The Hong Kong Polytechnic University

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Information Asymmetry In the Takeover Market

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CERTIFICATE OF ORIGINALITY

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_____ **(Signed)**

Lin LI **(Name of student)**

DEDICATION

To my parents,

But how much love has the inch-long grass

For three spring months of the light of the sun?

“Information Asymmetry In The Takeover Market”

Submitted by Lin LI

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Abstract

There are many takeover studies, but how information asymmetry of a target affects transaction processing receives little attention. This study fills this gap by examining the impact of the target information asymmetry on the bid premium, the target gains and the bidder gains in takeovers.

Using a sample of 1,612 acquisitions of publicly listed target firms over the period of 1985–2006, this study shows that information asymmetry has a significantly positive effect on the bid premium paid for the target. When the target is more opaque, the bid premium becomes higher and so do the target abnormal returns. These findings are inconsistent with the intuition that a negative relation exists between the target information asymmetry and the bid premium and the target gains in takeovers.

The high premium paid for an opaque target does not appear to be a wealth transfer from the bidder. Investors do not take the high premium for an opaque

target as an overpayment by the bidder. Investors respond less negatively or even positively to the bidder when an opaque target is acquired relative to a transparent one. Hence, new value is created when an opaque target is acquired.

The study also finds that the new value comes from two sources. First, it is a reflection of the expected synergy that will be realized in future operation by combining two entities. Second, the new value comes from the revaluation of the target that is undervalued by the market before the takeover attempt.

Keywords: Information Asymmetry, Takeover, Synergy, Bid Premium, Abnormal Return, Overpayment

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I still remember the first day when I came to Hong Kong. It was September 12, 2003. Dressed in a suit and taking my luggage, I came here to pursue my dreams: complete my PhD education and make a big contribution to society.

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Chapter I: Introduction

1.1 Research Questions and Findings

Decision-making relies heavily on available information, either public or private. When more information is available, the acquisition of information becomes more reliable and the thus the decision is more efficient. Of the most significant business decisions, mergers and acquisitions[1] are the one which relies heavily on the precision of available information. Before a takeover attempt, the bidder needs to identify a potential target and estimate its "true" value and the potential gains from the merger. The estimation determines whether a takeover will go ahead and, if so, how much the target ought to be paid for. The accuracy of the estimation to a great extent relies on the bidder information about the target.

However, the presence of information asymmetry between the bidder and the target may significantly affect the bidder valuation of the target. The market may also face information asymmetry about the true value of the target. How the presence of information asymmetry among the bidder, the market and the target

[1] The term "merger", "merger and acquisition" and "takeover" are used interchangeably in this study.

affects a takeover is an important issue. In this project, the issue is examined in terms of how the target information asymmetry affects the bid premium and the cumulative abnormal returns (CAR) for the bidder and the target alike. It is hoped that this research can provide a better understanding of the transaction and information processing in mergers and acquisitions.

In this study, five proxies are used to measure information asymmetry of target firms, namely, financial analyst coverage, analyst forecast error, analyst forecast dispersion, bid-ask spread and earning-return correlation R-Square. In addition, an information asymmetry index is constructed based on these proxies. By using a sample of 1,612 acquisitions of publicly listed targets over the period 1985–2006, information asymmetry is found to have a significant effect on the bid premium paid for the target. The opaqueness of the target, the bid premium and the target abnormal returns are positively related. The positive relation holds after controlling firm characteristics, deal characteristics, industry and year effects. The findings are contrary to the intuition that a negative relation between the bid premium and information asymmetry would arise. According to the intuition, in the presence of information asymmetry, the bidder is inclined to bid a low price for an opaque target to compensate for potentially adverse selection problems.

Since the high premium may due to the bidder overpayment for an opaque target, the relation between the bidder abnormal returns and the target information asymmetry is examined. Assuming that the capital market is efficient, if the bid premium is an overpayment for a target, investors are able to detect it and respond to the announcement of a takeover negatively. Hence, there is a negative relation between the target information asymmetry and the bidder abnormal returns. However, if there exists a non-trivial synergy in the merger and the high premium is the bidder correct valuation of the target, investors will not respond negatively (or even positively) to the takeover. Therefore, there is a positive relation between the target information asymmetry and the bidder CAR. To test the relation between the bidder abnormal returns and the target opaqueness, it is assumed that the capital market is efficient. That is, investors can assess the motivation of a takeover and hence the bid for target firms in a rational and correct manner.

The empirical results given by this study show a positive relation between the target information asymmetry and the bidder CAR. The positive relation holds after controlling firm characteristics and deal characteristics, showing that the investors consider the takeover as a pursuit of synergetic gains and that the bidder does not overpay for an opaque target with a high premium. The full

sample is divided into two subsamples according to the sample years of 1995-2001, 1986-1994 and 2002-2006. For periods of 1986-1994 and 2002-2006, the bidder abnormal returns are significantly positively related to information asymmetry. The positive relation holds even after controlling deal characteristics, firm characteristics, and industry and year effects. For 1995-2001, the bidder abnormal returns are significantly positively related to information asymmetry. However, the relation becomes insignificant after controlling deal characteristics and firm characteristics.

The higher the gain is in a synergy-motivated takeover, the higher the bid premium is paid for a target. To buttress the resource of the high premium, a proxy is created to capture the synergetic gains arising from the takeover. By controlling the synergetic gains, the effect of information asymmetry is re-examined on the bid premium and the abnormal returns for the bidder and the target. The results show that the positive relation still holds between the target information asymmetry, the bid premium and the abnormal returns for the bidder and the target. They also show that information asymmetry has a significant effect on transaction processing in the takeover market.

1.2 Contributions

This research contributes to the literature in three ways. Firstly, it makes a systematical and direct empirical examination of the effects of information asymmetry on asset pricing (bid price) in mergers and acquisitions. The role of information asymmetry has been empirically studied in many areas, including the used car market (Genesove, 1993; Porter et al., 1999), the labor market (Landers et al., 1996; Campbell et al., 1997), the insurance market (Chiappori et al., 2000; Finkelstein et al., 2002), the real estate market (Garmaise et al., 2004) and the software contracting market (Banerjee et al., 2000).

While there are many studies of takeovers, there are only a few empirical studies of the role of information asymmetry in the takeover market. Amihud et al. (1990) find that bidders with larger managerial ownership fractions are more likely to use cash payments in corporate acquisitions. They argue that the result can be interpreted as due to information asymmetry between corporate insiders and uninformed outside investors. Yook et al. (1999) also find that information asymmetry can explain the choice of payment methods. In a recent study, Moeller et al. (2007) examine information asymmetry in the takeover market from the perspective of the bidder and find that bidders with higher information

asymmetry (uncertain about the prospect of growth) face more negative abnormal return if equities are used to acquire public targets. Yet the negative relation disappears if bidders either acquire public targets by cash or acquire non-public targets.

A couple of studies focus on the target information asymmetry in the takeover market. Focarelli et al. (2001) find that cross-border mergers were less common in the banking industry than other sectors in the 1990s and argue that information asymmetry in banking makes domestic banks difficult to judge the true value of foreign banks. The work by Officer et al. (2006) focuses on information asymmetry of privately-held target firms and explains why stock purchase generates higher abnormal returns than cash purchase of private targets, the complete opposite of public targets. In their study, R&D expenditure and intangible assets are used as proxies for information asymmetry. The abnormal return of the acquirer is found to be significantly higher if stocks are used to acquire targets with high R&D expenditure or with many intangible and hard-to-value assets. The paper concludes that stock is an optimal payment method to acquire targets of extreme information asymmetry, such as privately-held firms, as it is a contingent contract which can safeguard the acquirer's shareholders against downside risks in case the target is opaque and the merger does not work

out.

The above studies do not measure information asymmetry systematically, nor do they assess its impacts on the takeover market. With systematical proxies to measure the target information asymmetry, this research fills this gap by examining the effect of information asymmetry on the bid premium directly.

Secondly, this research contributes to the literature by introducing the target information asymmetry as a factor in the bidder gains in mergers and acquisitions. The new factor is helpful to resolve certain puzzling phenomena in the takeover market. Studies in the takeover market show that while many bidders achieve zero or negative abnormal returns when acquiring public firms, they receive significant positive abnormal returns when acquiring unlisted firms or subsidiaries of public and private firms (Chang, 1998; Fuller et al., 2002; Hansen et al., 1996; Moeller et al., 2004). Faccio et al. (2006) find that the relation persists after controlling the factors suggested in the literature, such as the creation of a blockholder in the bidder, the payment method, the relative size of the target, the pre-announcement leakage about the transaction and so on. As a result, Faccio et al. conclude that the effect can be attributed to a more general distinction between listed target acquisitions and unlisted ones.

This puzzling issue may be caused by the target information asymmetry. On

the one hand, the target information asymmetry is positively related to the bidder gains. On the other hand, private firms are generally more opaque than public firms. Hence, the bidder gets a higher return when acquiring a private firm.

In this study, when the bidders acquire a group of the least opaque (the most transparent) public targets, they receive significantly negative returns. And when acquiring a group of the most opaque public targets, they receive *insignificantly* positive returns. Since private firms are generally more opaque than the group of the most opaque public targets in the sample, the bidder returns are even higher when acquiring private firms. That is, the bidder returns are *significantly* positive when acquiring private firms, as previous studies show.

Thirdly, this research is also significant in detecting the resources of the target positive gains in the takeover market. It has been shown in the literature that target firms receive significantly positive abnormal returns in the takeover market. There has been disagreement on the source of the positive gains in the literature. Supporters of the wealth transfer hypothesis argue that there is no new value generated in takeovers (Roll, 1986; Jensen, 1986). The bidder overpays for a target and the positive gains are only a wealth transfer from the bidder. Supporters of the synergy hypothesis argue that the positive gains come from the expected synergy which will be realized by merging the bidder and its target

entities (Mitchell et al., 1996; Harford, 2005; Jovanovic et al., 2001; Lambrecht, 2004). Supporters of the information hypothesis argue that the announcement of a takeover conveys favorable information about target firms (Grossman et al., 1981; Brous et al, 1993; Pound, 1988). The positive gains come from the market's adjustment of undervaluation of the target before the takeover attempt.

The findings in this study are inconsistent with the wealth transfer hypothesis. Both the bidder and the target abnormal returns are positively related to the target information asymmetry. This indicates that when acquiring an opaque target, the significantly positive gains are not attributable to the bidder overpayment for the target. The results are more significant for the periods of 1986-1994 and 2002-2006, when the merger and acquisition market was less common and the managers appeared more rational. In this study, the proxies for synergy and information asymmetry are both significantly positively related to the target gains. This indicates that both the synergy effect and the information effect are factors in achieving positive gains in takeovers.

Chapter II: Literature Review and Hypothesis Development

2.1 Introduction

How much to pay for a target is the most important issue in a takeover. Too low a bid may cause resistance from the target, and therefore the failure of the takeover and the loss of a profitable opportunity (Jennings et al., 1993). Too high a bid price may reduce the gains for the bidder, resulting in the bidder poor post-takeover performance (Lubatkin, 1987; Varaiya et al., 1987), and even insolvency of the bidder. For example, one year after paying a 124% premium to Federated Department Stores, Campeau declared bankruptcy because of its inability to meet debt payments from the acquisition (Kaplan, 1989; Trachtenberg et al., 1990).

Prior literatures have examined the factors that affect the bid premium[2]. Earlier researchers examine the effect of accounting reporting methods on the bid premium (Copeland and Wojdak, 1969; Andersen and Louderback, 1975; Nathan, 1988). When the pooling method was used to record acquisitions, the bid premium was generally higher than that using the purchase method. This

[2] Since the target abnormal return at the bid announcement is highly correlated with the bid premium, these factors also have significant effects on the target abnormal return.

finding is supported by some recent studies (Robinson et al., 1990; Ayers et al, 2000). However, the pooling method is no longer allowed under the current US Generally Accepted Accounting Principle (GAAP). The Financial Accounting Standards Board (FASB) and the Securities and Exchange Commission (SEC) require that all mergers and acquisitions initiated after June 30, 2001 should be recorded by the purchase method.

Walkling et al. (1985) study the association between the bid premium and the biding and target financial fundamentals. Using a sample of 158 cash tender offers initiated from 1972 to 1977, they find that bid premium is negatively related with the target leverage ratio, market-to-book value ratio, and the percentage of target shares held by the bidder prior to the offer (toehold). A higher bid premium is paid if the bidder seeks to control 50% or more of the target shares. Furthermore, the presence of competitive bidders can enhance the bid price. Varaiya et al. (1987) and Haunschild (1994) find that the bid price is higher in the presence of competitive bidders. Stulz (1988) examines the effect of shareholdings of the target managers on the bid premium and finds that the premium in a takeover is higher if the target managers have higher ownership. This finding is consistent with the argument that granting shares to managers can align the interests of managers with those of investors (Jensen et al., 1976; Fama,

1980).

