,331
Adj R-squared	0.066	0.066	0.067

Panel D. Completion probability. This panel presents results of regressions reported in Table 9, with one extra control variable: Ac_IO. Ac_IO represents acquirer institutional ownership at the quarter ended before the deal announcement. In Columns (1)-(3), the sample includes deals with negative three-day CARs. In Columns (4)-(6), the sample includes deals with positive three-day CARs. Robust standard errors are estimated and p-values are reported in parentheses. $***$, $**$, and $*$ denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	1	2	3	4	5	6
Ac_crossIO	-1.237***			0.345		
	(0.006)			(0.550)		
Mvweighted_crossIO		-1.231***			0.261	
		(0.005)			(0.642)	
Top10Count			-0.071**			0.055
			(0.045)			(0.246)
Ac_IO	0.255	0.232	-0.205	-0.164	-0.132	-0.053
	(0.347)	(0.382)	(0.380)	(0.618)	(0.683)	(0.857)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes
Intercept	Yes	Yes	Yes	Yes	Yes	Yes
Industry & Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,405	1,405	1,405	926	926	926
Pseudo R-squared	0.294	0.294	0.291	0.301	0.301	0.302

Table 11: Institutional cross-ownership and deal synergies

This table presents the ordinary least squares (OLS) regression results of the deal synergies on the institutional cross-ownership proxy variables. Our sample consists of 2,604 M&A deals between 1984 and 2014 in which both acquirers and targets are U.S. public firms. Following Bradley et al. (1988) and Harford et al. (2011), the dependent variable Synergies_percent is calculated as: (acquirer CAR3 * acquirer market value + target CAR3 * (1-toehold)*target market value)/ (acquirer market value + (1-toehold)*target market value). Detailed definitions of the independent variables are described in Appendix A. Year and Fama–French 10 industry fixed effects are controlled for in all regressions. Regression standard errors are adjusted for heteroscedasticity (White, 1980). p-values are reported in parentheses. ∗∗∗, ∗∗, and ∗ denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	1	2	3
Top5Count	0.037*		
	(0.055)		
Top10Count		0.020*	
		(0.054)	
Top20Count			0.004
			(0.529)
Pure_cash	0.080**	0.080**	0.078*
	(0.048)	(0.049)	(0.056)
Pure_stock	-0.018	-0.020	-0.017
	(0.603)	(0.572)	(0.632)
Toehold	-0.098	-0.097	-0.097
	(0.122)	(0.126)	(0.127)
Hostile	0.046	0.045	0.045
	(0.505)	(0.521)	(0.519)
Tender_offer	0.015	0.015	0.013
	(0.733)	(0.748)	(0.769)
Diversifying	-0.009	-0.009	-0.010
	(0.768)	(0.790)	(0.756)
Competition	0.097*	0.094*	0.095*
	(0.054)	(0.063)	(0.060)
Relative_size	0.009	0.008	0.009
	(0.425)	(0.481)	(0.436)
Size	0.006	0.003	0.005
	(0.553)	(0.766)	(0.650)
B/M	-0.001	-0.001	-0.001
	(0.898)	(0.895)	(0.876)
Leverage	0.000	0.000	0.000
	(0.600)	(0.550)	(0.564)
Ac_cashholding	-0.057	-0.063	-0.064

Continued on next page

Table 11 – continued from previous page

	1	2	3
	(0.581)	(0.541)	(0.531)
Cash/Equity	0.014	0.017	0.018
	(0.800)	(0.758)	(0.743)
Runup	-0.037	-0.036	-0.035
	(0.233)	(0.253)	(0.259)
Sigma	1.246	1.227	1.243
	(0.395)	(0.402)	(0.396)
Intercept	-0.071	-0.066	-0.050
	(0.626)	(0.650)	(0.732)
Industry fixed effects	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes
Observations	2,529	2,529	2,529
Adj R-squared	0.027	0.028	0.026

