

Information Conduit or Agency Cost:  
Top Management and Director Interlock between Acquirers and Targets

by

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## ABSTRACT

This paper investigates the role of top management and board interlocks between acquirers and targets. I hypothesize that an interlock may exacerbate agency problems due to conflicting interests and lead to value-decreasing acquisition. An interlock may also serve as a conduit of information and personal experience, and reduce the cost of information gathering for both firms. I find supporting evidence for these two non-mutually exclusive hypotheses. Consistent with the agency hypothesis, interlocked acquirers underperform non-interlocked acquirers by 2% during the announcement period. However, well-governed acquirers receive higher announcement returns and have better post-acquisition performance in interlocked deals. The proportional surplus accrued to an acquirer is positively correlated with the interlocking agent's ownership in the acquirer relative to her ownership in the target. Consistent with the information hypothesis, when the target's firm value is opaque, interlocks improve acquirer announcement returns and long-term performance. Interlocked acquirers are also more likely to use equity as payment, especially when the acquirer's stock value is opaque. Target announcement returns are not influenced by the existence of interlock. Finally, I find acquisitions are more likely to occur between two interlocked firms and such deals have a higher completion rate.

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## Chapter 1: Introduction

The finance literature has shown that US public firms are pervasively interlocked through their board of directors, and that interlocks have significant economic consequences. The vast network of connected officers and directors can contribute to agency conflicts if the network increases manager entrenchment or leads to conflicts of interest between connected firms. The network may also, however, alleviate information asymmetry by serving as an intermediary that helps management obtain information at a lower cost. I study the effect of interlocks in the context of mergers and acquisitions, important corporate investment decisions that have been plagued by both agency conflicts and incomplete information.

As major corporate events, mergers and acquisitions can lead to massive value creation or destruction for both the target and the acquirer. The decision-making and negotiation process is often long and complex, and requires significant effort from top executives and directors in both firms.<sup>1</sup> When an interlock forms between the acquirer and the target before the merger, it can exacerbate the potential agency conflict and change the information flow. In this paper, I identify an interlock between the acquirer and the target if one person has been employed by both companies as either officer, director, or both within three years prior to the merger announcement, and is still employed by at least one firm right before the announcement. Thus, there are two types

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<sup>1</sup> For example, Vafeas (1999) studies board meeting frequency and finds that boards meet more frequently when shareholders' interests are in potential danger, for example, during mergers, serial divestitures, and replacement for outgoing CEOs. The firm with the highest board meeting frequency in his sample was Santa Fe Pacific, which held 24 meetings during fiscal year of 1994, evaluating a merger with Burlington Northern. An average board meets 7.45 times per year.

of interlocks: a concurrent interlock and a lagged interlock. The coding decision to use a three-year window follows Stuart and Yim (2010) to account for the knowledge and personal connection generated from past and current employment.

Interlocks may exacerbate agency problems for two reasons. First, an interlock can lead to conflicts of interest between the two connected firms. By definition, a concurrent interlock involves an agent with fiduciary obligations to shareholders at both firms. When the two firms are involved in a corporate event such as a merger or acquisition, she may take actions that benefit one firm at the expense of the other.<sup>2</sup> A concurrent interlock also implies that the agent may have stock ownership in both firms. She thus has incentive to act in favor of the firm where the value of personal wealth is higher, which often means hurting the other firm in terms of division of total surplus. The same argument applies to the agent in a lagged interlock. If she keeps her stock ownership with the previous employer, she may have incentive to act in favor of the previous employer at the expense of the current employer. Another possibility is that the personal relationship established with the previous or current employer may also hamper the interlocking agent's judgment and lead to familiarity bias (Ishii and Xuan, 2010).<sup>3</sup>

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<sup>2</sup> This potential conflict of interest does not illegalize transactions with interlocking directors. Vedia (1956) discusses transactions between directors and their corporations, "In the United States...In cases of interlocking directorates, most of the courts follow the rule adopted by the federal courts, according to which contracts entered into by two or more corporations through interlocking directors will be upheld if fair and reasonable, even when the majority or all of the directors are common to the corporations." For more discussion of the legality of the transaction, see Marron (1931), Davenport (1953), Beveridge (1992). I discuss this issue in more details in Section 2.

<sup>3</sup> Technically, the flawed decision-making resulting from familiarity bias is not part of the principle-agent framework. However the two mechanisms yield similar predictions. I



Under these influences, the personal connection generated from interlocks makes it easier for acquirer executives and directors to collude with target management and to make value-destroying acquisitions in pursuit of personal gains, such as empire-building or higher compensation (Jensen, 1986; Grinstein and Hribar, 2004; Harford and Li, 2007). In the meantime, interlocked target executives and directors are subject to the same bias and incentives when evaluating the offers. They may not resist unfavorable bids hard enough; or after accepting the takeover bid, they may negotiate “sweet deals” such as excess cash payment or positions in the combined firm at the expense of the target shareholders (Hartzell, Ofek, and Yermack, 2004; Wulf, 2004).

The second reason why interlocks exacerbate agency problems is that the personal connection established through interlocks gives the agent leverage in the executive or director labor market and reduces the expected cost of making potentially bad decisions. Early work by Mace (1971) quotes one director: “Here in New York it’s a systems club. They are all members of the Brook Club, the Links Club, or the Union League Club. Everybody is washing everybody else’s hands.” Bates, Parrino, and Wu (2011) find that the number of directorship positions that a target CEO holds is positively correlated with her likelihood of obtaining a new job after the takeover. Empirical evidence shows that not only the target management and board of directors are displaced after the takeover. Lehn and Zhao (2006) find that CEOs are more likely to be replaced for making bad acquisitions. In this sense, the post-acquisition employment opportunity would provide incentive to both target and acquirer officers. However, interlocks may empower officers

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differentiate the two in Section 5 by introducing acquirer’s governance in the model of merger performance and interlock.

by enhancing the likelihood of post-acquisition placement and lead to lower quality mergers.

Therefore, agency hypothesis predicts that pre-merger interlocks exacerbate agency conflicts and increase the probability that acquirer and/or target firms pursue value-destroying mergers. Strong governance may alleviate the agency conflicts associated with interlocks and improve deal quality.

An interlock may provide a countervailing benefit, however, by serving as an information conduit between the two firms it connects, which ameliorates the two-sided information asymmetry problem in M&A. From an efficiency perspective, the private information about the intrinsic value of firm assets can be revealed at a lower cost through interlocks. For example, Gulati and Westphal (1999) find that firms are more likely to form a joint venture when they share outside directors and learn more about the reliability and management capabilities of potential venture partners. Past literature mainly focuses on the role of interlocks in facilitating the spread of corporate practices, including acquisition activity, adoption of poison pills, golden parachutes, and option backdating, etc. (Haunschild, 1993; Davis, 1991; Davis and Greve, 1997; Bizjak, Lemmon, and Whitby, 2009). These studies show that interlocks provide decision makers an opportunity to observe their peers' policies and the firsthand consequences.

Specifically in mergers and acquisitions, acquirers want to learn about the true value of targets and make appropriate offers, whereas targets want to estimate the potential synergy so as to negotiate for a higher premium in the bargaining process. In case of stock payments, targets also need to know the value of acquirers' equity. These uncertainties about the potential merger counterpart result in large search costs. Bruner

(2004) indicates that acquirers choose their targets in a search process that usually takes several months. Any factor reducing search cost or cost of due diligence is economically efficient. Lindsey (2008) documents that strategic alliances are more frequently formed among companies sharing a common venture capital investor, and that this effect is stronger when contracting problems are more complicated. Gompers and Xuan (2009) find that sharing a common venture capital investor helps public acquirers and their private targets alleviate information asymmetry, and such acquisitions are associated with higher announcement returns. If interlocks indeed facilitate information exchange between the two firms, one would expect a similar effect. Hence, the information hypothesis predicts that interlocked bids are associated with better performance of the combined firm, both at the announcement and in the long run. An acquirer interlocked with its target is also more likely to use stock as the payment method. This effect should be especially strong for acquirers with high information asymmetry because the benefit of having an interlock with the target will be higher if the target is more opaque or the bid involves equity payment.

This paper provides supporting evidence for both the agency hypothesis and the information hypothesis of interlocks in mergers and acquisitions. Using a sample of 2,194 acquisition bids between US public firms from 1991 to 2003, I identify 140 deals in which the acquirer and the target are interlocked via top management and board of directors. I test the effect of interlocks on merger quality by examining deal characteristics, the cross-sectional variation in the announcement returns of acquirers and targets, and the post-merger performance of the combined firm.

Consistent with the hypothesis that interlocks facilitate information transfer, I find interlocked mergers tend to have higher transaction value relative to the acquirer size and higher target Tobin's Q, compared with non- interlocked mergers. These targets also have higher R&D expenditures and higher dispersion of analyst forecasts. Moreover, interlocked mergers are more likely to use equity as the only payment method, enjoy a higher rate of consummation and a lower likelihood of target management hostility. The comparative statistics support the argument that interlocks improve information transfer between the two firms, and facilitates deals that otherwise may not be completed or even not initiated.

I then investigate how interlocks affect merger outcomes. I find that around the announcement day, the three-day cumulative abnormal return for interlocked acquirers is 1.3% lower than for other acquirers, after controlling for variables that have been shown to affect announcement returns. The difference is both statistically and economically significant. Following Chen, Harford, and Li (2007), I classify deal quality based on extreme market reaction. I find interlocked deals are more likely to be classified as "bad deals", meaning the acquirer three-day announcement CAR is in the bottom quintile. The weighted-average return of the acquirer and the target is also significantly lower in interlocked deals. No difference is found on the target announcement return or post-merger performance. Taken together, these results support the agency hypothesis predicting that interlocks lead to value-destroying deals, and are consistent with Ishii and Xuan (2010).

To investigate whether governance alleviates the negative effect caused by interlock-related agency problems, I include the interaction term between interlock and

acquirer governance. Using director ownership as a measure of acquirers' governance following Bizjak, Lemmon, and Whitby (2009), I find that the coefficient of the interaction term is significantly positive, indicating that when the acquirer is better governed, the existence of interlock is associated with higher deal quality. This evidence strongly supports the agency hypothesis, predicting that interlocks lead to value-destroying acquisitions on average, whereas good governance of acquirers mitigates the negative impact.

I further test the information hypothesis by including interaction terms between interlock and measures of information asymmetry. According to the hypothesis that interlocks help alleviate information asymmetry problems, when the target is opaque to the acquirer and information about the target is more valuable, the benefit of interlock is more pronounced. Consistent with this prediction, I find the interaction term between information asymmetry measures and interlock is significantly positive. If the target is above the industry median in terms of analyst forecasts dispersion or R&D expenditures, the acquirers interlocked with such targets gain 3.8% more than the non-interlocked acquirers over the three-day announcement window. The corresponding long-run effect is even more pronounced.

In addition to this wealth effect, the information hypothesis predicts a higher likelihood of using the acquirer's stock as the payment method. If an interlock reduces uncertainty about the acquirer's stock value, the target is more willing to accept a contingent payment, hence demanding a lower acquisition premium in stock bids compared with non-interlocked targets. Therefore in the equilibrium, there should be more stock payments in interlocked deals, especially when the acquirer's stock value is

more opaque. Using logistic regressions, I find that the existence of an interlock increases the likelihood of stock payment by 15%. For acquirers with high dispersion in analyst forecasts, the marginal effect of interlock is as high as 23%.