The effect of managerial resistance on the bid premium is also examined by researchers and mixed results are obtained. Whether managerial resistance can enhance the bid premium depends on the motivation and the intensity of the target resistance. Baron (1983) argues that there are mainly two reasons for managerial resistance. The first reason is that a manager wants to preserve his job, perquisites or the share of agency costs that he captures[3]. This type of resistance is harmful to investors. Wulf (2004) finds that CEOs negotiate shared control in a merged firm in exchange for lower premiums for shareholders. Hartzell et al. (2004) show that CEOs trade personal wealth for shareholders' premiums in takeovers and find that the target shareholders receive lower

[3] When the takeover is completed, the target managers may be made redundant by the bidder, thus losing their human capital (Martin et al., 1991; Mikkelson et al., 1997; Kini et al., 1995, 2004). The managers may not be paid the deferred compensation agreed by the target firm, and there is a possibility that the acquiring firm delays this compensation (Knoeber, 1986). There is also evidence that some out-of-work CEOs fail to secure another senior executive position in public firms for three years following their replacement (Agrawal et al., 1994). Thus, takeovers are not necessarily welcomed by managers. As a rational person, a manager may resist the takeover to pursue self-interests. Walkling et al. (1984) and Cotter et al. (1994) find that changes in managerial wealth resulting from an offer are negatively related to the likelihood of managerial resistance to it. To insulate themselves from takeovers threats, managers usually adopt defense mechanisms. There is much evidence that defense mechanisms keep the management insulated from takeover threats and their positions remain intact (Ryngaert, 1988; Malatesta et al., 1988; Borokhovich et al., 1997; Daines et al., 2001; Field et al, 2002), although managers usually argue that the adoption improves the firms' bargaining power during the takeover process.

acquisition premiums in transactions involving extraordinarily personal treatment of CEOs. The other reason is that a manager may resist an offer when the bid price is below the "true" value of the target. Jennings et al. (1993) find that management resistance can result in competitive bidders. Both Varaiya et al. (1987) and Haunschild (1994) find that competition can enhance the bid price. Hence, this type of managerial resistance is beneficial to shareholders. Hirshleifer et al. (1990) argue that the target is more inclined to accept high bids than low ones. Jennings et al. (1993) and Cotter et al. (1994) find that the bid premium is positively related to managerial resistance.

While researchers examine economic factors that affect the bid premium, few examine the effects of information asymmetry among the bidder, the target and the market on the bid premium. In mergers and acquisitions, the presence of information asymmetry between the bidder and the target has been examined in many studies (Grossman et al., 1980, 1981; Shleifer et al., 1986b; Fishman, 1988; Hirshleifer et al., 1990). Its effect on transaction processing in takeovers like the payment method (Hansen, 1987; Kohers et al., 2000; Datar et al., 2001) and the acquisition form (Berkovitch et al., 1991) has been examined. In the finance literature, the effect of information asymmetry between the target and the market on asset pricing has been well documented in a variety of contexts (Beatty et al.,

1986; Rock, 1986; Hertzel et al., 1993). Yet, there is still no study that focuses on the effect of information asymmetry between the bidder, the target and the market on the bid premium in the takeover market. It is also unclear how the equity values of the bidder and the target can be affected in the presence of information asymmetry[4]. To fill this gap, the above issues are examined in this study.

There is a two-side information asymmetry in mergers and acquisitions (Borek et al., 2004a, b). The bidder has private information about the target own value[5]. However, as Hansen (Note 10, 1987) notes, two caveats about the acquiring-side asymmetry should be heeded, "First, reputational consideration might restrain the acquiring firm from opportunistically using its information. Second, asymmetry might simply be less likely on the acquiring side because these firms tend to be larger and more well-known". Considering the situation, only the target-side information asymmetry is examined in this study.

[4] To date there are many research works concerning wealth effects in mergers and acquisitions. Jensen et al. (1983), Jarrell et al. (1988), and Andrade et al. (2001) review much of the literature on the takeover market before the 1980s, in the 1980s and in the1990s. Martynova et al. (2005) give a systematic review of the vast academic literature on the takeover market from 1890 to 2005. See these articles for reviews on how wealth effects are associated with takeovers.

[5] In a takeover with an all-cash offer, it is unnecessary for the target to know the "true" value of the bidder. The target accepts any offer of value exceeding the target own asset value. It is only in a takeover with a stock offer that the target needs to consider the value of the bidder. Hansen (1987) and Eckbo et al. (1990) analyze how the value of the bidder can be disclosed by the exchange medium in a takeover.

2.2 Synergy Motivation without Information Asymmetry

Firms usually adopt mergers and acquisitions as their main strategic means of growth and expansion to achieve increased economies of scale, synergy, and greater efficiency in managing assets. In a neoclassical model of profit maximization, mergers usually happen in an economic disturbance that leads to industrial reorganization. Coase (1937) is one of the earliest to argue that technological innovation leads to mergers. More recently, studies by McCardle et al. (1994) and Jovanovic et al. (2004) interprets takeovers as an alternative mechanism to enter a new market. Compared with the direct entrant as a new firm, the entrant acquiring an existing company can reduce entry costs. Lambrecht (2004) argues that firms have an incentive to merge in periods of economic expansion. Jovanovic et al. (2001) analyze mergers from 1885 to 1998 with a growth model that emphasizes technological innovation. In the model, when a new major technology appears, firms may not have the financial capacity to adopt and develop it. Eventually these firms become takeover targets for bidding firms who have taken advantage of the new technology. The mergers reallocate the assets to firms that can efficiently operate the new technology.

Maksimovic et al. (2001) provide empirical support for the synergy argument

in the takeover market. They find that productive firms are less inclined to sell at times of industrial expansion. Firms that are efficient in operation are likely to acquire additional assets for expansion to meet an increase in demand. Mitchell et al. (1996) and Harford (2005) also note that companies are more likely to combine and improve operational efficiency in industry shocks like technological innovation.

In a synergy-motivated takeover, the bidder needs to choose a target before proceeding with the takeover and evaluate the expected gains from the combination. The bidder can evaluate a transparent target easily and correctly. The larger the expected synergy is, the higher the bidder gain becomes. The synergy is therefore positively correlated with the bidder abnormal returns at the bid announcement. The bidder is willing to pay a higher price for a target that can generate a large synergy. Thus, the synergy is also positively correlated with the bid price and the target abnormal returns. Consequently, the following hypothesis is suggested:

Hypothesis 1: The synergetic gains from takeovers are positively correlated with the bid premium, the target abnormal returns and the bidder abnormal return at the announcement of takeovers.

2.3 Synergy Motivation with Information Asymmetry

2.3.1 Information Asymmetry between Bidder and Target

There is information asymmetry between the bidder and the target. The presence of information asymmetry makes it difficult for the bidder to correctly evaluate the target and the synergy. In the presence of potentially adverse selection problems, the bidder may not pay as high a price for an opaque target as for a transparent one. Koeplin et al. (2000) note that private firms are acquired at an average discount of 20-30% relative to similar public companies by using earnings multiples as the basis for transaction valuation. Officer (2007) also remarks that there is an average acquisition discount of 15-30% for stand-alone private firms and subsidiaries of other firms (unlisted targets) relative to acquisition multiples for comparable publicly-traded targets.

The market discounts on private firms relative to public ones may compensate for potentially adverse selection problems of private firms[6]. Officer (2007) finds

[6] The effect of information asymmetry on asset pricing has been documented in a variety of texts. For example, there is evidence that information uncertainty plays a significant role in the expected asset underpricing in a firm's IPO process (Beatty et al., 1986; Rock, 1986). In the placement of private assets, Hertzel et al. (1993) find that information asymmetry can explain a substantial part of market discounts on private assets.

that acquisition discounts on subsidiaries appear to be greater when there is more information asymmetry about the selling parent, but the effect is statistically marginal. Officer attributes this marginal result to the proxies for information asymmetry used in his study. He states that (page 573) “Information asymmetry is a notoriously difficult construct to measure, and empirical proxies for asymmetric information are naturally imprecise.” Since the proxies (e.g. the target relative size to the bidder and the metrics for growth opportunities at the target firm) used in his study are broad and imprecise, Officer argues that though the supporting empirical evidence is weak, the effects of information asymmetry probably constitute a large fraction of acquisition discounts.

However, discounts may also arise when private owners want to cash in for liquidity reasons (Fuller et al., 2002). There is evidence that market illiquidity has a great impact on asset pricing. For instance, Silber (1991) reports an average discount of 34% on restricted stocks. Wruck (1989) finds smaller but substantial average discounts. Several tax-accounting studies focus on market pricing for unregistered shares (Arneson, 1981a, b; Johnson et al., 1981; Friedlob, 1983). They find that the average discounts can exceed 50%. Thus, in the presence of possible liquidity, it is not clear whether the acquisition discount on private firms is caused by information asymmetry. However, information

asymmetry seems to play a key role in determining the bidder strategy in a sample composed of only public firms, in which the illiquidity problem is largely diminished. The following hypothesis is suggested:

Hypothesis 2: In the presence of information asymmetry between the bidder and the target, there is a negative relation between the target information asymmetry, the bid premium and the target abnormal return at the bid announcement.

2.3.2 Information Asymmetry between Market and Target

In a takeover motivated for synergetic gains, information asymmetry between the bidder and the target may drive the bidder pay a low price for a highly opaque target to reduce the risk of potentially adverse selection problems. In the takeover market, information asymmetry also exists between the target and the market, and often causes undervaluation of opaque targets. The related studies show that firms of low transparency and liquidity are usually priced low relative to industry peers or undervalued by the market (Brennan et al., 1996; Rendleman, 1980; Giammarino et al., 1982).

At the announcement of a takeover, the undervaluation of a target is adjusted by two pieces of information that may be disclosed to the market. One piece is about the expected synergy arising from the combination of the bidder and the target (Bradley et al., 1983; Fabozzi et al., 1988). The larger the expected synergy is, the bigger the adjustment is[7]. The other one is the bidder private information about the evaluation of a target (Dodd et al., 1977; Bradley, 1980; Ruback, 1988). Many financial studies argue that the bidder has private information about the target and the profitability of a takeover. The private information indicates that either the target is undervalued by the market or the target is worth more when merged with the bidder management. For instance, Grossman et al. (1981) argue that, in an acquisitional takeover, the bidder may acquire information about the target which is undervalued by the market under the current management. Jensen (1984, 1993), Jensen et al. (1983), Scharfstein (1988) and Hirshleifer et al. (1994) argue that the bidder acquires information on possible inefficiencies in the target management which can be improved under the bidder administration.

Takeovers can go ahead with the approval of the board of directors, and are often completed with the help of financial advisors like investment banks

[7] This results in a positive relation between the synergy and the target abnormal returns at the bid announcement as Hypothesis 1 suggests.

(Haunschild, 1994; Servaes et al., 1996; Kale et al., 2003). Before the public announcement of a merger, the bidder usually conduct due diligence or negotiates with the target. All this can provide the bidder with a better knowledge of the target than the public. In some circumstances, the targets may disclose proprietary information to the bidders to facilitate a merger. Povel et al. (2006) note that the target may voluntarily disclose internal information to potential bidders in order to improve the bid price. Shleifer et al. (1986a) analyze that the target management may volunteer information to the white knight in order to thwart hostile acquirers.

With private information, the bidder is better informed about the target than market participants, and therefore the paid price represents a fair valuation of the target[8]. Yet the bid price may be higher than the one perceived by the public. The "overpaying" problem is even more severe for highly opaque targets which are usually undervalued by the market. As a result, a positive relation arises

[8] A possibility deserves attention here. Taking advantage of public information, the bidder may intentionally bid a low price for an opaque target that is undervalued by the market. Grossman et al. (1981) argue that the problem can be mitigated by competition among informed bidders. They further argue that even though there is only one bidder, the target can still reap benefits from the takeover as long as the shareholders have rational expectations of the takeover process. Khanna (1986), Giammarino et al. (1986), Fishman (1988) and Hirshleifer et al. (1989) also argue that a bidder with private information about the profitability of a takeover may bid a high price to preempt potential competitors. Empirically, Walkling et al. (1985), Varaiya et al. (1987) and Haunschild (1994) find that competition can indeed significantly enhance the bid premium.

between the target information asymmetry and the bid premium. At the announcement of a takeover, private information is disclosed to the market, and triggers a valuation adjustment to the target. The more the target is undervalued, the higher the adjustment is. Consequently, a positive relation arises between the target information asymmetry and the target abnormal returns at the bid announcement. Thus, the following hypothesis is suggested:

Hypothesis 2a: In the presence of information asymmetry between the target and the market, there is a positive relation between the target information asymmetry, the bid premium and the target abnormal returns at the bid announcement.

2.4 Overpayment by the Bidder

The bidder may overpay for a target in certain takeovers. The overpayment often happens if a takeover is motivated by managerial hubris or agency problems. In such cases, a positive relation may arise between the target information asymmetry, the bid premium and the target abnormal returns.

The bidder may overpay for the target if the bidder management is affected by

hubris. Roll (1986) argues that a manager affected by hubris may *inadvertently* overstate his ability, actively and aggressively participate in takeovers, and consequently overpay for the target. Hayward et al. (1997) empirically examine the relationship between CEOs' overconfidence and the bid premium with a sample of 106 acquisitions and find that CEOs' overconfidence is significantly positively correlated with the bid premium paid for the target. Malmendier et al. (2005) also empirically examine the effects of CEOs' overconfidence in takeover activities and find that overconfident CEOs overinvest and conduct more mergers when they have abundant internal funds and curtail investment when they require external financing.

The overpayment may also happen if a takeover is motivated by managerial self-interest. According to Jensen et al. (1976), the modern firm is a nexus of contracts between the entrepreneur (the principle) and the manager (the agent). The principle employs the agent's human capital and engages him to operate the firm on his behalf. Since both parties want to maximize their own utilities, the agent in some circumstances may not operate the firm in the best interests of the principle. Jensen (1986) argues that conflict of interests can make managers not distribute freed-up cash to shareholders, but rather reinvest it in projects of negative net present value as the investment can increase the size of the firm and

the utility of the manager. Harford (1999) presents empirical evidence in support of this claim and finds that firms with rich cash holdings are more likely to attempt acquisitions.