Table 12: Institutional cross-ownership and deal long-run performance

This table presents the regression results of acquirer long-run operating and stock performance on institutional cross-ownership characteristics. The key independent variable is the number of independent cross-owners that are the top 10 largest institutional investors of acquirers and targets. The OLS regressions are based on a sample of 2,604 M&A deals that are carried out by U.S. public firms between 1984 and 2014. Following Huson et al. (2004), Guercio et al. (2008), and Duchin and Schmidt (2013), we compute changes of operating return on assets (aroa_change) to measure acquirer long-run operating performance after cross-border M&As. Following Barber and Lyon (1996), aroa is adjusted for the median aroa of a controlled group in which all firms have the same 2-digit SIC code and similar previous operating performance (*pm* 10% ROA) in the fiscal year preceding the deal announcement. Following Barber and Lyon (1997) and Lyon et al. (1999), acquirer's buy-and-hold abnormal return (BHAR) is matched with firms with similar size and book-to-market ratio (bhar_cf30, bhar_cf10). In order to control for the clustering of merger activities at industry level, we further include same-industry requirement in the criteria of benchmarks for acquirers (bhars_cf30sic). Another method to choose benchmark for acquirer's buy-and-hold abnormal return (BHAR) is to match with the return of the corresponding Fama–French 25 size- and book-to-market reference portfolio (bhar_25). All the long-term performance measurement are calculated for the period over 3 years after the deal announcement. Detailed definitions of all variables can be found in Appendix A. Year and Fama–French 10 industry fixed effects are controlled for in all regressions. Regression standard errors are adjusted for heteroscedasticity (White, 1980). p-values are reported in parentheses. Significance at the 0.01, 0.05, and 0.10 levels is indicated by ∗∗∗, ∗∗, and ∗.

	aroa_change	bhars_cf30sic	bhar_ff25	bhars_cf30	bhars_cf10
Top10CountIndependent	0.007**	0.003***	0.001**	0.002**	0.002*
	(0.030)	(0.002)	(0.038)	(0.026)	(0.064)
Pure_cash	0.006	0.002	0.002	0.001	0.003
	(0.511)	(0.467)	(0.196)	(0.692)	(0.315)
Pure_stock	-0.003	0.001	-0.001	-0.001	0.002
	(0.712)	(0.466)	(0.367)	(0.661)	(0.522)
Toehold	0.033**	0.007*	0.001	-0.005	0.001
	(0.027)	(0.062)	(0.655)	(0.332)	(0.839)
Hostile	-0.007	-0.008**	-0.001	0.004	0.002
	(0.611)	(0.037)	(0.709)	(0.447)	(0.598)
Tender_offer	-0.008	0.001	0.000	0.002	0.000

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Table 12 – continued from previous page

	aroa_change	bhars_cf30sic	bhar_ff25	bhars_cf30	bhars_cf10
Diversifying	0.005 (0.497)	-0.000 (0.886)	-0.001 (0.298)	-0.001 (0.717)	0.000 (0.891)
Relative_size	0.001* (0.088)	0.000 (0.241)	-0.000 (0.818)	-0.000 (0.594)	-0.000 (0.362)
Size	-0.001 (0.738)	-0.002*** (0.007)	-0.001*** (0.002)	-0.001* (0.053)	-0.001 (0.176)
B/M	-0.001 (0.316)	0.000 (0.877)	-0.000 (0.419)	0.000 (0.830)	0.000 (0.933)
Leverage	0.000 (0.657)	0.000 (0.498)	0.000 (0.451)	0.000 (0.372)	0.000 (0.879)
Cash/Asset	0.025 (0.264)	0.018*** (0.001)	0.016*** (0.000)	0.006 (0.410)	0.010 (0.127)
Premium	-0.001 (0.686)	-0.000 (0.508)	0.000 (0.914)	0.001 (0.228)	0.001 (0.160)
Cash Flow/Equity	-0.001 (0.962)	0.001 (0.639)	0.007*** (0.002)	0.008** (0.039)	0.005 (0.157)
Runup	-0.011* (0.075)	-0.002 (0.196)	-0.001 (0.482)	-0.002 (0.420)	-0.002 (0.406)
Sigma	0.170 (0.607)	-0.240*** (0.002)	-0.371*** (0.000)	-0.263*** (0.009)	-0.222** (0.022)
Intercept	-0.010 (0.775)	0.007 (0.423)	0.026*** (0.000)	0.010 (0.390)	0.007 (0.555)
Industry fixed effects	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes
Observations	1,777	2,148	2,150	2,148	2,148
Adj R-squared	0.039	0.034	0.056	0.028	0.022