In addition to the analysis of merger performance, I examine the relation between interlocks and other characteristics of M&A. I find that the fraction of total merger surplus allocated to the acquirer is positively correlated with the interlocking agent's ownership in the acquirer relative to her ownership in the target. This finding supports the hypothesis that an interlocking agent acts in favor of the firm where the value of personal wealth is higher.

An acquisition is also more likely to be initiated if two firms are interlocked and such transactions are more likely to be consummated. If there are multiple bids, the interlocked bidder has a higher chance of winning the auction. This additional evidence does not differentiate the two hypotheses. On the one hand, the information hypothesis predicts that interlocks facilitate transactions that otherwise may not be initiated or completed due to high search costs or high standards of due diligence. On the other hand, an interlocking agent may want to maximize her personal interest by facilitating a merger with an interlocked firm. The higher likelihood of winning an auction for an interlocked bidder may result from better knowledge of the target asset, or simply from favoritism of the target over other bidders.

### 1.1 Literature review

This paper contributes to a growing literature of board interlocks that links financial activities and outcomes to managerial behavior. Previous literature has investigated the role of interlocks as an information conduit by examining the spread of

corporate practice through board interlocks, such as acquisition activity (Haunschild, 1993), adoption of poison pills (Davis, 1991), golden parachutes (Davis and Greve, 1997), CEO option backdating (Bizjak, Lemmon, and Whitby, 2009), being targeted in a take-private transaction (Stuart and Yim, 2010), and so on. The empirical work on the other side of the story has mainly focused on the diminishing board independence associated with mutual interlocks, in which an officer of one firm sits on another firm's board and vice versa. Research has shown that CEOs earn significantly higher compensation when they are mutually interlocked (Hallock, 1997), when the board of the firm is mutually interlocked with another board (Fich and White, 2003), and when there is a "cozy" relationship between the top management and outside directors (Larcker, Richardson, Seary, and Tuna, 2005). The two hypotheses regarding agency cost and the information benefit of interlocks are not mutually exclusive but have completely different predictions on the wealth effect of interlocks. Mergers and acquisitions provide a perfect context to test the two hypotheses and to do a comprehensive cost-benefit analysis. This study finds support for both hypotheses.

This paper also contributes to the M&A literature. Past research has shown that various deal or firm characteristics explain the cross-sectional variation in short-term and long-term wealth effects to both targets and acquirers. For example, Bates and Lemmon (2003) find target announcement CARs are higher in deals with target termination fee provisions, and lower in deals with acquirer fee provisions. Chen, Harford, and Li (2007) show that concentrated holdings by independent long-term institutional investors lead to better post-merger stock and operating performance. Masulis, Wang, and Xie (2007) find that significantly lower acquirer CARs are associated with weaker corporate governance

such as anti-takeover provisions, CEO-chair duality, or operating in less competitive industries. This paper adds to this literature by showing the role that top management and director interlocks play in the M&A setting. This is a potentially interesting research question because the decision-making and negotiation process of M&A is often long and complex, and requires tremendous effort from top executives and directors in both the target and the acquirer. Vafeas (1999) finds that board of directors meet more frequently when shareholders' interests are in potential danger, for example, during mergers, serial divestitures, and replacement for outgoing CEOs. In his sample, the firm with the highest board meeting frequency was Santa Fe Pacific, which held 24 meetings during fiscal year of 1994, evaluating a merger with Burlington Northern, more than three times of the average annual frequency of board meeting (7.45).

This paper is most related to Ishii and Xuan (2010), who test the impact of social ties between targets and acquirers on merger outcomes. Instead of looking at explicit interlock between the two firms, they use educational background and past employment as a proxy for social ties. One may regard interlocks as a special form of social ties with a stronger connection between the two firms. More importantly, interlocks imply severe agency issues resulting from the dual agency role of the interlocking director or officer, whereas social ties involving two agents with same educational background or past employment may only result in cognitive bias. Another difference between the two papers is that I investigate the post-merger operating performance of the combined firm, which complements the announcement abnormal return as a measure of merger quality. In addition to the univariate analysis applied in Ishii and Xuan (2010), I regress post-merger performance measures on a set of commonly accepted explanatory variables



including measures of acquirer governance, target information asymmetry, and their interaction terms with interlock. The results indicate that the impact of interlock on post-merger performance is conditional on corporate governance and information asymmetry.

Several other papers study the relation between board connections and M&A. For example, Davis and Stout (1992) and Fligstein and Brantley (1992) find no evidence of the presence of a banker on board leading to a higher likelihood of engaging in merger activities, either as the target or the acquirer. Haunschild (1993) finds that firms' acquisition behavior is impacted by the practice of the firms that they are linked to, that is, if a firm is interlocked to another firm that recently engaged in acquisitions, it is more likely to engage in acquisitions afterwards. Schonlau and Singh (2009) find that acquirers with well-connected boards are associated with better post-merger performance compared with those with less-connected boards. All of these studies suggest that board connections affect firms' decision to acquire, the choice of their target, and the outcome of the merger. This paper is different from these studies in the sense that it specifically focuses on the interlocks between the acquirer and its target instead of a general connection between the acquirer and any other firm, therefore provides explicit evidence of the role that interlocks play in corporate activities.

The remainder of the paper is organized as follows. Section 2 provides a review of current judicial attitude on transactions between interlocked firms, and an anecdotal example. Section 3 describes the data and construction of variables. Section 4 presents the results from empirical tests on the relation between interlocks and merger performance and characteristics. Section 5 examines the above relation conditional on corporate governance and information asymmetry. Section 6 presents additional

empirical evidence including the relation between interlocks and probability of acquisition, and deal completion. Section 7 concludes.

## Chapter 2: Legal Treatment Of Transactions Between Corporations With Common Directors

### 2.1. Legal treatment of self-dealing transactions

113 out of the 140 interlocks in the sample are concurrent, which implies that the interlocking agent has a fiduciary obligation to both acquirer and target shareholders at the time of merger announcement. Different states have different clauses with regard to the legitimacy of these so called “self-dealing” transactions between corporations sharing common directors.

Regulators try to protect shareholders from potential self-dealing of the interlocking agents, but at the same time, they do not want to constrain companies from seeking value-enhancing deals through managerial connections. Stuart and Yim (2010) has shown that on average, a US public firm is interlocked to eight other firms, and the connection can be beneficial to both companies. The attitude of legislators is perhaps best demonstrated in the case of *Bowman v. Gum, Inc.* (1937). The court decided that an interlocking director is not disqualified by his adverse interest per se, but the conflict of interest will “subject his actions to the closest scrutiny and rescission for breach of his fiduciary relation” (Lane, 1938).<sup>4</sup> In general, a contract between corporations with common directors is not void or voidable if it is fair and reasonable, although the burden

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<sup>4</sup> As Vedia (1956) discusses transactions between directors and their corporations, “In cases of interlocking directorates, most of the courts follow the rule adopted by the federal courts, according to which contracts entered into by two or more corporations through interlocking directors will be upheld if fair and reasonable, even when the majority or all of the directors are common to the corporations. In the United States, it has become customary to insert in the articles of incorporation or by-laws a special provision permitting contracts between a director and his corporation or between corporations having interlocking directors.”

of proving fairness lies on the party seeking to uphold the contract (Davenport, 1953; Vedia, 1956).<sup>5</sup> The Corporation Law in Delaware, California and Texas provides three ways of validation for such transactions: a majority vote by disinterested directors, a majority vote by fully informed shareholders, and proof of fairness.

## 2.2 The MKS/ASTeX acquisition

The acquisition of Applied Science & Technology (hereinafter ASTeX) by MKS Instruments Inc. (hereinafter MKS) in year 2000 illustrates how the interlocking agent influences the merger process, and how the acquirer and the target take actions to avoid litigation. MKS, the acquirer, elaborated the background of the transaction in a filing amendment<sup>6</sup> after the merger was announced.

Mr. John R. Bertucci was the CEO and chairman of the board of MKS in 2000. He had also served on the board of directors of ASTeX since 1994. On July 12, 2000, Mr. Bertucci met with Merrill Lynch as the MKS CEO to discuss the consolidation in the industry. On July 20, 2000, one week after the meeting, the investment bank came back to MKS to discuss the strategic fit between MKS and ASTeX, where Mr. Bertucci served as a director. In August and September, ASTeX's board of directors, other than Mr. Bertucci, held special meetings to review the merger, discuss other possible buyers, and review the final terms of the merger agreement. On October 2, 2000, ASTeX and MKS entered into the merger agreement.

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<sup>5</sup> In some states such as California, the rule is even more liberal. For example, interlocking directors are permitted to vote, and the statute further leaves the burden of proof on the complaint, usually a minority shareholder. (Davenport, 1953)

<sup>6</sup> From EDGAR Online the SEC filing: S-4/A filed by MKS, 2000-12-13.

There are three points to be noticed in this case. First, the extremely short interval between Mr. Bertucci's meeting with the investment bank and the proposal of ASTeX as the potential target implies his contribution in initiating the deal between the two firms. Given that there are 103 firms with the same 4-digit SIC code as ASTeX in the year 2000, the proposal of ASTeX does not seem to be a coincidence. Second, this whole process from the initial talk to final merger agreement took less than three months, a very short search process compared with the example of private negotiation between targets and acquirers in Boone and Mulherin (2007). In that example, it took the two firms almost a whole year, from when the CEOs of BankBoston met with the CEO of Fleet Financial to discuss a possible merger (April 1, 1998), to the signing of the final merger agreement (March 14, 1999). The presence of no other bid on the target implies the interlock may have prevented other "outside" bidders from competing.

Lastly, Mr. Bertucci stepped aside by recusing himself from crucial target board meetings. As a matter of fact, both the acquirer and the target made explicit claims in the amendment as follows. The section of "Interests of executive officers and directors of MKS in the merger" reads in part, "In considering the fairness of the merger to the MKS stockholders, the MKS board of directors took into account Mr. Bertucci's interests. Some of these interests are different from, or in addition to, the interests of MKS stockholders generally in the issuance of MKS common stock in the merger." In other words, the acquirer board claimed to be aware of the interlocking agent's potential gain from the transaction. Further, the board believed that the acquisition was good for the acquirer shareholders and approved the acquisition. On the other hand, the target emphasized that "ASTeX's board of directors, with Mr. Bertucci not participating, has

unanimously approved the merger agreement and the merger and believes that the terms of the merger agreement are fair to, and that the merger is in the best interests of ASTeX and its stockholders.”

## Chapter 3: Data Description and Construction of the Interlock Variable

### 3.1 M&A sample formation

I start with a sample of 9,657 bids with a US public target from the Mergers and Acquisitions Database maintained by SDC. Because the date range for management and board data in Compact Disclosure is 1988–2004, I require the bids to be announced between 1991 and 2003. The status of the deal is either completed or withdrawn. Any bid is excluded if coded as a divestiture, acquisition of remaining or partial interest, buyback, recapitalization, or exchange offer. To focus on change-in-control events, I further require that the acquirer holds 20% or less of the target stock prior to the announcement, and seeks 50% or more, leading to 9,191 bids. Both target and acquirer are then matched with CRSP and COMPUSTAT databases for stock return and financial information, which reduces the sample size to 3,852.