Though a manager may consider the consequences of a takeover, one is inclined to overpay for a target if the acquisition is beneficial to oneself. This happens particularly to opaque targets. In the cases of transparent targets, the value is made known to the bidder board of directors and any overpayment can be easily detected and disapproved of. The overpayment often becomes more severe if the target finds out the manager's motive. More often than not, the target attempts to enhance the selling price and succeeds in doing so when it has bargaining power (Walkling et al., 1985). Hence, a positive relation arises between the target information asymmetry, the bid premium and the target abnormal returns.

Since the bidder can overpay for the target in a takeover by management hubris or agency problems, the following hypothesis is suggested:

Hypothesis 2b: If the bidder overpays for targets in takeovers, there is a positive relation between the target information asymmetry, the bid premium and the target abnormal returns at the bid announcement.

If the bidder overpays for the target, the overpayment will be detected eventually in an efficient market, and investors will respond negatively to the announcement of the takeover. The more the bidder overpays for the target, the more negatively the investors respond to the bidder. Hayward et al. (1997) and Malmendier et al. (2005) find that the bidder suffers a significant loss of equity value in takeovers motivated by management overconfidence. Morck et al. (1990) examine three kinds of managerial motive that may make an empire-building manager participate in takeovers: diversification, driving growth and bad past performance. They find that all three motives bring a significant loss to the shareholders' wealth.

As suggested in Hypothesis 2b, the bidder tends to overpay for an opaque target in takeovers motivated by managerial hubris or agency problems. However, if the bidder overpays for the target, the investors will respond to the bidder negatively, and the bidder will get less returns at the bid announcement. As a result, the bidder abnormal returns are negatively correlated with the target information asymmetry.

Hypothesis 3: If the bidder overpays for targets in takeovers, the bidder

abnormal returns at the bid announcement are negatively correlated with the target information asymmetry.

By contrast, if the bidder does not overpay for the target, the investors will detect it and consider the takeover as a pursuit of synergetic gains. Consequently, they respond positively to the takeover. There is evidence that overpayment often happens when the takeover is motivated by managerial hubris or agency problems. Granting the executives equity holdings in the firm can align the interests of the manager with those of the investors (Jensen et al., 1976; Fama, 1980). Hence, granting equity holdings in the bidder firm to the bidder manager can reduce agency problems, make the bidder manager commit to the takeover for synergy gains, and eliminate the problem of overpayment. Lewellen el al. (1985) show that the bidder gets higher returns if the bidder manager has large equity holdings in the firm.

If the bidder does not overpay for the target, the negative relationship will not exist between the bidder abnormal returns and the target information asymmetry. With a sample of private targets, Officer et al. (2006) find that bidders receive higher abnormal returns in stock offers when acquiring highly opaque targets. This indicates a positive relation between the target information asymmetry and

the bidder abnormal returns at the bid announcement. Hence, the following hypothesis is suggested:

Hypothesis 3a: If the bidders do not overpay for targets in takeovers, the bidder abnormal returns at the bid announcement is positively correlated with the target information asymmetry.

In the presence of information asymmetry among the bidder, the target and the market about the true value of a target, the relation becomes more complex between the target information asymmetry, the bid premium and the target gains. In the face of information asymmetry of the bidder and the target, the bidder bids a low price for an opaque target to compensate for potentially adverse selection problems. Hence, a negative relation is expected between the target information asymmetry, the bid premium and the target gains in the takeover market. On the other hand, information asymmetry also exists between the target and the market, and often causes undervaluation of the target. At the announcement of a takeover, the undervaluation is adjusted. The higher the undervaluation is, the higher the adjustment is. Hence, a positive relation exists between the target information asymmetry, the bid premium and the target abnormal returns.

In addition, if the takeover goes ahead because of managerial hubris or agency problems, the bidder manager may overpay for the target. Hence, a positive relation also exists between the target information asymmetry, the bid premium and the target abnormal returns. However, if the bidder overpays for the target, the investors will respond negatively to the bidder, thus resulting in a negative relationship between the bidder gains and the target information asymmetry. Otherwise, the relationship between the bidder gains and the target information asymmetry is positive. In the following chapters, the above relations will be examined empirically.

Chapter III: Data, Variables and Model

This chapter introduces the proxies used to measure information asymmetry of the target and the synergetic gains. Then it describes the data source and the procedure of data selection. It also introduces a regression model and defines the variables used in this study. Lastly, the Pearson correlations among the variables are performed.

3.1 Proxies for Information Asymmetry

Several proxies are used to measure information asymmetry of the target. They are financial analyst coverage, analyst forecast error, analyst forecast dispersion, and bid-ask spread. Based on the proxies, an information asymmetry index is constructed. The proxies are called contemporaneous market measures in this study. They are taken around or during the year in which the takeover is announced and do not contain any information about the reporting quality of the target, especially the balance sheets.

An additional proxy is used in this study to capture a different dimension of the target information environment. The proxy is R-square obtained from the

Ohlson clean surplus model of earning-return correlation. The calculation of R-square is based on both income statements and balance sheets, and the calculation is done with both accounting data and market data up to the IPO date of the listed firm. The new proxy eliminates the two deficiencies that the above four proxies have. Below are descriptions of these proxies.

3.1.1 Contemporaneous Market Measures

Financial analyst coverage (COV), measured as the number of analysts dealing with a target in the previous year of the takeover announcement, is the first proxy for information asymmetry. Analysts collect, digest and distribute information about a firm's performance. There is evidence that larger analyst coverage results in more available information about a firm. Lang et al. (1996) find that analyst coverage is positively associated with disclosure scores. Frankel et al. (2004) find that increased analyst coverage is associated with reduced profitability of insider trading and buying. Several studies, including Brennan et al. (1995) and Hong et al. (2000), also have analyst coverage as a proxy for supply of information about a firm.

Analyst forecast error and forecast dispersion are two widely used proxies for

firms' information asymmetry in literature on accounting (Christie, 1987; Imhoff et al., 1992; Lang et al., 1993; Barron et al., 1998; Barron et al., 1998) and finance (Barry et al., 1985; Jennings et al., 1993; Krishnaswami et al., 1999; Thomas, 2002; Zhang, 2006). These studies show that forecast errors and forecast dispersion decrease when firms disclose more information. Elton et al. (1984) show that forecast errors become fewer when predictions are getting closer to the fiscal year end. They find that nearly 84% of forecast errors in the final month can be attributed to the misestimation of firm-specific factors rather than economy- or industry-wide factors. This indicates that forecasts near the end of a forecasting period appropriately capture a firm's specific information, providing estimates for valuation of its performance. Analyst forecast error (ERR) in this study is calculated as a ratio of the absolute difference (between the average forecast earnings and the actual earnings per share in the final month of the previous fiscal year of the takeover announcement) to the price per share at the beginning of the month. Forecast dispersion (DISP) is calculated as the standard deviation of all individual analysts' earning forecasts made in the final month of the year before the takeover announcement.

Bid-ask spread is the fourth proxy for information asymmetry in this study. It captures the disagreement between investors in a market auction about a firm's

future cash flow or the probability of this future cash flow. A high bid-ask spread indicates high disagreement. Many studies show that firms with a large bid-ask spread have higher information asymmetry (Leuz et al., 2000; Welker, 1995; Affleck-Graves et al., 2002). Bid-ask spread (SPREAD) in this research is measured as the average of the daily relative bid-ask spread in the whole fiscal year before the takeover announcement. Here, the daily relative bid-ask spread is defined as the absolute value of the daily bid-ask spread divided by the average of the daily closing bid price and the closing ask price.

Based on the four proxies, an information asymmetry index (INDEX) is constructed in the following fashion. Each proxy is divided into ten groups according to its decile ranks. The reciprocal of financial analyst coverage is ranked with higher coverage representing lower information asymmetry. The decile ranks are then summed up over each observation. The sum is scaled by a number ten times larger than the number of non-zero proxies for each observation[9]. The reason for the index construction is two-fold. First, each proxy captures different facets of information asymmetry. Consolidating them into a single variable may result in a "richer" measure of information asymmetry. The unweighed index construction of a simple average assumes an equal weight of

[9] The proxies are also ranked by twenty, twenty-five, and fifty groups respectively and similar results are obtained (not reported).

the four proxies when capturing information asymmetry. Second, because of the missing data, some observations are not available with all four proxies. In such cases, observations are not deleted and an index is constructed with available proxies, which can help maximize the sample size[10].

3.1.2 Historical Accounting Measure

The above proxies have been used in many studies to assess a firm's information environment. The proxies for information asymmetry have two common characteristics. One salient characteristic is that they are *contemporaneous* measures taken around or during the year in which the takeover is announced. These proxies are calculated using data in the calendar year immediately prior to the announcement of a takeover. Hence, most information about the target is captured no more than 24 months before the takeover announcement. The proxies do not reflect the historical information environment between the target and the market.

Another characteristic is that they are all *market* measures which do not

[10] The information asymmetry INDEX is constructed using factor analysis of the four information asymmetry measures as well, and similar results are obtained (not reported). However, because of the missing data, the sample size is reduced to 877 observations.

contain information about the reporting quality of the target, with the exceptions of analyst forecast error and forecast dispersion. Analyst forecasts are based on a firm's historical accounting and other public financial information, and provide contemporaneous information on the future performance of the firm. Forecast dispersion measures the disagreement of analysts' expectation of a firm's future earnings. Both analyst forecasts and forecast dispersion primarily focus on a firm's future earnings while ignoring information on balance sheets and past earnings.

The contemporaneous proxies incorporate information about takeover activities between the target and the bidder and hence capture the historical and new takeover information among the bidder, the target and the market. To isolate the information environment between the target and the market, the historical relation is considered between the reporting quality of the target and its reflection of the target share value. An additional proxy is used in this study to capture a different dimension of the target information environment. The proxy is R-square (R^2) obtained from the Ohlson correlation model of clean surplus earning-return. The calculation of R-square is based on both income statements and balance sheets, and the calculation is done with accounting data and market data up to the IPO date of the listed firm. Hence, the new proxy eliminates the

two deficiencies that the above four proxies have.

Financial reports are a major channel that a firm communicates with investors. The information provided by financial statements has been shown to be relevant to the determination of a firm's value. The book-value-earnings-return relation has been used to measure the value relevance of financial statements and the quality of the reported financial information. With the first-order auto-regressive dynamics for a firm's residual income and the clean surplus relation, Ohlson (1995) derives a valuation model as a linear relationship between earning and book value of operating assets. The model is adopted empirically as $P_{it} = a + b_1 E_{it} + b_2 BV_{it} + \varepsilon_{it}$, where P_{it} is the price-per-share of the firm i three months after the fiscal year end t, E_{it} is the earnings-per-share of the firm i during the year t, BV_{it} is the book-value-per-share of firm i at the year end t, and ε_{it} is the regression residual.

The R-square (R^2) from Ohlson's (1995) valuation model can assess the extent of the association of a firm's financial information with its share price. It has been used to measure the informativeness and the value relevance of financial reports in studies by Collins et al. (1997) and Francis at al. (1999). Frankel et al. (2004) find that a high R-square firm can significantly decrease the profit earned by insiders. In line with these studies, the R^2 from the Ohlson

(1995) valuation model is used as a proxy for the information environment of the target in this study. Low R^2 is interpreted as high information asymmetry. To compute the R^2, firms are required to have a minimum of 5 yearly observations. To mitigate the effect of a takeover bid on stock prices, the observations immediately prior to the year of the takeover announcement are deleted if a takeover is announced in the first quarter of the year. Such requirements ensure that the computation of the R^2 uses data that are not related to takeover activities. Hence, the R^2 measures the historical public information environment of the target prior to the takeover.

3.2 Proxy for Synergy

In this study, a proxy is needed to measure the synergy effect resulted from the merger of two entities. Supporters of the synergy view argue that takeovers are bidders' attempts to exploit specialized resources by gaining control of targets and implementing a higher-valued operating strategy (Bradley et al., 1983; Fabozzi et al., 1988). Consistent with this argument, existing studies provide some *ex post* evidence that certain characteristics and attributes of targets and bidders generate wealth in a merger. Jovanovic et al. (2002) find that

a firm's Tobin's Q has a significant effect on its merger and acquisition decisions. Lang et al. (1989) and Servaes (1991) both find that target, bidder and total gains are all bigger when high Tobin's Q bidders acquire low Q targets. Since Tobin's Q is usually regarded as a firm's opportunity to grow from existing assets, these findings lend support to the synergy view in takeovers[11].

Based on the results of these studies, the variable SYNERGY is constructed here as a proxy for the synergy arising from takeovers. SYNERGY equals 1 if a low Q bidder acquires a high Q target (the least synergetic), 3 if a high Q bidder acquires a low Q target (the most synergetic), and 2 in other types of takeovers (the medium synergetic). SYNERGY is expected to be positively correlated to the bid premium, targets and bidder gains. Q is measured as a ratio of the firm's market value to the book value. A high Q firm is defined as a firm with Q greater than 1, and a low Q firm with Q lower than 1[12]. The data used to calculate Q are from the calendar year before the takeover announcement.