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Table 13: Institutional cross-ownership and investment bank fees

This table presents the ordinary least squares (OLS) regression results of the acquirer investment bank fees on the institutional cross-ownership proxy variables. Our sample consists of 654 completed M&A deals between 1984 and 2014 in which both acquirers and targets are U.S. public firms. The dependent variables in Panel A and B are the total investment bank fees paid by the acquirer and by the target as a percentage of deal value. Detailed definitions of the independent variables are described in Appendix A. Year and Fama–French 10 industry fixed effects are controlled for in all regressions. Regression standard errors are adjusted for heteroscedasticity (White, 1980). p-values are reported in parentheses. $***$, $**$, and $*$ denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A. Investment bank fees paid by acquirers

	1	2	3	4	5
Ac_crossIO	-0.918***				
	(0.000)				
Mvweighted_crossIO		-0.902***			
		(0.000)			
Top5Count			-0.059**		
			(0.017)		
Top10Count				-0.055***	
				(0.000)	
Top20Count					-0.034***
					(0.000)
Ac_IO	0.099	0.075	-0.356***	-0.345***	-0.267***
	(0.452)	(0.559)	(0.001)	(0.001)	(0.009)
Pure_cash	0.085	0.076	0.116	0.110	0.100
	(0.299)	(0.350)	(0.160)	(0.181)	(0.223)
Pure_stock	0.082	0.082	0.076	0.077	0.074
	(0.110)	(0.110)	(0.140)	(0.127)	(0.144)
Toehold	-0.032	-0.036	-0.075	-0.070	-0.067
	(0.755)	(0.720)	(0.463)	(0.483)	(0.505)
Hostile	-0.052	-0.048	-0.103	-0.086	-0.087
	(0.613)	(0.637)	(0.332)	(0.394)	(0.398)
Tender_offer	0.257***	0.258***	0.270***	0.265***	0.258***
	(0.001)	(0.001)	(0.000)	(0.001)	(0.001)
Diversifying	0.005	0.005	-0.001	-0.007	-0.007
	(0.924)	(0.922)	(0.984)	(0.882)	(0.887)
Competition	-0.148**	-0.143**	-0.171**	-0.161**	-0.154**
	(0.040)	(0.047)	(0.021)	(0.027)	(0.040)
Premium	-0.001	-0.001	0.000	-0.001	-0.001
	(0.952)	(0.949)	(0.978)	(0.892)	(0.910)
Relative_size	-0.014	-0.021	-0.032	-0.027	-0.031

Table 13 – continued from previous page

	1	2	3	4	5
	(0.578)	(0.427)	(0.215)	(0.294)	(0.250)
B/M	-0.033**	-0.033**	-0.036**	-0.036**	-0.035**
	(0.016)	(0.015)	(0.017)	(0.014)	(0.016)
Leverage	-0.004***	-0.004***	-0.004***	-0.004***	-0.004***
	(0.005)	(0.004)	(0.003)	(0.004)	(0.005)
Ac_cashholding	0.019	0.004	0.080	0.070	0.066
	(0.914)	(0.983)	(0.660)	(0.692)	(0.708)
Cash/Equity	-1.019*	-1.014*	-1.074**	-1.046*	-1.061**
	(0.059)	(0.060)	(0.043)	(0.052)	(0.050)
Intercept	1.166***	1.196***	1.480***	1.564***	1.537***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Industry fixed effects	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes
Observations	654	654	654	654	654
Adj R-squared	0.281	0.281	0.238	0.244	0.261