3,324 of these bids have both target and acquirer covered by Compact Disclosure. I further dropped the reverse mergers and the transactions in which the acquirer is in the financial industry (SIC between 6000 and 6999) but the target is not. The latter restriction is imposed to exclude cases in which the acquirer is the primary creditor of the target, and therefore a banker from the acquirer naturally sits on the target's board to monitor. To have a significant impact on the acquirer's value and performance, the relative deal value must be at least 5%, calculated as the ratio of the transaction value relative to the acquirer's market equity 20 days prior to the announcement date. The final sample consists of 2,194 bids.

Panel A in Table 1 shows the distribution of the sample bids by announcement year. Between 1991 and 2003, the number of bids increased with the rising of the

economy and dropped at the end of the 1990s. This trend is consistent with the observation in other studies, such as Moeller, Schlingemann, and Stulz (2004) and Chen, Harford, and Li (2007). Of the full sample of 2,194 bids (1,738 completed and 456 withdrawn), 140 bids are interlocked, without a significant time trend in the distribution across years. The highest percentage of interlocked bids is 11% and lowest is 2% for 1993 and 1992, respectively. Panel B presents the distribution by target's industry, defined by Fama-French 12-industry classifications. The industries with the highest percentage of interlocked bids are Telecommunication and Health (11% and 10%, respectively), whereas the industries with the lowest interlock ratios are Chemicals and Finance (3%). As with the financial sector, Utility is also a heavily regulated industry and has the second-lowest interlock ratio of 4%.



Table 1: Distribution of bids by year and industry

This table presents the distribution of sample bids by announcement year and by target's industry. All 2,194 bids are announced between 1991 and 2003, with transaction value at least 5% of the acquirer's market value of equity. Both the acquirer and target are US public firms covered by CRSP, COMPUSTAT, and Compact Disclosure. Interlocked bids are defined as those with at least one person employed by both firms as either director or top executive within 3 years before the announcement of the bid. The target's industry is defined by the Fama-French 12-industry classifications.

Panel A: Distribution of bids by year

Year	# of bids	# of interlocked bids	% of interlocked bids
1991	58	4	7%
1992	47	1	2%
1993	70	8	11%
1994	139	5	4%
1995	206	12	6%
1996	196	11	6%
1997	291	20	7%
1998	302	15	5%
1999	277	18	6%
2000	231	22	10%
2001	140	12	7%
2002	91	6	7%
2003	120	6	5%
sum	2,194	140	6.38%

Panel B: Distribution of bids by target's industry

Industry	# of bids	# of interlocked bids	% of interlocked bids
1. NonDurables	74	6	8%
2. Durables	39	3	8%
3. Manufacturing	177	12	7%
4. Energy	87	4	5%
5. Chemicals and Allied	37	1	3%
6. Business Equipment	419	28	7%
7. Telecommunication	97	11	11%
8. Utilities	77	3	4%
9. Wholesale, Retail	175	12	7%
10. Health	214	21	10%
11. Finance	565	17	3%
12. Other	233	22	9%
sum	2,194	140	6.38%

### 3.2 Interlock variable

The source of data on top management and board is the Compact Disclosure (a.k.a. Compact D/SEC) database. Compact Disclosure provides financial and management information extracted from 10-K and other SEC filings for over 7,000 firms. Both firms are matched for a full list of executive officers and board directors with name, age, and title within the company. On average, a target firm has 8.4 executives and 8.3 directors in a sample year, whereas an acquirer has 9.9 executives and 10 directors.

An interlock is identified if one person has been employed by both companies as either officer, director, or both within three years prior to the announcement (year  $t$ ), and is still employed by either acquirer or target in the year right before the merger (year  $t-1$ ). For the primary measure of interlocks, I use an indicator variable set equal to 1 if the two firms share at least one common director/officer in the three-year window. Using the number of interlocking agents yields similar results. Thus there are two types of interlocks: concurrent interlocks and lagged interlocks. In other words, the interlocking agent doesn't necessarily serve at both firms at the merger announcement. For example, an interlocking agent may be a target director until year  $t-2$  and serve as the CFO of the acquirer the whole time. The coding decision of three-year window follows Stuart and Yim (2010). The rationale is in line with the assumption that a director or executive should carry with her all the knowledge, personal experience, and connections from the previous employer, and further impact any acquisition decision involving the firm, even though the link between the previous employer and her current employer is not contemporaneous. Another underlying assumption is that past experiences will gradually lose relevancy to her current employer; that is, the further away the link the smaller the

relevancy is. The knowledge and connections with the old employer from three years ago are clearly more relevant than those from 10 years ago. Treating them as the same introduces noise to the measure. The results are robust to the use of 2-year or 4-year windows, yet a bit weaker.

Table 2 shows the distribution of bids by the number of interlocks. Among all 2,194 bids, 140 (6.38%) have at least one interlock. The remaining 2,054 bids are non-interlocked. I exclude bids with more than three interlocks, in which case the acquirer and target are usually related in some other way, such as the target being the acquirer's block holder or strategic alliance. This is not the interest of this paper since the existing fundamental relationship between two firms might be the primary factor for both information transfer and agency costs. Director interlock is more of a byproduct in this case. The results in this paper are not sensitive to the inclusion of these bids.

Table 2: Distribution of bids by number of interlocks between the target and acquirer

This table presents the distribution of bids by the number of interlocks. An interlock is defined as one person employed by both target and acquirer as either director or top executive within 3 years before the announcement of the bid. Presented first is the number of bids with a specific number of interlocks, followed by the percentage in all bids. Among all 2,194 bids, 140 have at least 1 interlock, collectively 6.38% of the full sample. The remaining 2,054 bids are non-interlocked.

# of interlocks	Frequency	Percentage
1	103	4.69
2	34	1.55
3	3	0.14
sum	140	6.38
0	2,054	93.62
sum	2,194	100

## Chapter 4: Empirical Results

In this section, I present results from both univariate analysis and multiple regression analysis that investigate the relation between interlock and merger characteristics, as well as the wealth effect of interlock in terms of short-run and long-run merger performance.

### 4.1 Univariate analysis

Table 3 presents descriptive statistics, comparing the subsample of 140 interlocked bids to the subsample of 2,054 non-interlocked bids. All variables are winsorized at the 1st and 99th percentiles except the indicator variables. Dollar values have been inflation-adjusted using year 2000 as the base. Mergers with interlocks have smaller targets and acquirers but higher relative deal value, calculated as the transaction value divided by the acquirer's market capitalization 20 days prior to the announcement date. Interlocked bids also have higher pre-announcement Q of the target. The Tobin's Q net of the industry median is 0.6 for interlocked bids, and only 0.22 for non-interlocked bids. Smith and Watts (1992) use market-to-book ratio of assets as a proxy for higher degree of the firm's growth opportunities. And target's pre-announcement growth opportunities are assumed to be private information, thus opaque to the acquirer (Bates and Lemmon, 2003). The higher pre-announcement Q of the target, together with the higher relative deal value, implies a more complex transaction and more opacity in the acquirer's perspective about the value of the target.

Acquirers interlocked to targets are more likely to use equity as the payment method and less likely to use cash. There are 60% (9%) interlocked bids solely paid by equity (cash), compared with 50% (16%) of non-interlocked bids. The choice of equity as

payment requires the acquirer to disclose more about the synergy and value of the combined firm (Moeller, Schlingemann, and Stulz, 2004). In addition, an interlocked bid is also more likely to be received as friendly by target management, to be completed, and to have a shorter interval between announcement and deal completion. All of these characteristics are significantly different at the 1% or 5% level, except that target hostility between the two groups is different at 10%. These findings imply the existence of more severe information asymmetry between the target and acquirer or a higher cost of the asymmetry when the two firms are interlocked, and therefore support the information hypothesis. The interlocking agent efficiently transfers information between the two firms and facilitates the deal that otherwise may not be completed or even initiated.

With respect to merger performance, announcement CARs for target and acquirer in non-interlocked bids are comparable to previous studies, 19% and -2.1%, respectively. Acquirers in interlocked bids, however, experience a lower CAR of -4%, an economically significant discount. Although CAR is a straightforward and market-based estimate of the wealth effect, and hence commonly used in M&A studies, Chen, Harford, and Li (2007) argue that additional measures of deal quality are necessary. On the one hand, due to all the uncertainty over merger surplus, distribution of surplus, and resolution of the transaction to the outside investors, the stock price reactions to both firms at the announcement could be rather noisy (Bhagat, Dong, Hirshleifer, and Noah, 2005). On the other hand, bids that receive significantly negative reactions are likely to be truly bad deals (Paul, 2007). Therefore, to complement the three-day CAR, this paper includes post-merger stock and operating performance measures, and constructs indicator variables to capture extreme stock reactions. Specifically, I follow Chen, Harford, and Li

(2007) in using the top and bottom quintiles of acquirer's three-day CAR to define good deals versus bad ones. Good Deal is an indicator variable that takes the value of one if the acquirer's three-day CAR is in the top quintile, and zero otherwise. Bad Deal is defined analogously for the bottom quintile.  $\Delta$ ROA is calculated as the difference between the post-merger three-year average ROA and the pre-merger three-year average. Both ROA and Q in this paper are net of the median of all firms with same two-digit SIC code.

Besides the lower CARs of acquirers, Table 3 shows that interlocked bids are associated with a significantly higher likelihood of being an extremely bad deal but with a larger increase in ROA. The announcement effects indicate that the market reacts negatively to the announcement of acquisitions with an interlock between target and acquirer. Section 5 explains the seemingly inconsistent evidence on  $\Delta$ ROA with further investigation.

In general, the univariate analysis shows that interlocked deals are associated with firm and bid characteristics that indicate information asymmetry between bidder and target, but also involve acquisitions of lower quality.

Table 3: Sample summary statistics

This table presents summary statistics for the characteristics of 2,194 bids as well as the targets and acquirers. An interlocked bid is one with at least one person employed by both target and acquirer as either director or top executive within 3 years before the announcement of the bid. Of the 2,194 bids, 140 (6.38%) are interlocked. Target and acquirer characteristics are computed using firm data from the fiscal year immediately preceding the announcement date. Leverage is book value of debt divided by book value of asset (Compustat Data Item 6). Book Debt is defined as the sum of long-term debt (Item 9) and debt in current liabilities (Item 34). Cash flow is operating income before depreciation (Item 13). Tobin's Q is proxied by the market-to-book assets ratio, defined as the book assets (Item 6) plus the market value of equity (Item 199 times Item 25) minus book equity (Item 60) then divided by the book assets. ROA is Operating Income before Depreciation (Item 13) over lagged book asset. Both Q and ROA presented here and used in regressions are the net of the industry median. R&D is R&D expenditure (Item 46) divided by book asset. STDDEV of forecasts is the standard deviation of analysts' earnings forecasts from I/B/E/S. Relative Deal Value is transaction value divided by equity market capitalization of the acquirer at 20 days prior to announcement date. Length is the number of days between the announcement date and the effective date. Toehold is the percent of ownership in the target by the acquirer at the announcement. Final premium is calculated as the final bid price per share from SDC divided by the target's stock price 42 trading days prior to announcement, less one. Diversifying Merger is an indicator variable equal to one if the target and the bidder are from different industries, industry defined by two-digit SIC code. MultipleBid is an indicator variable equal to one if the auction has multiple bids. An auction is composed of all bids for a target beginning with the first observed bid and including any successive bids made within 365 calendar days of a prior announcement. All Stock (All Cash) is an indicator variable equal to one if target shareholders are paid 100% by bidder's equity (cash). Tender Offer is an indicator variable equal to one if the bid is a tender offer. Complete is an indicator variable equal to one if the bid is completed. Hostile is an indicator variable equal to one if the bid is classified as "Hostile" in SDC. Target and acquirer 3-day CARs are calculated over the event window [-1, +1]. Combined 3-day CAR is the average of target and acquirer CARs weighted by their market cap of two days prior to announcement. Good (Bad) Deal is an indicator variable that takes the value of one if the acquirer's 3-day CAR is in the top (bottom) quintile, and zero otherwise. All variables are winsorized at the 1st and 99th percentiles except indicator variables. \*\*\*, \*\*, \* denote statistical significance between the interlocked and non-interlocked subsamples at the 1%, 5%, and 10% level, respectively.