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[11] These studies are usually classified as Tobin's Q hypothesis of takeovers. Though the conclusions are consistent among these studies, the definitions of Q are different. For Jovanovic et al. (2002), Tobin's Q is measured as a ratio of the firm's market value to the book value. Tobin's Q is measured as a ratio of the firm's market value to the replacement cost of its assets for Lang et al. (1989), while it is computed from the book value without adjustment by Servaes (1991).

[12] The classification of Q ratios into high and low here is consistent with Lang et al. (1989) who also use a cut-off of "one". This classification is partially based on the fact that under certain circumstances firms with Q ratios below one have marginal projects of negative net present value [see Lang et al. (1989)].

3.3 Data Source and Data Selection

The takeover sample used in this study comes from the Securities Data Company's (SDC) U.S. Mergers and Acquisitions Database. The SDC database reports deal characteristics, including the announcement date, the bid price, the deal value, the payment method, the number of bidders, and other information. The data about the analysts' consensus earnings forecasts are from the I/B/E/S database. The I/B/E/S database reports a monthly mean, a median, and a standard deviation of forecasts for each firm based on analysts' estimates that are submitted that same month. The financial data used in this project comes from the COMPUSTAT database, and the data about stock returns are from the CRSP database.

The data are first selected from the SDC database. The data requirements are: (1) both the acquirer and the target are U.S. firms traded on the NYSE, the AMEX or the NASDAQ; (2) the deal value is equal to or greater than $1 million; and (3) the takeover announcement date lies between 1985 and 2006. These requirements yield 5,853 acquisitions. Transactions are deleted when the interval between the completion date and the announcement date is more than 1,000 days,

and observations are also deleted without data on the bid premium. If the absolute value of the bid premium is bigger than two, the transaction is also deleted[13]. By applying these criteria, the sample size is reduced to 4,606 transactions. To control the deal characteristics, transactions are also deleted if there are missing data about the payment method, the acquisition form (merger or tender offer), the target management attitude, the accounting/reporting method (pooling or not), the bidder position before the takeover attempt, the status of the acquisition (successful or not), and the nature of the takeover (conglomerate or not). As a result, the sample size is further reduced to 4,025 transactions. Then the SDC database is merged with those of COMPUSTAT, CRSP and I/B/E/S. In doing so, it requires complete financial data on the transactions to calculate the various firm-specific characteristics used in this project, including the target size, relative size to the bidder, sales growth and market-book ratio. These requirements eventually yield a final sample of 1,612 transactions used in this project. An acquisition is kept when it misses data about analyst forecasts, since there are different measures of information asymmetry used in this study.

(Insert Table 1 here)

[13] The data about the bid premium is obtained directly from the SDC database. Please refer to Section 3.4 for details.

Table 1 shows the yearly distribution of the sample. As pointed out by Moeller et al. (2005), Rhodes-Kropf et al. (2005) and Andrade et al. (2001), there was a cluster of mergers in the sample in the late 1990s, and the number of acquisitions in the 1990s is significantly greater than that in the 1980s.

3.4 Model and Variables Definition

Three separate sets of regressions are performed in this study. The three dependent variables used in the separate sets of regressions are the bid premium (Premium), the average cumulative abnormal return for the target (TCAR) at the bid announcement, and the average cumulative abnormal return for the bidder (BCAR) at the bid announcement. The bid premium is obtained from the SDC database. In this study, the premium is calculated as *(offer price-target stock price four weeks prior to the original announcement date)/target stock price four weeks prior to the original announcement date*. This definition of premium has been widely used in literature (Rau et al., 1998; Officer, 2003; Louis, 2004; Dong et al., 2006). The abnormal returns are measured over a five-day event window (-2, +2) by a market model with the CRSP value-weighted index and the

parameters are estimated over the (-205, -6) interval prior to the takeover announcement. The main empirical model is:

$$Premium/TCAR/BCAR = a + b * Information\ Asymmetry\ Proxy + c * Deal\ Characteristics + d * Firm\ Characteristics + e * Synergy\ Effect + \varepsilon$$

The independent variables are information asymmetry and synergy proxies. The regression model includes a series of controlling variables, namely the deal and firm characteristics of the announced takeover. The related literature shows that the deal characteristics and some firm characteristics can significantly affect both the bid price and a firm's abnormal returns during the announcement period. Therefore, they are included in the regression analysis. When the analyses are performed on the TCAR and the BCAR, the bid premium is included in the model as a controlling variable.

The deal characteristics consist of the following variables. Conglomerate equals 1 if the primary business line of the bidder is different from the target, and zero otherwise. The industry code of the primary business line of the bidder and the target is taken from the SDC dataset. Theoretically, Amihud et al. (1981) show that, if managers are not properly diversified, they will diversify the

holdings in the firm to reduce the human capital risk, even though such diversification brings little benefit to the shareholders. Shleifer et al. (1990) argue that diversification can benefit the managers. For instance, when a manager's position is threatened by a series of poor performances of his firm, he will have an incentive to introduce a new business line which he thinks he is familiar with. Empirically, Morck et al. (1990) find that investors respond negatively to diversifying acquisitions, indicating that managers may overpay for the target. Thus, it is expected that Conglomerate is positively related to the bid premium.

The second controlling variable of deal characteristics is Toehold, which equals 1 if the bidder holds more than half of the target shares outstanding before the takeover, and zero otherwise[14]. Officer (2003) and Gaspar et al. (2005) say that the bidder pays less for the target if it owns more shares of the target prior to the takeover. Hence, a negative relation is expected between the bid premium and Toehold.

Prior studies find that the presence of competitive bidders can enhance the bid price (Walkling et al., 1985; Varaiya et al.1987; Haunschild, 1994). To control the effects of the bidding competition, the variable Competition is included as

[14] Similar results are obtained if Toehold is defined as using 5%, 10% or other percentages of shares.

the number of bidders in a takeover. Competition is expected to be positively correlated with the bid premium. By controlling the form of a takeover, a dummy variable Tender is included which equals 1 if the takeover goes ahead via a tender offer, and zero otherwise. Berkovitch et al. (1991) argue that a merger is a bargaining game between the acquiring and the target firms while a tender offer is an auction in which bidders arrive sequentially and compete for the target. In equilibrium, there exists such a unique level of synergy gains that a bidder with synergy gains below this level will not attempt to acquire a firm through a tender offer. Hence, an acquisition via a tender offer usually indicates a higher synergetic gain with a higher bid premium.

The target managerial resistance may affect the bid premium and the success of the takeover. Intuitively, the target is more likely to accept high bids than low ones (Hirshleifer et al., 1990). Empirically, Jennings et al. (1993) and Cotter et al. (1994) both find that the bid premium is positively related to managerial resistance. Then the variable Attitude is included which equals 1 if the offer is resisted by the target, and zero otherwise. The data about managerial resistance are obtained from the SDC database.

Earlier researchers also examine the effect of the accounting/reporting method on the bid premium (Copeland et al., 1969; Andersen et al., 1975; Nathan, 1988;

Robinson et al., 1990; Ayres et al., 2000) and show that when the pooling method was used to record acquisitions, a higher bid premium was generally paid. Hence, to control the effects of the reporting method, a dummy variable Pooling is included which equals 1 if the pooling-of-interest method is reported in takeovers and zero if the takeover is accounted for by the purchase method.

In the regression, the payment method Medium is included which equals 1 for pure cash offers, 2 for offers with a mixture of cash and stock, and 3 for pure stock offers. Berkovitch et al. (1990) argue that both the bidder and the target‘s abnormal returns are higher if the takeover is completed by a cash offer. Their argument is supported by numerous empirical studies (Travlos, 1987; Loughran et al., 1997). Fishman (1989) analyzes the effects of the bidder use of cash in mergers and acquisitions. In his model, the cash offer signals the bidder high valuation of the target and also a preemptive move against other bidders. The evidence shows that the payment method may affect the bid premium paid for the target.

Regarding firm characteristics, the related literature offers little to explain both the bid premium and a firm’s abnormal returns during the takeover announcement. Common firm characteristics, such as the bidder/target leverage, ROA, price-earnings ratio, the ratio of operating cash flow to total asset, are

included in the takeover studies (Schwert, 2000; Gaspar et al., 2005; Moeller et al., 2004). However, the estimates of these financial variables are usually found to be insignificant, and the signs of coefficients are inconsistent among different studies. One exception is the size of the target. Most studies report a significantly negative association between the target size and the bid premium. To control the effect of firm-specific characteristics, the target size is included in the regression model of this study. Like Moeller et al. (2004), Target Size is defined as the logarithm of the target book value of the total asset at the fiscal year end before the takeover announcement[15]. In addition, the target relative size to the bidder is also included in the regressions. Many studies document that the relative size to the acquirer has an impact on the bid premium, the TCAR and the BCAR (Lang et al., 1991; Officer, 2004; Bhagat, et al., 2005; Dong et al., 2006; Boone et al., 2007). Consistent with these studies, Relative Size is a ratio of the target market value of common stock to that of the bidder at the fiscal year end before the takeover announcement.

The growth opportunity variable (target valuation) Market-Book is also

[15] For the definition of the target firm's size, the results are generally robust whether it is calculated with total assets or total equities, book value or market value, with or without logarithmic transformation. The exception is the log of market value of equities (MVE) due to more serious multicollinearity between the target firm's size and the information asymmetry proxies. Please refer to Note 18 in Section 3.6 for details.

included in the regression model. It is calculated as a ratio of the target market value of common stock to the book value of equity at the fiscal year end before the takeover announcement. Dong et al. (2006) find that higher target valuation is associated with a lower bid premium and also a lower target announcement-period return. Sales Growth is also included as the target percentage change in sales in the year before the takeover announcement. Morck et al. (1990) specifically examine the effect of buying a growing firm on the market value of the bidders and find that returns to bidding shareholders are lower when the bidder buys a rapidly growing target. Gaspar et al.(2005) also find that the target sales growth is negatively related to both the bid premium and the target abnormal returns.

3.5 Data Description

Table 2 presents the descriptive statistics of the variables used in this study.

(Insert Table 2 Here)

The average (median) bid premium is 41.5% (35.9%). Due to the missing data,

only 1,276 observations are available for the TCAR and 1,078 observations for the BCAR. The average TCAR is 21.6% with a maximum of 337% and a minimum of -73.9%. The average BCAR is -1.2% with a maximum of 50.5% and a minimum of -83.9%. These figures are consistent with the results of the prior studies which find that the targets have significantly positive returns while the bidders experience zero or slightly negative abnormal returns in takeover transactions (e.g., Jensen et al., 1983; Jarrell et al., 1988; Andrade et al., 2001).

As for the takeover characteristics, 69% of the bidders acquire a firm in another industry (Conglomerate), and 12% a toehold of the target, i.e., holding more than half of the target outstanding shares. On average, there is one bidder in each acquisition with a maximum of four bidders. Of the 1,612 takeover announcements, 1,491 (92.5%) attract only one bidder, 95 (5.9%) two bidders, 22 (1.4%) three bidders, and 4 (0.25%) four bidders. Of the 1,612 takeovers, 22% go ahead via a tender offer (Tender), 12% are resisted by the target (Attitude), and 17% are reported with the pooling method (Pooling). Regarding the payment method (Medium), the average (median) number of offers containing stocks is 2.06 (2), indicating that a substantial portion of transactions in the sample are completed with stocks.

The average (median) sales growth of the 1,612 target firms is 38% (12.9%);

the average (median) market-book ratio is 2.65 (1.70); the average (median) size is $4.8 (4.86) million. The market value of the target is 34% of the bidder on average (Relative Size).

The main testing variables, information asymmetry and synergy proxies, have the following characteristics. There is a significant difference in analyst coverage (COV) among target firms. The maximum number of analysts dealing with a target is 29 while the minimum is 1 with an average (median) of 4.45 (3). The average earnings forecast errors (ERR) is 0.031 but the median is only 0.004. The forecast dispersion (DISP) is low with a mean (median) value of 0.01 (0.0021). The average (median) bid-ask spread is 0.037 (0.03). The information asymmetry proxy INDEX averages 0.56. The information asymmetry proxy R^2 averages 0.51. The synergy proxy SYNERGY averages 1.79.

3.6 Pearson Correlation

Table 3 shows the Pearson correlation coefficients of the variables.

(Insert Table 3 Here)

In Panel A, the bid premium is negatively correlated with analyst coverage and R^2, and positively correlated with analyst forecast error, forecast dispersion, bid-ask spread and the information asymmetry INDEX. The correlations are all significant at a 5% level. The simple correlations provide evidence that targets of high opaqueness receive high bid premiums in takeovers. The bid premium is also significantly positively correlated with SYNERGY at a 1% level.

For the firm characteristics variables, the bid premium is significantly negatively correlated with the target size and its relative size to the bidder. The result is consistent with the prior studies (Moeller et al., 2004; Lang et al., 1991; Officer, 2004; Bhagat et al., 2005; Dong et al., 2006; Boone et al., 2007). The bid premium is positively correlated with the target sales growth and the relation is marginally significant at a 10% level. The bid premium is negatively correlated with the target market-book ratio. Although the correlation is negative, it is not significant at any conventional level. This differs from the study by Dong et al. (2006) who show a significantly negative relation between them.