Panel B. Investment bank fees paid by targets

	1	2	3	4	5
Ac_crossIO	-1.509***				
	(0.000)				
Mvweighted_crossIO		-1.509***			
		(0.000)			
Top5Count			-0.109***		
			(0.000)		
Top10Count				-0.081***	
				(0.000)	
Top20Count					-0.052***
					(0.000)
Ac_IO	0.117	0.099	-0.533***	-0.514***	-0.408***
	(0.338)	(0.404)	(0.000)	(0.000)	(0.000)
Pure_cash	0.123**	0.123**	0.160***	0.159***	0.145***
	(0.020)	(0.020)	(0.003)	(0.003)	(0.007)
Pure_stock	0.126***	0.126***	0.133***	0.132***	0.126***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.004)
Toehold	-0.050	-0.056	-0.078	-0.073	-0.049
	(0.616)	(0.571)	(0.434)	(0.453)	(0.628)
Hostile	0.056	0.054	-0.053	-0.040	-0.039
	(0.648)	(0.655)	(0.665)	(0.725)	(0.739)
Tender_offer	0.135**	0.130**	0.144**	0.141**	0.144**
	(0.022)	(0.026)	(0.020)	(0.021)	(0.018)
Diversifying	0.028	0.030	0.018	0.019	0.012
	(0.479)	(0.448)	(0.658)	(0.628)	(0.763)
Competition	0.043	0.050	-0.005	0.018	0.024
	(0.587)	(0.525)	(0.952)	(0.818)	(0.754)
Premium	0.014	0.014	0.021	0.021	0.020
	(0.393)	(0.394)	(0.316)	(0.294)	(0.305)
Relative_size	-0.045**	-0.044**	-0.080***	-0.075***	-0.069***
	(0.046)	(0.048)	(0.002)	(0.002)	(0.007)
B/M	-0.015**	-0.015**	-0.017***	-0.017**	-0.017**
	(0.010)	(0.011)	(0.009)	(0.012)	(0.011)
Leverage	-0.001	-0.001	-0.001	-0.001	-0.001
	(0.490)	(0.418)	(0.519)	(0.478)	(0.553)
Ac_cashholding	0.208	0.186	0.273	0.267	0.281*
	(0.197)	(0.248)	(0.106)	(0.108)	(0.092)
Cash/Equity	-0.527***	-0.518***	-0.493***	-0.498***	-0.533***
	(0.003)	(0.004)	(0.008)	(0.006)	(0.003)
Intercept	0.944***	0.968***	1.397***	1.465***	1.441***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Industry fixed effects	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes
Observations	1,449	1,449	1,449	1,449	1,449
Adj R-squared	0.234	0.237	0.159	0.171	0.186

Table 14: Institutional cross-ownership and earnings restatement

This table presents the coefficients estimates from probit regressions of earnings misreporting. The dependent variable is equal to one if the beginning date of the misstatement period falls within a two-year window before the merger completion and zero otherwise. Detailed definitions of control variables can be found in Appendix A. Year and Fama–French 10 industry fixed effects are controlled for in all regressions. Robust standard errors are clustered at the deal level. P-values are reported in parentheses. Significance at the 0.01, 0.05, and 0.10 levels is indicated by ∗ ∗ ∗, ∗∗, and ∗.