Table 3 (continued)

	<u>Mean</u>			<u>Median</u>		
	Non-interlocked bid	Interlocked bid		Non-interlocked bid	Interlocked bid	
Frequency	2054	140		2054	140	
<i><u>Acquirer Characteristics</u></i>						
Book Asset	7841	6551		1202	469	***
Leverage	0.213	0.214		0.189	0.155	
CF to Asset	0.089	0.061	**	0.100	0.093	
Q	0.624	0.868		0.069	0.072	
R&D	0.077	0.129	***	0.036	0.042	
STDDEV of Forecasts	0.032	0.034		0.025	0.03	
<i><u>Target Characteristics</u></i>						
Book Asset	2258	1657		296	153	***
Leverage	0.209	0.200		0.163	0.135	
CF to Asset	0.057	0.008	***	0.085	0.072	*
Q	0.215	0.603	***	-0.017	0.036	
R&D	0.044	0.084	***	0.000	0.000	***
STDDEV of Forecasts	0.031	0.035	**	0.025	0.03	*
<i><u>Merger Performance Measures</u></i>						
Target 3-day CAR	0.190	0.176		0.155	0.136	
Acquirer 3-day CAR	-0.021	-0.041	***	-0.018	-0.031	*
Combined 3-day CAR	0.019	0.003	**	0.013	0.004	
Good Deal	20%	18%				
Bad Deal	19%	36%	***			
$\Delta$ ROA	0.029	0.085	**	0.002	0.006	
<i><u>Bid Characteristics</u></i>						
Deal Value	1723	2188		276	245	
Relative Deal Value	46%	51%	*	36%	46%	*
Length	143	136		125	114	**
Initial Premium	49%	50%		40%	39%	
Final Premium	49%	47%		41%	39%	
AllStock	50%	60%	**			
AllCash	16%	9%	**			
Diversifying Merger	24%	24%				
Complete	82%	89%	**			
Hostile	5%	1%	*			
Tender Offer	15%	13%				
Toehold	4%	6%				
MultipleBid	10%	6%				

## 4.2 Multiple regression analysis

In this section I consider whether the existence of interlock impacts the announcement performance of acquirers and targets and the post-acquisition performance. The cross-sectional regressions include a key variable of interlocks (hereinafter INTERLOCK), an indicator variable equal to one if there is one or more interlocks between the acquirer and the target, and zero otherwise. Control variables are firm and bid characteristics that are commonly accepted as influencing merger performance, including firm size measured by logged book asset, Q, leverage, cash flow to asset, relative deal value, indicator variables of 100% payment in equity or cash, and an indicator variable equal to one if the target and the acquirer are in the same industry defined by two-digit SIC code. The announcement return regressions use the entire sample of 2,194 bids, whereas the regression of post-merger performance uses 1,738 completed change-in-control transactions. All regressions include year and industry fixed effects to control for potential systematic differences in time or industry.

Table 4 presents cross-sectional regressions of different performance measures. Models 1-4 are OLS regressions, whereas Models 5-6 are logistic regressions modeling the likelihood that acquirer announcement abnormal return falls in the top (bottom) quintile of the sample. The findings are consistent with the agency hypothesis; that is, interlocks lead to value destruction in the acquirer. In Column I, the coefficient on INTERLOCK is -0.013 in the model with the acquirer's three-day announcement cumulative abnormal return (CAR) as the dependent variable. In other words, on average, an interlocked acquirer receives a 1.3% lower return than a non-interlocked acquirer, which is a discount of almost 70% of the average unconditional CAR (-2.1%), hence is of

economic significance. In addition, the likelihood that the acquirer's CAR is ranked in the bottom quintile, defined as a "bad deal" in Chen, Harford, and Li (2007), is also higher if the acquirer is interlocked to target through a director or executive. The marginal effect of interlock is 10.5% (not tabulated), a striking impact given that the unconditional likelihood of being ranked in the bottom quintile is 20% by definition. This result suggests that the market response to an interlocked acquisition is more likely to be extremely bad, and is complementary to the test of acquirer abnormal return.

An alternative explanation of this negative impact of interlock on acquirer announcement return is the wealth transfer between acquirers and targets, a notion in the M&A literature that acquirers overpay targets due to hubris or personal objectives (e.g. Roll (1986), Morck, Shleifer and Vishny (1990), Hietala, Kaplan, and Robinson (2003)). To test this alternative hypothesis, the second column shows the effect of interlocks on targets' CAR. Consistent with Ishii and Xuan (2010), the coefficient on INTERLOCK is insignificant in the target specification, suggesting that the negative impact of interlock on acquirer performance is not due to the acquirer overpaying the target. This finding is further confirmed in the unreported regression of the acquisition premium on interlock, final acquisition premium calculated as the final bid price per share from SDC divided by the target's stock price 42 trading days prior to announcement, less one. The coefficient on INTERLOCK is -0.027, negative and statistically insignificant from zero (not tabulated). If the existence of an interlock makes the acquirer overpay the target due to self-dealing incentives or familiarity bias, the premium should be higher and the target should have a higher announcement return, *ceteris paribus*. The existence of interlocks does not appear to impact post-merger performance. The coefficient on INTERLOCK in

regression of  $\Delta\text{ROA}$  is statistically insignificant. In general, the result is consistent with the notion that interlocks lead to value-reducing acquisitions for acquirers.

Table 4: Cross-sectional regression analysis of merger performance and interlock

This table presents cross-sectional regression results. The announcement return regressions use the whole sample of 2,194 bids, whereas post-merger performance regressions use the 1,738 completed deals. Target, acquirer, and combined firm 3-day CARs (CAR3) are calculated over the event window [-1, +1]. Good (Bad) Deal is an indicator variable that takes the value of one if the acquirer's 3-day CAR is in the top (bottom) quintile, and zero otherwise.  $\Delta$ ROA is the difference between the post-merger 3-year average of industry-adjusted ROA and the pre-merger corresponding measure. INTERLOCK is an indicator variable equal to one if there is at least one person employed by both target and bidder as either director or top executive within 3 years before the announcement, and zero otherwise. Target and acquirer characteristics are computed using firm data from the fiscal year immediately preceding the announcement date. Tobin's Q is proxied by the industry-adjusted market-to-book assets ratio. Leverage is book value of debt divided by book asset. Cash flow is operating income before depreciation (Item 13). Relative Deal Value is transaction value divided by equity market capitalization of the acquirer at 20 days prior to announcement date. Diversifying Merger, All Stock, and All Cash are indicator variables equal to one for bids with targets in different industries defined by the 2-digit SIC code from the acquirer, if only equity is used to pay for the acquisition or if only cash is used, respectively, and zero otherwise. Corresponding p-value is reported in the parentheses. \*\*\*, \*\*, \* denote statistical significance at the 1%, 5%, and 10% level, respectively.

Table 4 (continued)

	Acquirer CAR3	Target CAR3	Combined CAR3	$\Delta$ ROA	Good Deal	Bad Deal
INTERLOCK	-0.013 *	0.008	-0.013 *	0.001	-0.142	0.669 ***
	(0.059)	(0.663)	(0.085)	(0.971)	(0.551)	(0.002)
Log asset	-0.002 **	-0.005 *	0.000	0.004	-0.078 **	-0.007
	(0.035)	(0.092)	(0.968)	(0.399)	(0.032)	(0.852)
Q	-0.004 ***	-0.016 ***	-0.003 ***	0.019 ***	-0.011	0.080 ***
	(0.000)	(0.000)	(0.003)	(0.000)	(0.732)	(0.008)
Leverage	0.005	0.025	-0.005	-0.078	0.085	-0.546
	(0.668)	(0.379)	(0.675)	(0.124)	(0.813)	(0.155)
CF to Asset	-0.033 **	0.039	-0.012	-0.953 ***	-1.031 **	0.301
	(0.017)	(0.153)	(0.447)	(0.000)	(0.014)	(0.488)
Relative Deal Value	-0.032 ***	-0.095 ***	0.046 ***	0.041 *	0.248	1.838 ***
	(0.000)	(0.000)	(0.000)	(0.098)	(0.184)	(0.000)
All Stock	-0.016 ***	-0.031 ***	-0.021 ***	0.034 *	-0.090	0.746 ***
	(0.000)	(0.004)	(0.000)	(0.056)	(0.520)	(0.000)
All Cash	0.023 ***	0.050 ***	0.035 ***	0.025	0.621 ***	-0.796 ***
	(0.000)	(0.001)	(0.000)	(0.291)	(0.000)	(0.002)
Diversifying Merger	0.003	-0.006	-0.001	0.026	0.040	-0.175
	(0.495)	(0.603)	(0.842)	(0.178)	(0.773)	(0.251)
Year and Industry fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R2	7.6%	9.0%	9.4%	20.4%	7.9%	16.8%
Num of obs.	2,194	2,124	2,124	1,738	2,194	2,194

## Chapter 5: Evidence on the Two Hypotheses

If an interlock between the acquirer and target leads to a value-destroying merger decision due to an agent's self-dealing behavior or cognitive bias, the acquirer's pre-merger governance should alleviate the agency cost by preventing low-quality deals from being announced or completed. On the other hand, the cross-sectional variation of the target's opacity would also affect the relationship between merger performance and interlock if interlock efficiently transfers information from target to acquirer. Besides the wealth effect, the information hypothesis also predicts a higher likelihood of observing stock as the method of payment. If an interlock reduces the information asymmetry between the two firms, the target is more willing to accept a contingent payment, *ceteris paribus*. This positive impact should be higher if the acquirer's stock value is more opaque. This section investigates these predictions of the two hypotheses.

### 5.1 Wealth effect of interlock and corporate governance in acquirer

Following Bizjak, Lemmon, and Whitby (2009), I use director ownership as a proxy of corporate governance. Intuitively, if the stock and option ownership of the board as a group is high, the directors' interests are well aligned with the shareholders' and the directors will therefore have a stronger incentive to monitor managerial behavior, including acquisition activity. Specifically, I construct an indicator variable equal to one if the pre-merger director ownership in the acquiring firm is above the annual industry median, and zero otherwise. The data on director ownership come from a combination of Compact Disclosure and IRRC, the availability of which reduces the sample size to 1,507. The use of an indicator variable follows the measure of governance in Harford and Li (2007), who use an indicator variable, Strong Board, set equal to one for firms in

which CEOs' tenure is below the annual median. The purpose is to mitigate the noise contained in the excessive variation of director ownership or CEO tenure. All results hold if the continuous level of director ownership is used instead.