The Pearson correlations between the bid premium and the deal characteristics are reported in Panel B. The bid premium is significantly positively correlated with the bidding competition, tender, and pooling at a 5% level, and significantly negatively related to Toehold at a 1% level. This is consistent with the prior

studies which show that the bid premium is high when there are competitive bidders (Walkling et al., 1985; Varaiya et al., 1987; Haunschild, 1994), when the takeover goes ahead via a tender offer (Berkovitch et al., 1991), or when the accounting treatment of the takeover is the pooling-of-interest method (Copeland et al.,1969; Andersen et al.,1975; Nathan, 1988; Robinson et al.,1990; Ayres et al.,2000). Consistent with other studies, the bid premium is found to be lower if the bidder is the controlling shareholder of the target (Officer, 2003; Gaspar et al.,2005). The bid premium is positively correlated with Conglomerate, although the correlation is not significant at any conventional level. Similarly, the bid premium is also negatively but insignificantly correlated with the payment method.

For the target abnormal returns (TCAR), it is significantly positively correlated with the bid premium at a 1% level as reported in Panel A. The Pearson correlation between them is as high as 0.57. The TCAR is also significantly positively correlated with the BCAR at a 5% level. For the information asymmetry proxies, the TCAR is negatively correlated with analyst coverage and R^2, and positively correlated with analyst forecast error, forecast dispersion, bid-ask spread, and the information asymmetry index. All these correlations are significant at a 10% level. These simple correlations provide

evidence that targets of high opaqueness get high abnormal returns in takeovers. For the synergy proxy, the TCAR is significantly positively correlated with SYNERGY at a 5% level.

In Panel B, the TCAR is significantly negatively correlated with Target Size and its Relative Size to the bidder at a 1% level. For the deal characteristics, the TCAR is significantly positively correlated with Tender at a 1% level. It is significantly negatively correlated with Toehold at a 1% level and Competition at a 10% level.

For the bidder abnormal returns (BCAR), it is positively correlated with the bid premium as reported in Panel A. Yet, the correlation is not significant at any conventional level. The BCAR is negatively correlated with analyst coverage (COV) and positively correlated with forecast error (ERR), forecast dispersion (DISP), bid-ask spread (SPREAD) and the information asymmetry index (INDEX). These correlations are all significant at a 5% level. The BCAR is positively correlated with R^2. But the correlation is not significant at any conventional level. These simple correlations generally provide evidence that bidders get high abnormal returns in takeovers when they acquire targets of high opaqueness. As for the synergy proxy, the BCAR is significantly positively correlated with SYNERGY at a 5% level.

For the firm characteristics, the BCAR is significantly negatively correlated with the target market-book ratio at a 10% level as reported in Panel A. It is also significantly negatively correlated with the target sales growth (Sales Growth) at a 5% level. This is consistent with the work by Morck et al. (1990) who show that the bidder returns are lower when it buys a rapidly growing target. Consistent with the literature (Moeller et al., 2004; Bhagat et al., 2005; Dong et al., 2006), the bidder abnormal returns are significantly negatively correlated with both the target size (Target Size) and its relative size to the bidder (Relative Size) at a 1% level.

For the deal characteristics, ,the BCAR is significantly positively correlated with the bidding competition at a 5% level as reported in panel B. As shown by Jensen et al. (1983), the BCAR is high if the bidder acquires the target via a tender offer. For the payment method, the bidder experiences significantly low returns if it acquires the target with stocks. This can be explained by Myers et al. (1984), who argue that different methods of financing projects may have different signaling implications: financing via stocks may signal that the firm is overvalued while financing with cash may signal that the firm is undervalued. Based on the above argument, the acquisition via stocks may signal that the bidder is overvalued by the market. Consequently, investors respond negatively

to the announcement. For the accounting/reporting method, the bidder abnormal returns are low if the pooling-of-interest method is used for the takeover.

Table 3 also reports the Pearson correlations among the synergy proxy, the information asymmetry proxies, the firm characteristics and the deal characteristics. The information asymmetry proxies are correlated with each other in Panel A. Analyst coverage is significantly negatively correlated with bid-ask spread at a 1% level with a correlation coefficient equal to -0.4. Analyst forecast error is significantly positively correlated with forecast dispersion at a 1% level with a correlation coefficient equal to 0.36. The information asymmetry INDEX is significantly negatively correlated with analyst coverage at a 1% level, and the correlation coefficient is as high as -0.55. INDEX is significantly positively correlated with bid-ask spread at a 1% level, and the correlation coefficient is as high as 0.63. INDEX is also significantly positively correlated with analyst forecast error and forecast dispersion at a 1% level. These correlations indicate that the information asymmetry proxies capture the same phenomenon, and the constructed INDEX is an accurate measure of information asymmetry. There is also a high correlation between the four contemporaneous market measures and the historical accounting measure R^2. R^2 is significantly negatively correlated with analyst coverage at a 1% level while significantly

positively correlated with bid-ask spread at a 1% level. It is also significantly positively correlated with forecast error at a 5% level.

The Pearson correlations between the target size and the information asymmetry proxies are reported in Panel A. The correlation coefficient between the target size and analyst coverage (COV) is 0.36; bid-ask spread (SPREAD) -0.37; and the information asymmetry index (INDEX) -0.42. All three correlations are significant at a 1% level. The target size is significantly negatively correlated with R^2 at a 5% level. It is also negatively correlated with analyst forecast error (ERR) and analyst forecast dispersion (DISP) with correlation coefficients equal to -0.03 and -0.05, respectively. Both correlations are significant at a 10% level. The target size is taken as an information asymmetry proxy in some studies (Zhang, 2006). It is conceivable that small firms are likely to have more serious information asymmetry problems than large firms. In this study, it is used as a control variable because studies typically find a significant relation between the firm's size and the bid premium (Dong et al., 2006; Gaspar et al.,2005). However, the firm's size and the information asymmetry proxies are likely to generate a certain degree of multicollinearity, which will lower the p-values of the information asymmetry proxies in the

regression[16].

The Pearson correlations between the information asymmetry proxies and the deal characteristics are reported in Panel C. The bidding competition is significantly positively correlated with analyst forecast error at a 1% level while significantly negatively correlated with bid-ask spread at a 5% level. The pooling method is significantly positively correlated with analyst coverage at a 1% level while significantly negatively correlated with forecast error, forecast dispersion and the information asymmetry INDEX at a 5% level. These results indicate that the correlations between the information asymmetry proxies and the deal characteristics are mixed.

The Pearson correlations demonstrate a positive relation between the target information asymmetry and the bid premium and also between the target gains and the bidder gains in the takeover market. The simple correlations provide evidence that the target of high opaqueness receives a high bid premium and a

[16] For the target size, the main results are generally robust whether it is calculated with total assets or total equities, book value or market value, with or without logarithmic transformation. The exception is the log of market value of equities (MVE) due to more serious multicollinearity. The Pearson correlation coefficients between log (MVE) and COV, ERR, DISP, SPREAD, INDEX are 0.52, -0.18, -0.21, -0.54, and -0.68 respectively, which are uniformly higher than other corresponding equivalence size-measures. But even so, when log (MVE) is orthogonalized against individual information proxies and the residuals are used to re-run all the tests, the results reappear in the way that the residual log (MVE) enters significantly negatively and the information proxies enters significantly positively in all the regressions.

high abnormal return in the takeover market. Yet, the high bid premium is not the bidder overpayment. The bidder gets high abnormal returns when it acquires the target of high opaqueness.

The Pearson correlations also demonstrate a positive relation between the expected synergy and the bid premium, the target gains and the bidder gains in the takeover market. The simple correlations provide evidence that the bidder gets high gains in the takeover market when the expected synergy is large. For the target that can create a large synergy, the bidder tends to pay a high price to acquire it, and consequently the target gets a high bid premium and a high abnormal return in the takeover market.

Chapter IV: Empirical Result

This chapter describes the empirical relations between the target information asymmetry and the bid premium, the target gains and the bidder gains.

4.1 Bid Premium

The bid premium is first assigned to five portfolios based on the level of information asymmetry. The approach has been widely adopted in the area of asset pricing to reduce the variability of returns. Then the multivariate tests are done to examine the relation between the bid premium and information asymmetry with the White-adjust method to correct the heteroscedasticity problem.

4.1.1 Univariate Analysis

The bid premium is sorted into 5 deciles using each information asymmetry proxy. The reciprocal of analyst forecasts is ranked. The results are shown in Table 4.

(Insert Table 4 here)

As shown above, the bid premium is significantly positive in each portfolio with a p-value lower than 0.01%. For each proxy, the bid premium is almost invariably increasing monotonically in information asymmetry. That is, highly opaque targets tend to receive high bid premiums relative to the least opaque targets. For all the proxies, the premium differs significantly between the target portfolios of the highest asymmetry and those of the lowest. For instance, the average premium for the lowest ranking targets in INDEX (i.e. the most transparent) is 34% and for the highest ranking targets (i.e. the most opaque) is 47%. Their average difference of 13% is highly significant with a p-value lower than 0.01%. The evidence is not consistent with Hypothesis 2, which predicts a negative relation between the bid premium and the target information asymmetry. By contrast, the evidence lends support to Hypotheses 2a and 2b, which predict a positive relation between the bid premium and the target information asymmetry.

4.1.2 Multivariate Analyses

In this section, the bid premium is regressed on the information asymmetry proxies with the White-adjusted standard errors method to correct the heteroscedasticity problem. In the regression, the 1% outliers are deleted from the bid premium and each information asymmetry proxy. The results are presented in Table 5.

(Insert Table 5 here)

As shown above, after controlling deal and target characteristics, the bid premium is significantly positively related to forecast error with an estimated coefficient of 0.56 and a p-value of 0.0410, forecast dispersion with an estimated coefficient of 2.26 and a p-value of 0.0976, bid-ask spread with an estimated coefficient of 0.71 and a p-value of 0.0490, and the information asymmetry INDEX with an estimated coefficient of 0.13 and a p-value of 0.0096. The bid premium is also negatively related to forecast coverage, though the relation is insignificant with an estimated coefficient of -0.004 and a p-value equals to 0.2056. The multiple regression results thus reject Hypothesis 2, which predicts

a negative relation between the bid premium and the target information asymmetry, but support Hypotheses 2a and 2b, which predict that highly opaque targets tend to receive high bid premiums in takeovers.

Regarding deal characteristics, the bid premium is significantly negatively related to Toehold with p-values lower than 0.01% in all five models. It is consistent with previous findings on a negative relation between the bidder toehold and the bid premium (Officer, 2003; Gaspar et al, 2005).

Consistent with existing findings (Copeland et al., 1969; Andersen et al., 1975; Nathan, 1988; Robinson et al., 1990; Ayres et al., 2000), the bid premium is high if the pooling-of-interest method is reported in the takeover. The relation between the bid premium and the pooling variable is significantly positive at a 10% level in all five models.

The bid premium is high if the takeover goes ahead via a tender offer. In the five models, the tender offer is significantly positively related to the bid premium with p-values lower than 0.01%. This supports the argument of Berkovitch et al. (1991), who argue that a merger is a bargaining game between acquiring and target firms, while a tender offer is an auction in which bidders arrive sequentially and compete for the target. In equilibrium, there exists such a unique level of synergy gains that a bidder having synergy gains below this level

will not attempt to take over the firm through a tender offer. Thus, an acquisition via a tender offer usually indicates a high synergetic gain and therefore a high bid premium.

Walkling et al. (1985), Varaiya et al. (1987) and Haunschild (1994) find that the bid premium is positively related to the presence of competitive bidders. Yet the relation in Table 5 is not significant at any conventional level. The insignificance of the coefficient can be attributed to the proxy's applicability to takeover competitiveness in the takeover market. In this study, the number of announced public bidders is used to measure the competitiveness of the takeover market. However, Boon et al. (2007) show that such a proxy cannot represent the real nature of the takeover market in the 1990s. The announcement of a public takeover is only a small part of the whole takeover process. A highly competitive market exists well before the public announcement. Only the winner is announced while the negotiation with the target comes later.

The empirical results show that there are no consistent results about the target management resistance to the bid premium. The estimated coefficient of the target management resistance (Attitude) is not significant at any conventional level in the five models. The result is hardly surprising, considering the different intentions of the target management resistance. As Baron (1983) mentions, if the

target management resistance is to pursue self-interest, the resistance is harmful to shareholders. For instance, Wulf (2004) finds that CEOs negotiate shared control of the merged firm in exchange for lower premiums for shareholders. Hartzell et al. (2004) find that CEOs trade personal wealth for shareholders' premiums in takeovers. The target shareholders receive lower acquisition premiums in transactions involving extraordinarily personal treatment of CEOs. However, Baron also points out that if the manager resists an offer because the bid price is below the "true" value of the target, the resistance can improve the bid premium. For example, both Jennings et al. (1993) and Cotter et al. (1994) find that the bid premium is positively correlated with managerial resistance.

The payment method (Medium) has no effect on the bid premium. The diversifying acquisition (Conglomerate) is positively related to the bid premium, but the relation is not significant at any conventional level. As to the target characteristics, the bid premium is significantly negatively related to both the target size and its relative size to the bidder at a 10% level. This is consistent with various previous studies (Moeller et al., 2004; Lang et al. 1991; Officer, 2004; Bhagat et al., 2005; Dong et al. 2006; Boone et al., 2007). The bid premium is positively related to the target sales growth and market-book ratio, but neither relation is significant at any conventional level.