	1	2	3	4	5	6
Ac_crossIO	-0.143*					
	(0.054)					
Ta_crossIO		-0.127*				
		(0.064)				
Mvweighted_crossIO			-0.183**			
			(0.017)			
Top5Count				-0.026***		
				(0.002)		
Top10Count					-0.012**	
					(0.029)	
Top20Count						-0.008**
						(0.018)
Acquirer characteristics						
Ac_IO	0.104***	0.073**	0.106***	0.055*	0.057*	0.061*
	(0.006)	(0.030)	(0.004)	(0.099)	(0.083)	(0.067)
Ac_Size	-0.012	-0.007	-0.012	-0.012	-0.012	-0.012
	(0.233)	(0.489)	(0.239)	(0.227)	(0.252)	(0.226)
Ac_Leverage	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000
	(0.606)	(0.597)	(0.601)	(0.665)	(0.618)	(0.623)
Ac_B/M	-0.004*	-0.004*	-0.004*	-0.004*	-0.004*	-0.004*
	(0.066)	(0.086)	(0.062)	(0.073)	(0.073)	(0.090)
Ac_Runup	0.035***	0.034***	0.035***	0.034***	0.034**	0.033**
	(0.007)	(0.009)	(0.007)	(0.010)	(0.010)	(0.011)
Ac_Sigma	0.919	0.929	0.901	0.884	0.904	0.895
	(0.215)	(0.210)	(0.224)	(0.231)	(0.218)	(0.219)
Target characteristics						
Ta_IO	-0.056	-0.016	-0.038	-0.082**	-0.082**	-0.074**
	(0.153)	(0.751)	(0.352)	(0.024)	(0.026)	(0.049)
Ta_Size	0.024**	0.017	0.026**	0.023**	0.023**	0.025**
	(0.038)	(0.122)	(0.028)	(0.036)	(0.049)	(0.030)
Ta_Leverage	-0.001**	-0.001**	-0.001**	-0.001**	-0.001**	-0.001**
	(0.039)	(0.039)	(0.040)	(0.034)	(0.035)	(0.030)
Ta_B/M	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002
	(0.523)	(0.497)	(0.536)	(0.595)	(0.531)	(0.532)
Ta_Runup	0.003	0.004	0.003	0.004	0.003	0.003
	(0.638)	(0.554)	(0.648)	(0.544)	(0.594)	(0.609)
Ta_Sigma	-1.694***	-1.727***	-1.695***	-1.711***	-1.712***	-1.682***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Deal characteristics						
Pure_stock	0.025	0.026	0.026	0.026*	0.025	0.024
	(0.119)	(0.103)	(0.107)	(0.098)	(0.122)	(0.128)
ToeHold	-0.025	-0.024	-0.027	-0.017	-0.023	-0.024
	(0.625)	(0.640)	(0.610)	(0.743)	(0.664)	(0.637)
Hostile	0.048	0.046	0.048	0.039	0.045	0.045
	(0.444)	(0.473)	(0.444)	(0.543)	(0.473)	(0.484)
Tender_offer	-0.029	-0.031	-0.029	-0.027	-0.028	-0.029
	(0.196)	(0.178)	(0.192)	(0.221)	(0.213)	(0.188)
Diversifying	-0.013	-0.013	-0.013	-0.014	-0.013	-0.014
	(0.423)	(0.416)	(0.418)	(0.363)	(0.402)	(0.363)
Competition	0.037	0.038	0.037	0.033	0.036	0.036
	(0.225)	(0.221)	(0.224)	(0.290)	(0.247)	(0.244)
Premium	0.012***	0.012***	0.012***	0.011***	0.011***	0.011***
	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)
Relative_size	-0.024	-0.022	-0.024	-0.022	-0.023	-0.024
	(0.161)	(0.197)	(0.157)	(0.172)	(0.160)	(0.145)
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,497	1,497	1,497	1,497	1,497	1,497
Pseudo R-squared	0.098	0.097	0.099	0.104	0.099	0.100

Table 15: Institutional cross-ownership and deal diversification

This table presents the summary statistics of the five institutional cross-ownership proxies for the diversifying deal sample and the non-diversifying deal sample. We define a deal to be diversifying if the acquirer and the target have different two-digit SIC codes. In the last two columns, we report p-values of t-test and Wilcoxon test for the difference between diversifying deals and non-diversifying deals. Detailed definitions of all variables can be found in Appendix A. Significance at the 0.01, 0.05, and 0.10 levels is indicated by ***, **, and *.

Cross-ownership	Diversifying Deals		Non-diversifying Deals		Difference	
	Mean	Std. Dev.	Mean	Std. Dev.	t-test	Wilcoxon test
Ac_crossIO	0.172	0.168	0.189	0.181	0.025 **	0.061 *
Mvweighted_crossIO	0.175	0.169	0.192	0.181	0.023 **	0.060 *
Top5Count	0.521	0.735	0.617	0.761	0.003 ***	0.001 ***
Top10Count	1.621	1.361	1.890	1.420	0.000 ***	0.000 ***
Top20Count	3.984	2.422	4.501	2.656	0.000 ***	0.000 ***

Figure 1: Distribution of institutional owners and cross-owners. This bar chart of the figure presents the annual distribution of average numbers of institutional owners of acquirers and targets, and the institutional cross-owners. The institutional cross-owners are defined as the intuitional investors who hold both acquirer and target stocks before the M&A announcements. The line chart of the figure also presents the distribution of the average ratio of cross-owners for acquirers and targets for each announcement year. The value of left axis denominates the number of intuitional owners and the right axis denominates the percentage of the cross-owners in total institutional investors. Our sample includes 2,604 M&A deals between 1984 and 2014. Both the acquirer and the target are U.S. public firms with complete information in the CRSP and Compustat databases, and they have institutional ownership information from the Thomson Financial CDA/Spectrum Institutional (13F) database. Detailed definitions of all variables can be found in Appendix A.