Table 5 presents the results from OLS regressions of different measures of merger performance on the key variable and control variables. The setting is similar to baseline models presented in Table 4, with two key variables introduced: the pre-merger acquirer governance and the interaction term between interlock and governance. The coefficients on the interaction term are significantly positive in regressions of the acquirer's CAR, combined CAR, and accounting performance  $\Delta$ ROA. When the acquirer is strongly governed, an interlocked deal is associated with a higher acquirer CAR (6.9%) and higher combined CAR (5%), compared with a non-interlocked deal. Notably, the coefficient on the interaction term is 0.144 in the model of change in ROA, significant both statistically and economically, which is more than four times as high as the unconditional sample mean (0.033). Compared with the insignificant coefficient on INTERLOCK without controlling for acquirer governance, this result means the interlocked acquisition leads to a dramatic increase in operating performance only when the incentives of the board of director are well aligned.

The positive impacts on stock and operating performance can result from synergies of acquisitions that may not be initiated without an interlock due to asymmetric information. In contrast, a weakly governed acquirer suffers more when interlocked with the target. The acquirer's CAR, combined CAR, and  $\Delta$ ROA are, respectively, 5.7%, 5.2%, and 0.09 lower than those in a non-interlocked deal. This finding is consistent with the prediction of the agency hypothesis that if the board fails to monitor the acquisition



behavior, the deal facilitated by the interlocked person destroys value. The estimates from the logit regression with Good Deal and Bad Deal indicator variables as the dependent variable are consistent with that of acquirer's CAR. The evidence that good pre-merger governance of the acquirer mitigates the negative wealth effect of interlocks supports the agency hypothesis.<sup>7</sup>

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<sup>7</sup> Results are generally robust to the use of G-index as the proxy for corporate governance, but slightly weaker.

Table 5: The effect of corporate governance on wealth effect of interlock

This table presents cross-sectional regression results controlling for corporate governance. The announcement return regressions use the whole sample of 2,194 bids, whereas post-merger performance regressions use the 1,738 completed deals. Target, acquirer, and combined firm 3-day CARs (CAR3) are calculated over the event window [-1, +1]. Good (Bad) Deal is an indicator variable equal to one if acquirer's 3-day CAR is in the top (bottom) quintile, and zero otherwise.  $\Delta$ ROA is the difference between the post-merger 3-year average of industry-adjusted ROA and the pre-merger corresponding measure. INTERLOCK is an indicator variable equal to one if there is at least one person employed by both target and bidder as either director or top executive within 3 years before the announcement, and zero otherwise. DirOwn is an indicator variable equal to one if the pre-merger director ownership in the acquiring firm is above the annual industry median, and zero otherwise. Target and bidder characteristics are computed using firm data from the fiscal year immediately preceding the announcement. See Table 4's description for definitions of common control variables. Corresponding p-value is reported in the parentheses. \*\*\*, \*\*, \* denote statistical significance at the 1%, 5%, and 10% level, respectively.

	Acquirer CAR3	Target CAR3	Combined CAR3	Delta ROA	Good Deal	Bad Deal
INTERLOCK	-0.057 *** (0.000)	-0.049 (0.134)	-0.052 *** (0.000)	-0.090 ** (0.024)	-1.463 ** (0.021)	1.281 *** (0.001)
INTERLOCK *DirOwn	0.069 *** (0.000)	0.052 (0.253)	0.050 *** (0.005)	0.144 *** (0.007)	1.457 * (0.053)	-1.485 ** (0.012)
DirOwn	0.000 (0.962)	-0.012 (0.380)	0.004 (0.407)	-0.015 (0.370)	-0.070 (0.683)	0.032 (0.864)
Log asset	-0.004 *** (0.005)	-0.006 (0.104)	-0.003 ** (0.017)	0.010 ** (0.018)	-0.116 ** (0.022)	0.060 (0.233)
Q	-0.005 *** (0.000)	-0.017 *** (0.000)	-0.005 *** (0.000)	0.002 (0.632)	0.010 (0.810)	0.090 ** (0.033)
Leverage	0.002 (0.866)	0.012 (0.731)	0.002 (0.866)	-0.084 * (0.074)	0.252 (0.596)	-0.801 (0.117)
CF to Asset	-0.015 (0.376)	-0.003 (0.928)	0.005 (0.805)	-0.642 *** (0.000)	-0.504 (0.366)	0.408 (0.504)
Relative Deal Value	-0.039 *** (0.000)	-0.093 *** (0.000)	0.029 *** (0.000)	0.041 * (0.071)	0.074 (0.769)	2.262 *** (0.000)
All Stock	-0.016 *** (0.001)	-0.042 *** (0.001)	-0.024 *** (0.000)	0.023 (0.142)	-0.119 (0.508)	0.740 *** (0.000)
All Cash	0.025 *** (0.000)	0.049 *** (0.004)	0.032 *** (0.000)	0.023 (0.255)	0.723 *** (0.001)	-1.170 *** (0.001)
Diversifying Merger	0.003 (0.549)	-0.004 (0.799)	0.002 (0.667)	0.011 (0.516)	0.054 (0.764)	-0.244 (0.234)
Year and Industry FE.	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R2	10.5%	8.5%	10.3%	12.4%	11.2%	22.4%
Num of obs.	1,507	1,462	1,462	1,218	1,507	1,507

## 5.2 Wealth effect of interlock and information asymmetry of target

I test the information hypothesis by including an interaction term between information asymmetry measures and INTERLOCK in the regression of merger performance. If an interlock helps transfer information about the target to the acquirer or vice versa, it should be more valuable when the target value is opaque to the acquirer. Therefore, the benefit of interlock should be more pronounced. Table 6 reports estimates from OLS regression, including the information asymmetry measures, controlling for the acquirer's governance. I use different measures for target information asymmetry in Panel A and Panel B. HighStdDev and HighR&D are indicator variables with value of one if the target's standard deviation of earnings forecasts from I/B/E/S or R&D is higher than the sample median, respectively, and zero otherwise.

Panel A shows that the acquirers interlocked to targets with higher dispersion in earnings forecasts gain 3.8% more than non-interlocked acquirers acquiring similar targets. The combined CAR for interlocked bids is higher by 4.2%. The long-run effect is even more economically significant: the increase in ROA for the interlocked deals with less transparent targets is 0.088 more than the non-interlocked deals, more than three times the subsample mean (0.029). The sign of INTERLOCK alone remains significantly negative, and the sign of the interaction term between the acquirer's governance and interlock remains significantly positive. In Panel B, R&D is the proxy for target information asymmetry. The results are, in general, consistent with Panel A, except that combined CAR is statistically insignificant. A possible explanation is that R&D can also proxy for growth opportunities in the target, and therefore is by itself positively correlated with target announcement return, with significant correlation coefficient of

4.3%. This alternative explanation is unrelated to the existence of interlocks. Therefore, the effect of interlocks on combined CAR is diluted by the target and becomes insignificant. The long-run operating performance, in contrast, shows a larger difference between interlocked deals and non-interlocked deals, compared with the coefficient in Panel A.

The evidence supports the prediction that interlocks help alleviate information asymmetry between target and acquirer. There is thus a trade-off between cost and benefit for the acquirer to take over a target with which it shares key personnel.

Table 6: The effect of information asymmetry on announcement effect of interlock

This table presents cross-sectional regression results controlling for information asymmetry. Of the 2,194 bids, 140 (6.38%) are interlocked. Target, acquirer, and combined firm 3-day CARs (CAR3) are calculated over the event window [-1, +1].  $\Delta$ ROA is the difference between the post-merger 3-year average of industry-adjusted ROA and the pre-merger corresponding measure. INTERLOCK is an indicator variable equal to one if there is at least one person employed by both target and bidder as either director or top executive within 3 years before the announcement, and zero otherwise. DirOwn is an indicator variable equal to one if the pre-merger director ownership in the acquiring firm is above the annual industry median, and zero otherwise. HighR&D and HighStdDev are indicator variables equal to one if the target's R&D and the standard deviation of earnings forecasts are higher than the sample median, respectively, and zero otherwise. Target and bidder characteristics are computed using firm data from the fiscal year immediately preceding the announcement date. See Table 4's description for definitions of common control variables. Corresponding p-value is reported in the parentheses. \*\*\*, \*\*, \* denote statistical significance at the 1%, 5%, and 10% level, respectively.

Table 6 (continued)

Panel A: Dispersion of analyst forecasts of target earnings as measure of information asymmetry

	Acquirer CAR3	Target CAR3	Combined CAR3	$\Delta$ ROA
INTERLOCK	-0.080 *** (0.000)	-0.070 (0.108)	-0.074 *** (0.000)	-0.146 *** (0.001)
INTERLOCK* HighStdDev	0.038 ** (0.033)	0.036 (0.451)	0.042 ** (0.016)	0.088 * (0.061)
HighStdDev	-0.005 (0.297)	0.004 (0.766)	-0.001 (0.822)	0.008 (0.567)
INTERLOCK*DirOwn	0.065 *** (0.000)	0.048 (0.290)	0.039 ** (0.022)	0.145 *** (0.001)
DirOwn	0.000 (0.957)	-0.012 (0.365)	0.005 (0.297)	-0.025 * (0.083)
Log Asset	-0.004 *** (0.005)	-0.006 * (0.096)	-0.003 ** (0.011)	0.007 * (0.068)
Q	-0.005 *** (0.000)	-0.017 *** (0.000)	-0.004 *** (0.001)	0.006 * (0.098)
Leverage	0.001 (0.915)	0.013 (0.717)	0.001 (0.914)	-0.081 ** (0.043)
CF to Asset	-0.014 (0.418)	0.000 (0.995)	0.002 (0.931)	-0.687 *** (0.000)
Relative Deal Value	-0.039 *** (0.000)	-0.093 *** (0.000)	0.030 *** (0.000)	0.032 * (0.097)
All Stock	-0.016 *** (0.001)	-0.042 *** (0.001)	-0.021 *** (0.000)	0.017 (0.195)
All Cash	0.025 *** (0.000)	0.049 *** (0.004)	0.031 *** (0.000)	0.023 (0.179)
Diversifying Merger	0.003 (0.636)	-0.004 (0.793)	0.004 (0.489)	0.006 (0.685)
Year and Industry Fixed Effects	Yes	Yes	Yes	Yes
Adjusted R-square	10.7%	8.4%	10.6%	20.1%
Number of Observations	1,507	1,462	1,462	1,218

Table 6 (continued)