4.1.3 Sensitive Analysis

To ensure that the premium results are robust, sensitive tests are performed in this section. First, non-typical deals are eliminated from the sample. It is known that the takeover announcement often elevates the target stock prices and the prices remain high for a long time even when the takeover fails (Bradley et al, 1983; Fabozzi et al., 1988). Consequently, the high price inevitably influences the bid price of the next bidder/takeover. To eliminate the contamination of multiple biddings for the same target, failed transactions are deleted from the sample. Like previous studies by Moeller et al. (2004), transactions are also deleted if the value of the deal is less than 1% of the market value of the bidder assets (namely the book value of assets minus the book value of equity plus the market value of equity). In doing so, the sample size is reduced to 1,120 transactions, with which the regression is run. The result is presented in Model 1 in Table 6 with INDEX as the information asymmetry proxy.

(Insert Table 6 Here)

As shown in Model 1, the information asymmetry proxy INDEX is significantly positively related to the bid premium with an estimated coefficient of 0.17 and a p-value equal to 0.11%. The magnitude of the estimated coefficient is larger than that in Table 5, and the coefficient is also more significant than that in Table 5 (the estimated coefficient of INDEX is 0.13 and the p-value equals 0.96% in Table 5).

Second, the full sample is split based on some key control variables which are found to affect the bid premium most. The idea is to see if the premium results are driven by firm or deal characteristics. They are the target size, its relative size to the bidder, and the payment method. The results are shown in Models 2-8 in Table 6.

In Models 2 and 3, the sample is divided into two groups based on the median target size. The observations of the target size above the median are classified into the “big” group while those below “small”. In Models 4 and 5, the sample is divided into two groups based on the target median relative size to the bidder. The observations of the relative size above the median are classified into the “big” group while those below “small”. It is shown that the information asymmetry INDEX is significantly positively related to the bid premium at a 10% level in all four models. All this shows that a positive relation between the

bid premium and the target information asymmetry is not driven by special samples.

In Models 6, 7 and 8, the sample is divided into three groups according to payment method, e.g. pure cash, mixture offer, and pure stock. For each payment method, INDEX is positively related to the bid premium. The relationship is significant at a 5% level for mixture offer. It is also marginally significant in cases of pure cash offer and pure stock offer. It is shown that the positive relationship between the bid premium and the target information asymmetry is not driven by payment methods.

Hypothesis 2 is rejected, which predicts a negative relation between the bid premium and the target information asymmetry. The main regression results show that highly opaque targets tend to receive high bid premiums in takeovers. Hence, Hypotheses 2a and 2b are supported.

4.2 Target Cumulative Abnormal Returns

Like the bid premium, the relation between information asymmetry and the target abnormal returns is tested in this section.

4.2.1 Univariate Analysis

Before conducting multiple analyses of the target cumulative abnormal returns (TCAR), a univariate analysis is performed to get a preliminary idea of the linkage between the target cumulative abnormal returns and information asymmetry. The TCAR is assigned to portfolios based on the level of information asymmetry in order to draw conclusions on the TCAR for these classes of targets. The results are presented in Table 7.

(Insert Table 7 Here)

The sorting results of the TCAR in Table 7 reveal monotonic increasing patterns of the TCAR against information asymmetry across the information asymmetry proxies. INDEX is taken as an example here. In the INDEX column, the average of the lowest ranking TCAR (the most transparent) is 14.8% and that of the highest ranking (the most opaque) is 24.3%. Both are statistically significant with a p-value lower than 0.01%. Their average difference of 9.5% is also statistically significant with a p-value lower than 0.01%. The univariate analysis rejects Hypothesis 2 and support Hypotheses 2a and 2b. Highly opaque

targets get higher cumulative abnormal returns in takeovers.

4.2.2 Multivariate Analyses

To further examine the linkage between information asymmetry and the target gains, multivariate analyses are conducted in this section. It should be pointed out that the linkage may be "mechanical", considering that information asymmetry has a significant impact on the bid premium, and that the bid premium is significantly correlated with the TCAR (as shown in Panel A of Table 3, they are positively correlated with a coefficient of 0.57 and a p-value lower than 1%). Therefore, a special control term "ResPremium" is added to the model. ResPremium is a residual of the bid premium from orthogonalizing against each information asymmetry proxy. Table 8 presents the results.

(Insert table 8 here)

ResPremium enters significantly and positively in all five models with p-values lower than 0.01%. But more importantly, the information asymmetry proxies remain significant in most of the models after ResPremium is added.

Forecast error (ERR) and bid-ask spread (SPREAD) exhibit positive relations to the TCAR with estimated coefficients of 0.07 and 0.33 respectively. Both coefficients are significant with p-values of 3.62% and 9.90% respectively. Forecast dispersion (DISP) also bears a positive coefficient although it bears no statistical significance. Analyst coverage (COV) has a negative impact on the TCAR but bears no statistical significance either. The constructed information asymmetry proxy INDEX shows a high significance with a p-value of 0.28%. Hence, Hypothesis 2 is rejected, and Hypotheses 2a and 2b are supported. Highly opaque targets get higher cumulative abnormal returns in takeovers.

Regarding deal characteristics, the TCAR is significantly negatively related to the payment method (Medium) at a 1% level in all five regressions. The result is consistent with prior studies showing that the target gets higher gains if the takeover is completed with cash (Travlos, 1987; et al., 1997). Berkovitch et al. (1990) argue that both the bidder and the target abnormal returns should be higher if the takeover is completed with a cash offer. The TCAR is significantly positively related to a tender offer at a 5% level in all five regressions, which is easy to understand as tender offers are usually completed with cash.

The TCAR is significantly negatively related to the bidding competition at a 1% level in all five models. This result is inconsistent with previous findings that

the presence of competitive bidders can enhance the bid price (Walkling et al., 1985; Varaiya et al., 1987; Haunschild, 1994). This somewhat surprising result may be attributed to two possibilities. One possibility is that the number of public bidders may not represent the true competition of a real takeover market. Boon et al. (2007) examine 400 takeovers of major U.S. corporations which were announced over the period 1989 to 1999 and find that the announcement of public takeovers only plays a small part in the whole takeover process. Before the public announcement, a highly competitive market already exists where half of the targets are auctioned among multiple bids, while only the winner is announced and negotiations with the target come later. The other one is that the result may be biased by the small number of multiple-bidder transactions. Of the 1,612 takeovers, 1491 (92.5%) has one bidder, 95 (5.9%) two bidders, only 22 (1.4%) three bidders, and only 4 (0.25%) four bidders. The average TCAR is 0.215, 0.222, 0.035, 0.163 for transactions with single, two, three and four bidders respectively. Obviously, the small numbers of three- and four-bidder transactions cause the negative relation between the TCAR and the bidding competition.

The TCAR is positively related to managerial resistance (Attitude). Yet, the relation is not significant at any conventional level in all five models. The

insignificance of the coefficient may be caused by the different motivations of the resistance. Whether managerial resistance can benefit the target shareholders depends on the motivation of the resistance. Baron (1983) argues that there are mainly two possible reasons for a manager's resistance to an offer. One reason is that a manager may want to preserve his job, perquisites or the share of any agency costs he captures (Martin et al., 1991; Mikkelson et al., 1997; Kini et al., 1995, 2004; Knoeber, 1986). This type of resistance is harmful to investors. Wulf (2004) finds that CEOs negotiate shared control in the merged firm in exchange for lower premiums for shareholders. Hartzell et al. (2004) find that CEOs trade personal wealth for shareholders' premiums in takeovers. The target shareholders receive lower acquisition premiums in transactions involving extraordinarily personal treatment of CEOs.

The second reason is that the bid price may be below the "true" value of the target. Hirshleifer et al. (1990) argue that the target is more likely to accept a high bid than a low one. The target management resistance can increase the likelihood of a competing offer (Jennings et al., 1993). Meanwhile, a bidding competition can enhance the bid price (Varaiya et al., 1987; Haunschild, 1994). Hence, this type of managerial resistance is beneficial to shareholders. In fact, both Jennings et al. (1993) and Cotter et al. (1994) find that the bid premium is

positively related with managerial resistance.

Regarding firm characteristics, none of them are significant at any conventional level. This can be attributed to the bid premium variables added to the model. The bid premium is significantly related to the TCAR and certain firm characteristics like the target size. In the presence of the bid premium in the model, the significance of firm characteristics cannot be reflected. In fact, the robustness tests (not reported) show that both the firm's size and its relative size are significantly negatively related to the target abnormal returns at a 1% level without the bid premium in the model.

4.2.3 Sensitive Analysis

To confirm that the results are not driven by special takeover samples, a few sensitive analyses are conducted by dividing the full sample according to the payment method, the bidder size, the target size, and the target relative size to the bidder. The results are shown in Table 9.

(Insert Table 9 Here)

In Column A, the sample is divided into three groups according to the payment method, that is, pure cash offer, mixture offer, and pure stock offer. Each group is then divided into two sub-groups according to the median value of the information asymmetry proxy INDEX. LOW is for INDEX values below the median and HIGH is for those above the median. The mean values of the TCAR in the two sub-groups are then compared. For the CASH payment group, the average TCAR of LOW information asymmetry (i.e. more transparent firms) is 23%. The average TCAR of HIGH information asymmetry (i.e. more opaque firms) is 29%. Both are statistically significant at a 0.01% level. The mean difference ("High – Low") 5.4% is significant at a 5% level. For the STOCK payment group, the mean TCAR difference between transparent and opaque targets is 3.6% which is statistically significant at a 10% level. For the MIXTURE group, the mean TCAR difference between transparent and opaque targets is 5.9%, which is statistically significant at a 10% level. Hence, it is confirmed that the target abnormal returns tend to be higher for more opaque targets, no matter whether the acquisition is paid for by cash or stocks.

In Column B, the sample is divided into three groups, i.e. small bidder, medium bidder, and big bidder, according to the bidder year-end market value of common equity in the year prior to the takeover announcement. For the SMALL

bidders, the mean TCAR difference between transparent and opaque targets is 4% with a p-value of 5.95%. For the MEDIUM bidders, the difference is 6.5% with a p-value of 0.15%. For the BIG bidders, the difference is 5.7% with a p-value of 2.42%. The similar comparison is also done by dividing the sample according to the target size in Column C. For SMALL targets, the mean TCAR difference is 7% with a p-value of 0.50%. For MEDIUM and BIG targets, the differences are 4% and 1% respectively, which means neither of them has any statistical significance. If we focus on the relative size between the target and the bidder in Column D, the differences are also significant at a 5% level for SMALL and BIG groups. The results confirm that the target abnormal returns are higher for more opaque targets, irrespective of the size of the bidder or the target.

(Insert Table 10 Here)

Table 10 presents a sensitive analysis of regression results. Since many studies show that the payment method has a significant effect on the target abnormal returns, we only present the results of the payment method. For the pure cash offer, the information asymmetry proxy INDEX is significantly positively

related to the target abnormal returns with an estimated coefficient of 0.127 and a p-value of 2.14%. For the mixture offer, INDEX is significantly positively related to the target abnormal returns with an estimated coefficient of 0.139 and a p-value of 2.77%. For the pure stock offer, the coefficient of INDEX is 0.093 and the p-value equals 6%. These results show that the positive relation between the target information asymmetry and abnormal returns is not driven by the payment method.

The empirical results show that highly opaque targets get higher cumulative abnormal returns in takeovers. Hence, Hypothesis 2 is rejected, and Hypotheses 2a and 2b are supported.

4.3 Bidder Cumulative Abnormal Returns

To date the empirical results show that highly opaque targets get high premiums and high gains in the takeover market. The results support Hypotheses 2a and 2b, both of which predict a positive relation between the target information asymmetry, the bid premium and the target abnormal returns at the bid announcement. It is noted that Hypothesis 2a predicts that a positive relation is driven by the revaluation of the target, while Hypothesis 2b predicts that the

positive relation is driven by the overpayment of the bidder.

To clarify the cause of the high premium, the effect of information asymmetry on the bidder cumulative abnormal returns is examined. If the bidder overpays for targets in takeovers, the bidder abnormal returns at the bid announcement will be negatively correlated with the target information asymmetry. However, if the bidder does not overpay for targets in takeovers, the bidder abnormal returns at the bid announcement will be positively correlated with the target information asymmetry. By examining the relation between the target information asymmetry and the bidder abnormal returns, the cause of the high premium can be clarified.

4.3.1 Univariate Analysis

The univariate analysis is conducted in this study to have a preliminary idea of the linkage between the bidder cumulative abnormal returns (BCAR) and information asymmetry. In Table 11, the BCAR is assigned to portfolios based on the level of information asymmetry.

(Insert Table 11 Here)

There are a couple of points worth mentioning. First, the monotonic increasing property features prominently in every column of the information asymmetry proxy. Take INDEX as an example. The average of the lowest ranking BCAR (the most transparent) is -2.7% and that of the highest ranking (the most opaque) is 0.3%. Their average difference of 3% is highly significant with a p-value lower than 0.01%.

Second, the average BCAR is generally negative, which is consistent with many studies. But some of the BCAR figures are positive at the bottom where firms are highly opaque. Even though these positive BCARs are statistically equivalent to zero, negative BCARs are typically highly significant.

The results confirm a scenario where the target becomes more opaque, the market agrees more with the takeover decision through giving fewer discounts on the bidder stock prices. Hence, Hypothesis 3 is rejected, which predicts a negative relation between the target information asymmetry and the bidder abnormal returns at the bid announcement. Hypothesis 3a is supported, which predicts that the bidders receive high gains by acquiring highly opaque targets in takeovers. The results also show that the high premium paid for the target is not an overpayment by the bidder. Hence, Hypothesis 2b is rejected and Hypothesis

2a is supported.

4.3.2 Multivariate Analyses

After the univariate analysis, multiple regressions are performed to test the effect of information asymmetry on the BCAR. Table 12 presents the results.

(Insert Table 12 here)

As shown in Model 1, the BCAR is significantly negatively related to analyst coverage (COV) with an estimated coefficient of -0.002 and a p-value of 0.75%. Since more coverage reduces information asymmetry, it supports the hypothesis that higher information asymmetry leads to higher abnormal returns for bidders. Other information asymmetry proxies, such as forecast error in Model 2, forecast dispersion in Model 3, and bid-ask spread in Model 4, exhibit uniformly a positive linkage with the BCAR although the statistical significance is weak in general. The last model shows that the constructed information proxy INDEX has an estimated coefficient of 0.03 and a p-value of 0.15%. Again, this means that higher information asymmetry leads to higher abnormal returns for bidders.

Regarding control variables, the BCAR is negatively related to Conglomerate, but the relation is not significant at any conventional level, which is inconsistent with Morck et al.(1990), who show that the bidder gains are significantly lower for diversifying acquisitions. The insignificance of the coefficient in this study may be caused the definition of Conglomerate. The definition here is derived from the SDC dataset, which uses the four-digit SIC code to classify primary business lines of a firm. The robustness test (unreported) shows that if the four-digit SIC code from the CRSP dataset is used to define a firm's primary business lines, the BCAR is significantly lower for diversifying acquisitions.

The BCAR is significantly positively related to the bidding competition at a 10% level in all five models. It is also positively related to the acquisition form of a tender offer. The results are consistent with those in prior literatures. In a well-known article, Jensen et al. (1983) summarize the results of a number of studies examining the change of stock prices (measured net of market-wide price movements) for completed takeovers. The results show that bidding firms achieve statistically significant abnormal returns of 4% in tender offers and zero in mergers. Rau et al. (1998) examine the long-term performance of the bidder by adjusting both the firm's size and book-market ratio and find that the bidders in mergers generally underperform equally weighted control portfolios by a

statistically significant 4% over a period of three years after the merger. By contrast, the bidders in tender offers generally earn a statistically significant positive abnormal return of 9%.

The payment method (Medium) has a great effect on the BCAR. The BCAR is significantly negatively related to Medium at a 5% level in all five models. The results are consistent with those in prior literatures. In event studies, Travlos (1987) finds that bidding firms suffer significant losses in acquisitions by pure stock offers, but experience “normal” returns by cash offers. During a five-year post-acquisition period, Loughran et al. (1997) find that bidders paying for acquisitions with stocks experience significantly negative returns whereas bidders completing takeovers with cash achieve significantly positive returns.

Regarding firm characteristics, the bidder experiences lower abnormal returns if it acquires a big target. Consistent with Morck et al. (1990), the BCAR is significantly negatively related to the target sales growth at a 1% level in all five models. The BCAR is also negatively related to the target market-book ratio, which is not surprising as high growth firms usually have a high market-book ratio.

The relative size in this study is not significant at any conventional level in all five models. The result is inconsistent with prior studies which show a

significantly negative relation between the bidder cumulative abnormal returns and the target relative size to the bidder (Lang et al., 1991; Dong et al., 2006; Boone et al., 2007; Bhagat et al, 2005). This is due to different regression methods used. In the regression, the OLS method is used in all the prior studies while the heteroscedasticity-corrected estimation with the White-adjust method is used in this study. The robustness tests (unreported) show that if the OLS regression is used here, the coefficient of Relative Size is significantly negative in all five models with a p-value lower than 1%.

4.3.3 Sensitive Analysis

The samples for the robust check are divided according to the payment method, the bidder size, the target size, and the target relative size to the bidder. The results are shown in Table 13.

(Insert Table 13 Here)

In Column A, the sample is divided according to the payment method. For the CASH payment group, the average BCAR of LOW information asymmetry (i.e.

more transparent firms) is 0.03%. The average BCAR of HIGH information asymmetry (i.e. more opaque firms) is 1.05%. The mean difference ("High – Low") 1% is statistically significant at a 5% level. Stronger results come from the STOCK payment group, in which the mean BCAR difference between transparent and opaque targets is 2.2% at a statistically significant 1% level. A similar situation also exists in the MIXTURE group. Hence, it is confirmed that the BCAR tends to be higher for more opaque targets, regardless whether the acquisition is paid for by cash or stocks.

For SMALL bidders in Column B, the mean BCAR difference between transparent and opaque targets is 3.2% with a p-value of 0.19%. For MEDIUM bidders, the difference is 2.3% with a p-value of 0.04%. For BIG bidders, the difference is 1.2% with a p-value 4.07%. For SMALL targets in Column C, the mean BCAR difference is 1.4% with a p-value of 4.01%. For MEDIUM targets, the difference is 2.2% with a p-value of 0.86%. For BIG targets, the difference is 1.5% with a p-value of 3.12%. If we focus on the relative size between the target and the bidder in Column D, the differences are also significant at a 5% level for all three groups. Again, the results confirm that the BCAR is higher for more opaque targets, no matter whether the bidder and target size is large or otherwise.

Table 14 presents the sensitive analysis of regression results. Since many

researchers show that the payment method has a significant effect on the bidder abnormal returns, we only present such results here.

(Insert Table 14 Here)

For pure cash offers, the information asymmetry proxy INDEX is significantly positively related to the bidder abnormal returns with an estimated coefficient of 0.037 and a p-value of 1.76%. For mixture offers, INDEX is positively related to the bidder abnormal returns with an estimated coefficient of 0.021, but the relationship is not significant at any conventional level. For pure stock offers, the coefficient of INDEX is 0.055 and the p-value equals 3.71%. The results confirm a generally positive BCAR-information-asymmetry link in all three types of payment method.

The results reject Hypothesis 3, which predicts a negative relation between the target information asymmetry and the bidder abnormal returns at the bid announcement, but lend support to Hypothesis 3a, which predicts that the bidders get high gains by acquiring highly opaque targets in takeovers. The results show that the high premium paid for the target is not an overpayment by the bidder. Hence, Hypothesis 2b is rejected and Hypothesis 2a is supported.

4.4 Synergy Gains

The empirical results show that there is a positive relation between the target information asymmetry, the bidder gains and the target gains in the takeover market. The positive relation indicates that the high premium paid for the target is not a wealth transfer of the bidder. That is, new value is created when an opaque target is acquired. To further examine this, the association between information asymmetry and combined gains is tested in this section.

Like Bradley et al. (1988), synergy gains are defined as the cumulative abnormal returns over the (-2, +2) event window for a value-weighted portfolio of the bidder and target returns. The weights for the bidder and the target are based on the market value of equity two days prior to the announcement of a deal. The target weight adjusts the percentage of the target shares held by the acquirer prior to the announcement of a deal. Abnormal returns are defined as market model residuals, where the parameters are estimated over the (-205,-6) event window relative to the announcement day. Table 15 presents the regression results.

(Insert table 15 here)

As shown above, the information asymmetry proxies are significant in most of the regressions. The information asymmetry INDEX is significantly positively related to synergy gains with an estimated coefficient of 0.03 and a p-value equals 0.79%. Bid-ask spread is also significantly positively related to synergy gains with an estimated coefficient of 0.13 and a p-value equals 6.21%. Analyst coverage is significantly negatively related to synergy gains with an estimated coefficient of -0.001 and a p-value equals 6.33%. Forecast dispersion is positively related to synergy gains with an estimated coefficient of 0.13 and the relation is marginally significant with a p-value of 10.53%. The relation between forecast error and synergy gains is also positive with an estimated coefficient of 0.01, though it is not significant at any conventional level.

Hence, the results indicate that the high premium paid for the target is not an overpayment by the bidder. When the bidder acquires an opaque target, new value is created.

4.5 Disentangle Synergy Effect and Information Asymmetry Effect

To date the empirical results show that an opaque target gets a high premium and a high abnormal return in the takeover market. Meanwhile, the bidder also gets a high gain when acquiring an opaque target. Hence, the bidder does not overpay for a target. The total positive gain further demonstrates that new value is created when an opaque firm is acquired in the takeover market. However, it is not clear about the sources of the new value.

The positive gain may be attributable to two sources. First, it may be resulted from the information contained in a takeover announcement about the stand-alone value of the target. The target may be undervalued by the market before the takeover attempt. However, the bidder bid price reveals the fair value of the target to the market. Hence, the information revealed at the bid announcement triggers a revaluation of the target. When the information asymmetry becomes greater between the target and the market before the takeover, the target is more undervalued, and the adjustment to the target stock prices becomes bigger at the bid announcement.

Second, the new value may be created due to the information contained in a takeover announcement about synergy gains arising from the combination of the

bidder and the target. High synergy can bring high benefit to the bidder. The bidder tends to pay a high premium to acquire a target that can create high synergy. This results in a positive relation between synergy, the bid premium, the target gain and the bidder gain.

These two effects are disentangled by adding the synergy proxy SYNERGY to the regression model. The regression is first run with the contemporaneous market measure of the information asymmetry INDEX and then with the historical accounting measure R^2.

4.5.1 Synergy and Contemporaneous Market Measure

The regression results with the synergy proxy SYNERGY and the contemporaneous market measure of the information asymmetry INDEX are shown in Table 16.

(Insert table 16 here)

Column 1 shows that SYNERGY is significantly positively related to the bid premium with an estimated coefficient of 0.05 and a p-value of 0.0238. Column

2 shows that SYNERGY is also significantly positively related to the target abnormal returns with an estimated coefficient of 0.02 and a p-value of 0.0864. The results are consistent with the previous findings based on the Tobin's Q hypothesis in takeovers (Lang et al.,1989, 1991; Servaes, 1991). That is, shareholders of low Q targets have significantly higher benefit from takeovers than the shareholders of high Q targets. Column 3 presents regression results of synergy with the bidder abnormal returns. SYNERGY is also positively related to the bidder gains with an estimated coefficient of 0.003, though the relation is not significant with a p-value of 0.5361. The results lend support to Hypothesis 1, which predicts a positive relation between synergy, the bid premium, the target gain and the bidder gain in takeovers.

Then the impact is examined on the target information asymmetry proxy INDEX. By controlling the synergy effect and also firm and deal characteristics, the information asymmetry variable INDEX is significantly and positively related to the bid premium with an estimated coefficient of 0.11 and a p-value of 0.0142 as shown in Column 1. In Column 2, INDEX is significantly and positively related to the target abnormal returns with an estimated coefficient of 0.11 and a p-value lower than 0.01%. In Column 3, INDEX is positively related to the bidder abnormal returns with an estimated coefficient of 0.03 and a p-

value equal to 0.0045. The results lend support to Hypothesis 2a, which predicts that the takeover announcement contains information about the stand-alone value of the target, and that the revealed information triggers a revaluation of the target.

4.5.2 Synergy and Historical Accounting Measure

The information asymmetry INDEX is constructed with four information asymmetry proxies: analyst coverage, analyst forecast error, analyst forecast dispersion, and bid-ask spread. However, these four proxies do not reflect the historical information environment between the target and the market. They do not contain information about the reporting quality of the target either.

Hence, to disentangle the synergy effect and the information effect, an additional proxy R^2 is used to capture a different dimension of the target information environment. The proxy R^2 is obtained from the Ohlson correlation model of clean surplus earning-return. The calculation of R^2 is based on income statements and balance sheets, and the calculation is done with accounting data and market data up to the IPO date of the listed firm. Hence, the new proxy eliminates the two deficiencies that the other four proxies have. The regression results with R^2 are shown in Table 17.

(Insert table 17 here)

Column 1 shows that SYNERGY is significantly positively related to the bid premium with an estimated coefficient of 0.06 and a p-value of 0.0413. Column 2 shows that SYNERGY is significantly positively related to the target abnormal returns with an estimated coefficient of 0.03 and a p-value of 0.0366. Column 3 shows that SYNERGY is positively related to the bidder gains with an estimated coefficient of 0.002, though the relation is not significant at any conventional level. The results lend support to Hypothesis 1, which predicts a positive relation between synergy, the bid premium, the target gain and the bidder gains in takeovers.

Then the information asymmetry proxy R^2 is investigated. After controlling the synergy effect and also firm and deal characteristics, R^2 is significantly and negatively related to the bid's premium with an estimated coefficient of -0.11 and a p-value of 0.0177. R^2 is also significantly and negatively related to the target abnormal returns with an estimated coefficient of -0.10 and a p-value equal to 0.0382. R^2 is positively related to the bidder abnormal returns with a coefficient of 0.01, but the relation is not significant with a p-value of 0.1986.

The negative relation between R^2 and the target abnormal returns confirms Hypothesis 2a, which predicts that there exists information asymmetry between the target and the market prior to the takeover. As the bid price reveals information on the valuation of the target, the information asymmetry is greater between the target and the market before the takeover when the adjustment to the target stock prices becomes higher at the bid announcement. The results indicate that the takeover announcement does contain information about the stand-alone value of the target, and that the revealed information triggers a revaluation of the target.

4.6 Sample Period

This study's sample period spans a long time during which the socio-economic environments for mergers and acquisitions could change significantly. The sample is divided into two parts as a sensitive check. The first part concerns the sub-sample period 1995-2001. Takeovers announced in this period constitute around 60% of the total sample. In addition, this part includes the period of the high-tech bubble, when the managers and the investors might be overconfident. The second part consists of takeovers announced in periods 1986-1994 and

2002-2006, in which takeovers were less concentrated. Takeovers announced in this period constitute around 40% of the total sample with less than 100 takeovers for each year. The regression results are shown in Table 18.