## Panel B: Target R&amp;D expenditure as measure of information asymmetry

	Acquirer CAR3	Target CAR3	Combined CAR3	$\Delta$ ROA
INTERLOCK	-0.086 *** (0.000)	-0.063 (0.227)	-0.068 *** (0.001)	-0.178 *** (0.002)
INTERLOCK*HighR&D	0.038 * (0.068)	0.020 (0.722)	0.025 (0.234)	0.104 * (0.081)
HighR&D	0.007 (0.272)	0.043 ** (0.012)	0.008 (0.217)	-0.015 (0.392)
INTERLOCK*DirOwn	0.066 *** (0.000)	0.050 (0.268)	0.041 ** (0.014)	0.149 *** (0.001)
DirOwn	0.000 (0.976)	-0.011 (0.401)	0.006 (0.274)	-0.023 (0.100)
Log Asset	-0.004 *** (0.005)	-0.006 (0.125)	-0.003 ** (0.015)	0.008 ** (0.039)
Q	-0.005 *** (0.000)	-0.017 *** (0.000)	-0.004 *** (0.001)	0.006 * (0.082)
Leverage	0.003 (0.801)	0.015 (0.662)	0.003 (0.817)	-0.086 ** (0.032)
CF to Asset	-0.014 (0.409)	0.011 (0.745)	0.000 (0.991)	-0.700 *** (0.000)
Relative Deal Value	-0.039 *** (0.000)	-0.094 *** (0.000)	0.031 *** (0.000)	0.035 * (0.069)
All Stock	-0.016 *** (0.001)	-0.041 *** (0.002)	-0.021 *** (0.000)	0.019 (0.151)
All Cash	0.025 *** (0.000)	0.050 *** (0.003)	0.031 *** (0.000)	0.024 (0.169)
Diversifying Merger	0.003 (0.632)	-0.003 (0.826)	0.004 (0.486)	0.005 (0.723)
Year and Industry Fixed Effects	Yes	Yes	Yes	Yes
Adjusted R-square	10.7%	8.8%	10.5%	20.0%
Number of Observations	1,507	1,462	1,462	1,218

### 5.3 Interlock and the distribution of transaction surplus

So far the attention of this paper has been focused on the return matrix. To provide a comprehensive analysis of the impact of interlock on shareholders' wealth, I also estimate the dollar value wealth created in merger transactions and investigate the distribution of total surplus between the acquirer and the target. While abnormal stock return measures the absolute wealth effect to shareholders, proportional dollar value wealth is a better proxy for the negotiated allocation of surplus. Following Bates, Lemmon, and Linck (2006), I calculate the change in market value ( $\Delta MV$ ) of each firm as the product of pre-bid market value on 2 days prior to the announcement and the 3-day CAR. Total market value change is the sum of the changes in acquirer market value and target market value, with acquirer's toehold adjusted. The variable of interest is the share of total gains or losses accrued to acquirer shareholders, calculated as the change in acquirer's market value divided by total market value change.

According to the agency hypothesis, an interlocking agent, regardless of being concurrent or lagged interlock, may have stock ownership with both the acquiring firm and the target. She thus has incentive to act in favor of the firm where the value of personal wealth is higher, which often means hurting the other firm. I measure the relative ownership by the difference between the interlocking agent's dollar value wealth in the acquirer and in the target, scaled by the sum of her wealth in the two firms. Table 7 shows the OLS regression of fractional surplus to the acquirer on interlocking agent's relative ownership in the acquirer and control variables. The sample includes 98 transactions where individual stock ownership of the interlocking agent is available at



both firms. Due to the small sample size, year and industry fixed effects are not included in this regression.

Model 1 suggests that the proportional surplus distributed to the acquirer is positively correlated with the interlocking agent's relative ownership in the acquirer. The coefficient on relative ownership indicates that if the interlocking agent's ownership in acquirer stock worth 1% more than her ownership in target stock, the acquirer gains 0.229% more of the total surplus than an acquirer whose interlocking agent owns equal amount in both firms. The dependent variables in Model 2 and 3 of Table 7 are the changes in acquirer market value and target market value, respectively. The significantly positive sign of relative ownership in Model 2 and negative sign in Model 3 further support the prediction that a self-dealing agent will exert influence in the negotiation process, and act in favor of the shareholders to whom her interest is better aligned.

Table 7: Interlock and the distribution of transaction surplus

This table presents OLS regressions of the fractional surplus to the acquirer on interlocking agent's relative ownership in the acquirer and control variables. The sample includes 98 transactions where individual stock ownership of the interlocking agent is available at both firms. The dependent variables are the share of total surplus accrued to acquirer shareholders, the change in acquirer market value, and the change in target market value. Share of total surplus to acquirer is calculated as the change in acquirer market value divided by total market value change. Change in market value ( $\Delta MV$ ) of is the product of pre-bid market value on 2 days prior to the announcement and the 3-day CAR. Total market value change is the sum of the changes in acquirer market value and target market value, with acquirer's toehold adjusted. RelativeOwn is the difference between the interlocking agent's dollar value wealth in the acquirer and in the target, scaled by the sum of her wealth in the two firms. See Table 4's description for definitions of common control variables. \*\*\*, \*\*, \* denote statistical significance at the 1%, 5%, and 10% level, respectively.

Parameter	Share of surplus to Acquirer (%)	$\Delta MV$ of Acq (\$)	$\Delta MV$ of Tgt (\$)
Intercept	0.086 (0.822)	3.373 ** (0.045)	-1.728 *** (0.004)
RelativeOwn	0.229 * (0.071)	0.950 * (0.086)	-0.342 * (0.077)
Log asset	-0.083 (0.146)	-0.933 *** (0.000)	0.448 *** (0.000)
Q	0.056 (0.168)	-0.145 (0.411)	0.133 ** (0.032)
Leverage	0.597 (0.118)	1.700 (0.307)	-0.623 (0.284)
CF to Asset	-0.222 (0.610)	-0.109 (0.954)	-0.168 (0.800)
Relative Deal Value	-0.122 (0.611)	2.113 ** (0.046)	-0.890 ** (0.016)
All Stock	-0.106 (0.523)	-1.303 * (0.074)	0.516 ** (0.043)
Tender Offer	-0.095 (0.744)	0.244 (0.847)	-0.034 (0.938)
Multiple Bid	0.183 (0.687)	0.937 (0.637)	-0.422 (0.542)
Year and Industry Fixed Effects	No	No	No
Adjusted R-square	5.5%	12.3%	25.5%
Number of Observations	98	98	98

#### 5.4 Interlock and the choice of payment method

In addition to its wealth effect, an interlock between the acquirer and the target also impacts the choice of payment method, that is, whether the acquirer chooses to use equity or cash or a mixture of both to pay for the acquisition. The empirical literature has found that overvaluation of its stock gives the acquirer more incentive to do a stock deal. However, from the target's perspective, if the acquirer's stock value is opaque, the target may refuse to accept stock payment or require a higher premium to compensate for the potential loss. Therefore, uncertainty about the acquirer's stock value should be negatively associated with the use of stock as payment, *ceteris paribus*. According to the information hypothesis, interlocks reduce the information asymmetry between the two firms, which predicts a higher likelihood of stock payment when the two firms are interlocked. The agency hypothesis has no clear prediction on this issue.

Table 8, Panel A presents the results from logistic regressions of the choice of payment method on INTERLOCK and control variables. The dependent variable is an indicator variable equal to one if the acquisition is paid solely in acquirer's stock, and zero otherwise. Marginal effects are calculated as the change in the probability given a one standard deviation increase in continuous variables, or a shift from zero to one in indicator variables, holding all other variables at their means. INTERLOCK is significantly positive in the baseline model; that is, when the two firms share a common director or officer, the likelihood of pure stock payment is higher by 15.1%. Model (2) introduces acquirer opacity and shows that interlocks increase the likelihood of using stock payment by 18.6% only for opaque acquirers. It is interesting to observe that the positive effect of INTERLOCK is absorbed by its interaction term with acquirer opacity,

indicating that the existence of interlock mostly helps the acquirers that have difficulties conveying their stock value, but not the transparent acquirers. The negative sign on the analysts' forecasts dispersion of the acquirer is consistent with the intuition that targets are reluctant to accept acquirers' stock for which analysts have very different forecasts.

Table 8: Logistic model of the choice of payment method

Panel A presents a logistic model of the relation between the choice of stock as payment method and the existence of interlock. The dependent variable is an indicator variable equal to one if the acquisition is paid in 100% stock equity, and zero otherwise. 1,111 bids are pure stock bids. Panel B presents regression results of merger premium on the existence of interlock. The dependent variable is final premium, computed as the final bid price per share divided by the target's share price 42 trading days prior to the announcement date, less one. INTERLOCK is an indicator variable equal to one if there is at least one person employed by both target and bidder as either director or top executive within 3 years before the announcement, and zero otherwise. HighStdDev is an indicator variable equal to one if the acquirer's (target's) standard deviation of earnings forecasts is higher than the sample median, and zero otherwise. P/B is an indicator variable equal to one if the acquirer's price-to-book ratio is higher than the sample median, and zero otherwise. Relative Cash is cash reserve divided by the transaction value of the deal. Runup is the acquirer's or target's stock price on day -42 divided by its stock price on day -2. Market RunUp is the corresponding measure calculated using CRSP market index. Poison Pill is an indicator variable equal to one if the target adopts the poison pill clause. Positive Toehold is an indicator variable equal to one if the acquirer's ownership in the target is non-zero prior to the announcement. See Table 4's description for definitions of common control variables. Marginal effects are provided in parentheses, as the change in the probability given a one standard deviation increase in continuous variables, or a shift from zero to one in indicator variables, holding all other variables at their means. \*\*\*, \*\*, \* denote statistical significance at the 1%, 5%, and 10% level, respectively.

Table 8 (continued)

## Panel A: Logistic model of the choice of payment method

Parameter	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)
Intercept	-1.330	-0.990	-0.828	-1.499	-1.394
Interlock	0.603 ** (0.151)	0.124 (0.031)	0.419 (0.105)	0.968 *** (0.242)	0.970 *** (0.242)
HighStdDev (Acquirer)		-0.205 * (-0.051)	-0.218 * (-0.054)	-0.068 (-0.017)	-0.086 (-0.021)
INTERLOCK * HighStdDev (Acquirer)		0.743 * (0.186)	0.918 * (0.229)		
HighStdDev (Target)			0.274 * (0.069)		
INTERLOCK * HighStdDev (Target)			-0.746 (-0.186)		
P/B				0.590 *** (0.147)	0.584 *** (0.146)
INTERLOCK * P/B				-0.797 * (-0.199)	-1.095 * (-0.274)
INTERLOCK * P/B * HighStdDev (Acquirer)					0.464 (0.116)
Relative Cash	-0.099 *** (-0.079)	-0.092 ** (-0.073)	-0.096 ** (-0.077)	-0.079 ** (-0.063)	-0.078 ** (-0.063)
Log asset	-0.011 (-0.006)	-0.016 (-0.008)	-0.022 (-0.011)	-0.027 (-0.014)	-0.026 (-0.014)
Q	0.219 *** (0.099)	0.211 *** (0.096)	0.212 *** (0.096)	0.161 *** (0.073)	0.163 *** (0.074)
Runup (Acquirer)	0.127 * (0.031)	0.132 * (0.032)	0.131 * (0.032)	0.067 (0.016)	0.071 (0.017)
Market Runup	0.763 (0.031)	0.756 (0.031)	0.785 (0.032)	0.542 (0.022)	0.547 (0.023)
Diversifying Merger	-0.169 (-0.042)	-0.182 (-0.046)	-0.172 (-0.043)	-0.192 (-0.048)	-0.196 (-0.049)
Multiple Bid	-0.781 *** (-0.195)	-0.771 *** (-0.193)	-0.764 *** (-0.191)	-0.803 *** (-0.201)	-0.799 *** (-0.200)
Tender Offer	-3.497 *** (-0.874)	-3.504 *** (-0.876)	-3.513 *** (-0.878)	-3.578 *** (-0.895)	-3.584 *** (-0.896)
Year and Industry fixed effect	Yes	Yes	Yes	Yes	Yes
Pseudo Rsq	0.261	0.263	0.264	0.270	0.270
num of obs	1,906	1,906	1,906	1,903	1,903

Table 8 (continued)

## Panel B: OLS regression of the merger premium

Parameter	Model (1)	Model (2)
INTERLOCK	0.001 (0.966)	0.032 (0.329)
P/B	0.023 ** (0.043)	0.026 ** (0.025)
INTERLOCK * P/B		-0.049 (0.237)
Log asset	-0.008 ** (0.023)	-0.008 ** (0.021)
Q	-0.011 *** (0.001)	-0.010 *** (0.002)
Leverage	-0.032 (0.339)	-0.029 (0.382)
CF to Asset	0.019 (0.497)	0.017 (0.542)
Runup (Target)	0.471 *** (0.000)	0.472 *** (0.000)
Hostile	0.116 *** (0.004)	0.116 *** (0.004)
Poison Pill	-0.075 (0.384)	-0.074 (0.391)
Multiple Bid	0.023 (0.247)	0.023 (0.251)
Tender Offer	-0.015 (0.725)	-0.015 (0.718)
Positive Toehold	0.057 (0.122)	0.053 (0.147)
Relative Deal Value	-0.006 (0.710)	-0.006 (0.737)
Diversifying Merger	-0.007 (0.597)	-0.007 (0.589)
Year and Industry FE.	Yes	Yes
Adjusted R2	33.1%	33.1%
Num of observations	1,396	1,396

The information asymmetry in a merger is two-sided, in which an acquirer is also uncertain about the target's value and thus wants to use its stock as contingent payment to reduce the cost of overpayment (Hansen, 1987). Therefore it is also interesting to test whether interlocks transfer non-public information about the target and further reduce the necessity of using stock as protection against "lemons". Model (3) includes the target's analysts' forecast dispersion and the sign is significantly positive; that is, if the target's future cash flow is opaque, the acquirer has more difficulty estimating the synergy, and the value of contingent payment is more pronounced. The interaction term between the target's opacity and INTERLOCK is negative as predicted but not statistically significant.

The control variables have signs that are consistent with the previous literature: the acquirer is more likely to use equity as payment when it has less cash in hand, when the target has more growth opportunities (measured by Q), when the acquirer's equity is overvalued (measured by run-up), when there is not competing bid on the target, and when it is not a tender offer.

One of the concerns for target shareholders is that the acquirer may use overvalued stock as currency to purchase the less overvalued or even undervalued assets. Shleifer and Vishny (2003) and Rhodes-Kropf and Viswanathan (2004) propose models in which the target management accepts overvalued stock either due to a short time-horizon or due to overestimation of the merger synergies, which is positively correlated with the market valuation. Empirical studies document that the incidence of all-stock acquisitions increases with acquirer's stock valuation (Rhodes-Kropf, Robinson, and Viswanathan, 2005; Ang and Cheng, 2006; Dong, Hirshleifer, Richardson, and Teoh, 2006).



I follow Dong, Hirshleifer, Richardson, and Teoh (2006) by using price-to-book ratio as a proxy of the acquirer's stock misvaluation. P/B is an indicator variable equal to one if the acquirer's price-to-book ratio is higher than the sample median, and zero otherwise. The information hypothesis predicts that interlocks alleviate the information asymmetry between acquirers and targets. If target management accepts overvalued stock because they overestimate the synergy created in the merger, the existence of an interlock will reduce such overestimation and overvalued acquirer's stock will be rejected. Model (4) and (5) in Table 8, Panel A show that an acquirer with higher price-to-book ratio is more likely to make an all-stock offer by 14.7%, compared with fairly-valued acquirers. But when it shares a common director or officer with the target, the acquirer is less likely to use its stock by 20%. This effect does not depend on the opacity of acquirers.

The relationship between merger premium and interlocks further supports the information hypothesis. Panel B of Table 8 shows the OLS regression results of merger premium on INTERLOCK and control variables. The dependent variable is final premium, computed as the final bid price per share divided by the target's share price 42 trading days prior to the announcement date, less one. This test is restricted to 1396 bids where bidder's stock consists at least 50% of the payment and where the final price per share is available from SDC. As indicated in Panel B, the overvaluation of bidder's stock, measured by P/B, leads to higher premium, whereas the coefficient of the interaction term between P/B and INTERLOCK is negative, although not statistically significant. A possible explanation is that on the one hand, a target observes higher P/B of the bidder therefore negotiates for higher premium. On the other hand, an interlock reduces the use

of overvalued stock by alleviating target's overestimation of merger synergy, therefore the surviving bids are associated with lower misperception and a lower premium.

## Chapter 6: Further Empirical Evidence on Merger Characteristics

To better understand the wealth effect of interlock between acquirer and target, I further investigate whether interlocks influence other aspects of M&A. I test whether acquisition is more likely to occur between two firms with a common director or officer in the first place. I then examine the relationship between interlock and the rate of deal completion.

### 6.1 Probability of acquisition and interlocks

Both the agency hypothesis and information hypothesis predict that when searching for a potential buyer (seller), a firm is more likely to choose another firm with which it shares a connection. On the one hand, individual ownership and personal connections at the other firm give an interlock director/officer the incentive to vote for her other employer. On the other hand, interlock may facilitate information transfer between the two firms therefore reduce the remarkable search cost. In this section, I follow Ishii and Xuan (2010) and calculate the expected rate of interlock between two firms, an indirect approach to test the relation between interlock and acquisition.

The first row of Table 9 represents the 2,194 pairs of sample acquirers and targets, 140 (6.38%) of which are identified as interlocked bids. For each bid, I associate the sample acquirer with a “random target”, a firm drawn randomly from the sample target’s industry (same 2-digit SIC code) in the announcement year. The 2,194 random-match pairs are then merged with a director/officer dataset from Compact Disclosure and identified whether there is an interlock between the two firms or not. This procedure is repeated for 500 times and Row (2) reports the average number and percentage of interlocks. There are 8.3 (0.38%) interlocks on average from the 500 iterations. Similarly,

I form pairs of sample targets and random acquirers and identify 7.4 (0.34%) interlocks in the simulated sample. Row (4) represents simulated pairs in which a random firm from the acquirer's industry is matched to a random firm from the target's industry.

Table 9: Probability of acquisition and interlocks

This table tests whether the probability of acquisition is higher if the acquirer and target are interlocked. Two firms are defined as interlocked if at least one person is employed by both firms as either a director or a top executive within 3 years before the announcement. Of the 2,194 bids, 140 (6.38%) are interlocked. The second column reports the total number of pairs in which two firms are interlocked; and the third column reports the significance level of Row (2)–(4) from Row (1). Row (1) represents the 2,194 pairs of acquirer and target in the event sample used in this study. Row (2) represents pairs of a sample acquirer and a random target-match, which is a random firm with the same 2-digit SIC code as the sample target in the acquisition announcement year. The summary statistics are based on the procedure being repeated 500 times. Row (3) represents pairs of a sample target and a random acquirer-match. Row (4) represents pairs of a random acquirer-match and a random target-match. \*\*\*, \*\*, \* denote statistical significance at the 1%, 5%, and 10% level, respectively.

		# of interlocked bids	% of interlocked bids	Difference from (1)
Sample Acquirers and Sample Targets	(1)	140	6.38%	
Sample Acquirers and Random Targets	(2)	8.3	0.38%	***
Random Acquirers and Sample Targets	(3)	7.4	0.34%	***
Random Acquirers and Random Targets	(4)	4.7	0.21%	***

The statistics in Rows (2)–(4) shows the expected likelihood of an interlock between a potential pair of acquirer and target. The matching approach takes industry effect and year effect into account. Compared with the result in Ishii and Xuan (2010) that the observed level of social connection between actual acquirers and targets is more than twice as high as that between potential acquirers and targets, the evidence here on interlock is much stronger. The average ratio of interlock between potential acquirers and targets is only 0.21%, compared with 6.38% in the actual merger event sample. In other words, the occurrence of acquisition is strongly correlated with the existence of interlock.

## 6.2 Interlock and deal completion

I also test whether interlocks influence deal completion. Table 10 tabulates the coefficient estimates from a logistic regression, in which the dependent variable is an indicator variable, equal to one if the transaction is consummated and zero otherwise. Marginal effects are calculated as the change in the probability given a one standard deviation increase in continuous variables, or a shift from zero to one in indicator variables, holding all other variables at their means.

The coefficient of interlock in the baseline model is 0.87, corresponding to an increase of 12.7% in the likelihood of deal completion if the two firms share a director or officer. Model (2) shows that if there are multiple bids, the sample bidder is less likely to win the auction and complete the acquisition. However, given the existence of competing bids, an interlocked bidder has a 23% higher chance of winning the auction and closing the deal. This difference is both statistically and economically significant, implying less information asymmetry between the two firms or a lower standard of due diligence. Model (3) and (4) include combined CAR and final premium, both of which have

positive sign but are not significant when interacted with INTERLOCK. This evidence shows that when merger performance is lower, the existence of interlock does not help stop a seemingly unprofitable transaction.

Table 10: Logistic regression analysis of deal completion and interlock

This table presents a logistic model of the relation between the probability of a deal being completed and the existence of interlock. The dependent variable is an indicator variable equal to 1 for completed bids, and zero otherwise. Of the 2,194 bids, 1,738 bids are completed. INTERLOCK is an indicator variable equal to one if there is at least one person employed by both target and bidder as either director or top executive within 3 years before the announcement, and zero otherwise. There are 140 (6.38%) interlocked deals. Toehold is the percent of ownership in the target by the acquirer at the announcement. Final premium is calculated as the final bid price per share from SDC divided by the target's stock price 42 trading days prior to announcement, less one. Target and bidder characteristics are computed using firm data from the fiscal year immediately preceding the announcement date. See Table 4's description for definitions of common control variables. Marginal effects are provided in parentheses, as the change in the probability given a one standard deviation increase in a continuous variable, or a shift from zero to one in an indicator variable, holding all other variables constant at their means. \*\*\*, \*\*, \* denote statistical significance at the 1%, 5%, and 10% level, respectively.



Table 10 (continued)

Parameter	Model (1)	Model (2)	Model (3)	Model (4)
Intercept	-0.174 (-0.025)	-0.439 (-0.064)	-0.411 (-0.059)	-0.531 (-0.079)
INTERLOCK	0.865 *** (0.127)	0.615 * (0.090)	0.833 *** (0.120)	1.655 ** (0.245)
INTERLOCK*Multiple Bid		1.574 * (0.231)		
Multiple Bid		-2.357 *** (-0.345)	-2.360 *** (-0.339)	-2.100 *** (-0.311)
INTERLOCK*Combined CAR3			0.631 (0.091)	
Combined CAR3			1.317 * (0.189)	
INTERLOCK* Premium				-1.212 (-0.180)
Premium				0.601 ** (0.089)
Toehold		-1.489 *** (-0.218)	-1.315 *** (-0.189)	-1.167 *** (-0.173)
Tender Offer		0.937 *** (0.137)	0.909 *** (0.131)	1.072 *** (0.159)
Log Asset	0.173 *** (0.052)	0.202 *** (0.061)	0.195 *** (0.058)	0.162 *** (0.050)
Q	0.028 (0.007)	0.044 (0.012)	0.044 (0.011)	0.013 (0.004)
Leverage	-0.743 ** (-0.020)	-0.822 ** (-0.022)	-0.637 (-0.016)	-0.748 (-0.020)
CF to Asset	0.202 (0.004)	-0.010 (0.000)	0.356 (0.007)	0.981 (0.020)
Relative Deal Value	-1.069 *** (-0.051)	-0.900 *** (-0.043)	-0.996 *** (-0.047)	-1.058 *** (-0.051)
All Stock	0.047 (0.007)	-0.008 (-0.001)	0.032 (0.005)	0.046 (0.007)
All Cash	-0.347 * (-0.051)	-0.456 ** (-0.067)	-0.520 ** (-0.075)	-0.630 ** (-0.093)
Diversifying Merger	-0.139 (-0.020)	-0.152 (-0.022)	-0.121 (-0.017)	-0.247 (-0.037)
Year and Industry Fixed Effects	Yes	Yes	Yes	Yes
Pseudo R-square	11.2%	21.2%	21.5%	27.5%
Number of Observations	2,194	2,194	2,155	1,382

Note that the additional evidence of higher likelihood of mergers between interlocked firms and higher completion rate does not differentiate the two hypotheses. On the one hand, the information hypothesis predicts that interlocks facilitate transactions that otherwise may not be initiated or completed due to high search costs or high standards of due diligence. On the other hand, an interlocking agent may want to maximize her personal interest by facilitating a merger with the interlocked firm. The higher likelihood of winning an auction for an interlocked bidder may result from better knowledge of the target asset, or simply from favoritism of the target over other bidders.

## Chapter 7: Conclusion

In this paper, I investigate the role of top management and board interlocks between acquirers and targets in an M&A setting, and develop two non-mutually exclusive hypotheses. An interlocking agent may serve as a conduit of information between the two firms and reduce the cost of information gathering for both the acquirer and the target. Interlocks may also exacerbate agency problems due to conflicts of interest.

Supporting evidence is found for both hypotheses. I test for the effect of interlocks on merger characteristics and outcomes, using a sample of 2,194 bids between US public firms from 1991 to 2003, including 140 interlocked deals. Interlocked deals are more likely to use equity payment, to have higher relative deal value, and to have a target with higher Q. These characteristics are associated with more severe information asymmetry, indicating that an interlocking agent efficiently transfers information between the two firms and hence facilitates the deal that otherwise may not be initiated or completed.

Consistent with the agency hypothesis, I find the acquirer's announcement return is lower by 1.3% in an interlocked deal. A further investigation of whether the negative wealth effect of interlocks varies with the acquirer's pre-merger governance level confirms the hypothesized self-dealing behavior. Strongly governed acquirers receive higher announcement returns and have better post-acquisition performance in interlocked deals. In addition, the proportional merger surplus accrued to an acquirer is positively correlated with the interlocking agent's ownership in the acquirer relative to her ownership in the target. Consistent with the information hypothesis, when the value of

the target is opaque, interlocks are associated with higher acquirers' announcement returns and better long-term performance. Interlocked acquirers are also more likely to use equity as payment, especially when the acquirer's stock value is opaque. Target CARs are not influenced by the existence of interlock, indicating the wealth effect of interlocks on acquirers is not due to overpayment. In addition, I find acquisitions are more likely to occur between two interlocked firms and such deals have a higher completion rate.

## REFERENCES

- Ang, James, Yingmei Cheng, 2006. Direct evidence on the market-driven acquisition theory. *Journal of Financial Research* 29: 199–216.
- Bates, Thomas, Michael Lemmon. 2003. Breaking up is hard to do? An analysis of termination fee provisions and merger outcomes. *Journal of Financial Economics* 69: 469–504.
- Bates, Thomas, Michael Lemmon, James Linck. 2006. Shareholder wealth effects and bid negotiation in freeze-out deals: Are minority shareholders left out in the cold? *Journal of Financial Economics* 81: 681–708
- Bates, Thomas, Robert Parrino, Qingqing Wu. 2012. Target CEO career incentives and takeover bids.
- Beveridge, Norwood. 1992. The corporate director's fiduciary duty of loyalty: understanding the self-interested director transaction.
- Bhagat, Sanjai, Ming Dong, David Hirshleifer, Robert Noah. 2005. Do tender offers create value? New methods and evidence. *Journal of Financial Economics* 76: 3–60.
- Bizjak, John, Michael Lemmon, Ryan Whitby. 2009. Option backdating and board interlocks. *Review of Financial Studies* 22: 4821–4847.
- Boone, Audra, Harold Mulherin. 2007. How are firms sold? *Journal of Finance* 62: 847–875.
- Bruner, Robert. 2004. *Applied mergers and acquisitions*. Hoboken, New Jersey: John Wiley & Sons, Inc.
- Chen, Xia, Jarrad Harford, Kai Li. 2007. Monitoring: which institutions matter? *Journal of Financial Economics* 86: 279–305.
- Davis, Gerald. 1991. Agents without principles? The spread of the poison pill through the intercorporate network. *Administrative Science Quarterly* 36: 583–613.
- Davis, Gerald, Henrich Greve. 1997. Corporate elite networks and governance changes in the 1980s. *American Journal of Sociology* 103: 1–37.
- Davis, Gerald, Suzanne Stout. 1992. Organization theory and the market for corporate control: a dynamic analysis of the characteristics of large takeover targets. *Administrative Science Quarterly* 37: 605–633.
- Davenport, William, 1953. Effect of statutes on contracts between corporations with common directors. *Michigan Law Review* 51: 705–713

- Dong, Ming, David Hirshleifer, Scott Richardson, Siew Hong Teoh, 2006. Does investor misvaluation drive the takeover market? *Journal of Finance* 61: 725–762.
- Fich, Eliezer, Lawrence White. 2003. CEO compensation and turnover: the effects of mutually interlocked boards. *Wake Forest Law Review* 38: 935–959.
- Fligstein, Neil, Peter Brantley. 1992. Bank control, owner control, or organizational dynamics: who controls the large modern corporation? *American Journal of Sociology* 98: 280–307.
- Gompers, Paul, Joy Ishii, Andrew Metrick. 2003. Corporate governance and equity prices. *Quarterly Journal of Economics* 118: 107–155.
- Gompers, Paul, Yuhai Xuan. 2008. Bridge building in venture capital-backed acquisitions.
- Grinstein, Yaniv, Paul Hribar. 2004. CEO compensation and incentives: Evidence from M&A bonuses. *Journal of Financial Economics* 73: 119–143.
- Gulati, Ranjay, James Westphal. 1999. Cooperative or controlling? The effects of CEO-board relations and the content of interlocks on the formation of joint ventures. *Administrative Science Quarterly* 44: 473–506.
- Hallock, Kevin. 1997. Reciprocally interlocking boards of directors and executive compensation. *Journal of Financial and Quantitative Analysis* 32: 331–344.
- Hansen, Robert. 1987. A theory for the choice of exchange medium in mergers and acquisitions. *Journal of Business* 60: 75–95.
- Harford, Jarrad, Kai Li. 2007. Decoupling CEO wealth and firm performance: the case of acquiring CEOs. *Journal of Finance* 62: 917–949.
- Hartzell, Jay, Eli Ofek, David Yermack. 2004. What's in it for me? Personal benefits obtained by CEOs whose firms are acquired. *Review of Financial Studies* 17: 37–61.
- Haunschild, Pamela. 1993. Interorganizational Imitation: The impact of interlocks on corporate acquisition activity. *Administrative Science Quarterly* 38: 564–92.
- Hietala, Pekka, Steven Kaplan, David Robinson. 2003. What is the price of hubris? Using takeover battles to infer overpayments and synergies. *Financial Management* 32: 5 – 31.
- Ishii, Joy, Yuhai Xuan. 2009. Acquirer-target social ties and merger outcomes.
- Jensen, Michael. 1986. Agency costs of free cash flow, corporate finance and takeovers. *American Economic Review* 76: 323–339.

- Lane, Kenneth. 1938. Statutory regulation of dealings between corporations with interlocking directorates. *Cornell Law Quarterly* 23: 445–451.
- Larcker, David, Scott Richardson, Andrew Seary, İrem Tuna. 2006. Back door links between directors and executive compensation.
- Lehn, Kenneth, Mengxin Zhao. 2006. CEO turnover after acquisitions: are bad bidders fired? *Journal of Finance* 61: 1759–1811.
- Lindsey, Laura, 2008. Blurring firm boundaries: the role of venture capital in strategic alliances. *Journal of Finance* 63: 1137–1168.
- Mace, Myles. 1971. *Directors: Myth and reality*. Harvard Business School Press, Boston.
- Marron, Owen. 1931. Corporations: Effect upon contracts of adverse interest of directors: Interlocking directorates. *California Law Review* 19: 304–313.
- Masulis, Ronald, Cong Wang, Fei Xie. 2007. Corporate governance and acquirer returns. *Journal of Finance* 62: 1851–1889.
- Moeller, Sara, Frederik Schlingemann, Rene Stulz. 2004. Firm size and the gains from acquisitions. *Journal of Financial Economics* 73: 201–228.
- Morck, Randall, Andrei Shleifer, Robert Vishny. 1990. Do managerial objectives drive bad acquisitions? *Journal of Finance* 45: 31–48.
- Paul, Donna. 2007. Board composition and corrective action: evidence from corporate responses to bad acquisition bids. *Journal of Financial and Quantitative Analysis* 42: 759–783.
- Rhodes-Kropf, Matthew, David Robinson, S. Viswanathan, 2005. Valuation waves and merger activity: The empirical evidence. *Journal of Financial Economics* 77: 561–603.
- Rhodes-Kropf, Matthew, S. Viswanathan, 2004. Market valuation and merger waves. *Journal of Finance* 59: 2685–2718.
- Roll, Richard. 1986. The hubris hypothesis of corporate takeovers. *Journal of Business* 59: 197–216.
- Schonlau, Robert, Param Singh. 2009. Board networks and merger performance.
- Shleifer, Andrei, Robert Vishny. 2003. Stock market driven acquisitions. *Journal of Financial Economics* 70: 295–311.

- Smith, Clifford, Ross Watts. 1992. The investment opportunity set and corporate financing, dividend and compensation policies. *Journal of Financial Economics* 32: 263–292.
- Stuart, Toby, Soojin Yim. 2010. Board interlocks and the propensity to be targeted in private equity transactions. *Journal of Financial Economics* 97: 174–189.
- Vafeas, Nikos. 1999. Board meeting frequency and firm performance. *Journal of Financial Economics* 53: 113–142.
- Vedia, Fernando. 1956. Dealings between directors and their corporations in Argentine and American law. *American Journal of Comparative Law* 5: 497–504
- Wulf, Julie. 2004. Do CEOs in mergers trade power for premium? Evidence from mergers of equals. *Journal of Law, Economics, and Organization* 20: 60–101.