(Insert table 18 here)

The first column shows the regression results for periods of 1986-1994 and 2002-2006. After controlling deal characteristics, firm characteristics, and the industry and year effect, the information asymmetry INDEX remains significantly positively related to the bid premium, the target abnormal returns, and the bidder abnormal returns with p-values of 0.0169, 0.0800, and 0.0431, respectively. The second column shows the regression results for the period of 1995-2001. After controlling deal characteristics, firm characteristics, and the industry and year effect, the information asymmetry INDEX remains significantly positively related to the bid premium and the target abnormal returns with p-values of 0.0282 and 0.0192 respectively. The relation between the bidder abnormal returns and information asymmetry is positive with an estimated coefficient of 0.02. However, the relation is not significant at any conventional level with a p-value of 0.1741.

Based on the sample period, the regression results show that takeovers play a key role in information-revealing. The value of the undervalued target firm is adjusted at the takeover announcement. Investors adjust the valuation of the target firm by latest information inferred from the takeover bid. It is substantiated as shown in periods of 1986-1994 and 2002-2006.

However, it is still not easy to write off the possibility that the bidder does not overpay for the target. For the sub-sample period of 1995-2001, the relation between the bidder CAR and the target information asymmetry is not significant, although the estimated coefficients are positive. One possible reason for insignificance is the netting-out of the positive effect of the information-revealing function on the bidder CAR by the negative effect of possible overbidding due to the bidder overconfidence.

Chapter V: Conclusion and Discussion

There are many takeover studies, but how information asymmetry of a target affects transaction processing receives little attention. This study fills this gap by examining the impact of the target information asymmetry on the bid premium, the target gains and the bidder gains in takeovers.

This study shows that information asymmetry has a significantly positive effect on the bid premium paid for the target. When the target is more opaque, the bid premium becomes higher and so do the target abnormal returns. These findings are inconsistent with the intuition that a negative relation exists between the target information asymmetry, the bid premium and the target gains in takeovers.

The high premium paid for an opaque target does not appear to be a wealth transfer from the bidder. Investors do not take the high premium for an opaque target as an overpayment by the bidder. Investors respond less negatively or even positively to the bidder when an opaque target is acquired relative to a transparent one. Hence, new value is created when an opaque target is acquired.

The study also finds that the new value comes from two sources. First, it is a reflection of the expected synergy that will be realized in future operation by

combining two entities. Second, the value comes from the revaluation of the target that is undervalued by the market before the takeover attempt.

This study also has its own limitations and implications for future studies. Firstly, this study documents a positive relation between the target information asymmetry and the bidder abnormal returns. Hence, it rejects the hypothesis which suggests that the bidder overpays for the target, but supports the hypothesis which affirms that the takeover goes ahead for synergy gains. However, there is only indirect evidence in support of the two hypotheses. Furthermore, this study shows that there is a positive but insignificant relation between the bidder abnormal returns and information asymmetry for the sample period of 1995-2001. One possible reason for insignificance is the netting-out of the positive effect of the information-revealing function on the bidder CAR by the negative effect of possible overbidding due to the bidder overconfidence.

Secondly, this study assumes that the market is efficient and investors can make correct judgment about a takeover once it is announced. A positive response to the bidder means that the market agrees with the takeover, and a negative response indicates the market's disagreement with the bidder decision. Based on this assumption, it is found that the market responds positively when the bidder acquires a highly opaque target. That is, the market agrees more when

the bidder acquires a highly opaque target than a slightly opaque target. This indicates that investors expect that bidders who acquire highly opaque targets should perform better in the long run than those who acquire least opaque targets. This behavioral issue is not examined in this study. Future studies can investigate whether such an expectation is true.

Lastly, this study shows that a highly opaque target gets a high bid premium and achieves high abnormal gains in takeovers. It seems that high information asymmetry is not harmful to the target in transaction processing of the takeover. However, the effect of information asymmetry is not known on the possibility of completing takeovers. That is, whether the success rate for acquiring highly opaque targets is lower than that for the least opaque targets is unclear. If the takeover fails, the target cannot gain anything from the takeover. By the same token, high information asymmetry is harmful to the target. It is not clear whether high information asymmetry makes the target less attractive to the bidder before the takeover attempt. That is, whether highly opaque firms are less likely to become targets of the bidder than least opaque firms is unclear. Future studies should deal with these issues.

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Table 1
Sample Distribution by Announcement Year

This table presents the yearly distribution of the sample which contains 1612 mergers and acquisitions announced between 1986 and 2006. In the sample, both the acquirer and the target are American firms traded on NYSE, AMEX or the NASDAQ, and the deal value is equal to or greater than $ 1 million.

Year	Number	Percentage
1986	30	1.86%
1987	33	2.05%
1988	62	3.85%
1989	43	2.67%
1990	23	1.43%
1991	30	1.86%
1992	26	1.61%
1993	34	2.11%
1994	38	2.36%
1995	103	6.39%
1996	113	7.01%
1997	167	10.36%
1998	168	10.42%
1999	182	11.30%
2000	120	7.44%
2001	110	6.82%
2002	67	4.16%
2003	85	5.27%
2004	89	5.52%
2005	68	4.22%
2006	21	1.30%
TOTAL	1612	100%

Table 2
Descriptive Statistics of the Variables

This table presents the descriptive statistics of the variables used in this study. *Premium* is calculated as (offer price-target stock price of four weeks prior announcement) /target stock price of four weeks prior takeover announcement. *BCAR* is the bidder abnormal returns over the five-day event window (-2, +2) using market model benchmark returns with the CRSP value-weighted index returns. *TCAR* is the target abnormal returns over the five-day event window (-2, +2) using market model benchmark returns with the CRSP value-weighted index returns. *Conglomerate* equals one if the primary business line of the bidder is different with the target and zero otherwise. *Toehold* equals one if the bidder holds more than half of the target's shares outstanding before the takeover and zero otherwise. *Competition* is the number of bidders in a takeover. *Tender* equals one if the takeover is advanced via tender offer and zero otherwise. *Attitude* equals one if the offer is resisted by the target and zero otherwise. *Pooling* equals one if the pooling-of-interest accounting method is reported in takeovers and zero if purchase method is used. *Medium* equals one for pure cash offer, two for offer with a mixture of cash and stock, and three for pure stock offer. *Sales Growth* is the target's proportional change in sales in the year before takeover announcement. *Market-to-Book* is the ratio of market value of target common stock to book value of equity at the end of the year before takeover announcement. *Target Size* is the logarithm of book value of target total asset at the end of the year before takeover announcement. *Relative Size* is the ratio of the market value of target common equity to that of the bidder at the end of the year before takeover announcement. *COV* is the number of analysts following a target in the year before takeover announcement. *ERR* is the ratio of the absolute difference between the forecast earnings and the actual earnings per share in the last month of the previous year of takeover announcement to the price per share at the beginning of the month. *DISP* is the standard deviation of all earnings forecasts made in the last month of the previous year of takeover announcement. *SPREAD* is the annual average of the daily relative bid-ask spread defined as the absolute value of the bid-ask spread divided by the average of bid and ask in the previous year of announcement. *INDEX* is constructed by consolidating the four information asymmetry measures: *COV*, *ERR*, *DISP* and *SPREAD*. R^2 is got from the earning-return correlation model $P_{it} = a + b_1 E_{it} + b_2 BV_{it} + \varepsilon_{it}$. *SYNERGY* equals 1 if a low Q bidder acquires a high Q target (the least synergetic), equals 3 if a high Q bidder acquires a low Q target (the most synergetic), and equals 2

for takeovers of other types (the medium synergetic).

Variable	Number	Mean	STD DEV	Min	Median	Max
Testing Variables						
Premium	1612	0.415	0.380	-0.929	0.359	2
BCAR	1078	-0.012	0.079	-0.839	-0.009	0.505
TCAR	1276	0.216	0.252	-0.739	0.176	3.370
Deal and Firm Characteristics						
Conglomerate	1612	0.69	0.46	0	1	1
Toehold	1612	0.12	0.33	0	0	1
Competition	1612	1.08	0.33	1	1	4
Tender	1612	0.22	0.41	0	0	1
Attitude	1612	0.12	0.32	0	0	1
Pooling	1612	0.17	0.37	0	0	1
Medium	1612	2.06	0.88	1	2	3
Market-to-Book	1612	2.65	3.71	0.08	1.70	66.63
Sales Growth	1612	0.38	2.45	-1.0	0.129	82.76
Target Size	1612	4.80	1.19	0.11	4.86	6.90
Relative Size	1612	0.34	0.74	0.0001	0.12	10.08
Information Asymmetry and Synergy Proxies						
COV	1199	4.45	3.97	1.0	3	29.0
ERR	1151	0.031	0.16	0	0.004	3.21
DISP	989	0.01	0.043	0	0.0021	0.74
SPREAD	1499	0.037	0.035	0.0014	0.03	0.60
INDEX	1612	0.56	0.17	0.1	0.56	1.0
R^2	926	0.51	0.27	0.0002	0.51	0.98
SYNERGY	1612	1.79	0.63	1	2	3

Table 3

Pearson Correlations among Variables

This table shows the Pearson correlation among variables used in this study. Variable definitions are in Table 2. Significance at the 10%, 5%, and 1% level is noted by *, **, and ***, respectively.

Panel A. Testing variables with information asymmetry proxies, synergy proxy and firm characteristics variables

	Premium	BCAR	TCAR	R^2	COV	ERR	DISP	SPREAD	INDEX	SYNERGY	Market-to-Book	Sales Growth	Target Size	Relative Size
Premium	1	0.04	0.57***	-0.08***	-0.05**	0.11***	0.08***	0.09***	0.12***	0.07***	-0.02	0.02*	-0.09***	-0.10***
BCAR		1	0.07**	0.05	-0.13***	0.04**	0.08***	0.09***	0.14***	0.06**	-0.05*	-0.06**	-0.09***	-0.09***
TCAR			1	-0.10***	-0.07*	0.06***	0.03*	0.06**	0.13***	0.07**	-0.03	0.01	-0.07***	-0.08***
R^2				1	-0.12***	0.10**	0.01	0.11***	-0.05	0.03	-0.06*	0.04	-0.10**	-0.005
COV					1	-0.03	-0.03	-0.40***	-0.55***	-0.16***	0.09***	-0.03	0.36***	0.14***
ERR						1	0.36***	0.25***	0.24***	0.11***	-0.08***	-0.01	-0.03*	-0.04
DISP							1	0.07**	0.27***	0.06**	-0.07**	-0.01	-0.05*	-0.03
SPREAD								1	0.63***	0.21***	-0.12***	-0.01	-0.37***	-0.09***
INDEX									1	0.12***	-0.19***	-0.001	-0.42***	-0.10***
SYNERGY										1	-0.18***	0.002	-0.14***	-0.01
Market-to-Book											1	0.08***	-0.07***	0.03
Sales Growth												1	-0.06**	-0.01
Target Size													1	0.09***
Relative Size														1

Panel B. Testing variables with deal characteristics variables and firm characteristics variables

	Premium	BCAR	TCAR	Conglomerate	Toehold	Competition	Tender	Attitude	Pooling	Medium	Market-to-Book	Sales Growth	Target Size	Relative Size
Premium	1	0.04	0.57***	0.03	-0.17***	0.05**	0.16***	-0.05**	0.06***	-0.02	-0.02	0.02*	-0.09***	-0.10***
BCAR		1	0.07**	-0.02	0.03	0.06**	0.12***	0.01	-0.09***	-0.17***	-0.05*	-0.06**	-0.09***	-0.09***
TCAR			1	0.04	-0.12***	-0.04*	0.18***	-0.01	-0.01	-0.13	-0.03	0.01	-0.07***	-0.08***
Conglomerate				1	0.08***	0.03	0.10***	0.05**	-0.04*	-0.08***	0.01	-0.01	-0.01	0.002
Toehold					1	-0.09***	-0.01	0.32***	-0.17***	-0.26***	0.01	0.04	0.01	0.03
Competition						1	0.14***	0.18***	-0.07***	-0.07***	-0.06**	-0.01	0.03	0.13***
Tender							1	0.13***	-0.23***	-0.45***	-0.01	0.02	-0.03	-0.0003
Attitude								1	-0.15***	-0.25***	-0.06***	-0.02	0.04	0.18***
Pooling									1	0.46***	0.09***	0.02	0.02	-0.03
Medium										1	0.11***	0.04	0.06**	0.03
Market-to-Book											1	0.08***	-0.07***	0.03
Sales Growth												1	-0.06**	-0.01
Target Size													1	0.09***
Relative Size														1

Panel C. Testing variables with information asymmetry proxies, synergy proxy and deal characteristics variables

	R^2	COV	ERR	DISP	SPREAD	INDEX	SYNERGY	Conglomerate	Toehold	Competition	Tender	Attitude	Pooling	Medium
R^2	1	-0.12***	0.10**	0.01	0.11***	-0.05	0.03	-0.03	0.02	0.01	-0.07**	-0.03	0.01	0.03
COV		1	-0.03	-0.03	-0.40***	-0.55***	-0.16***	-0.002	0.01	0.04	-0.01	0.11*	0.07***	0.04
ERR			1	0.36***	0.25***	0.24***	0.11***	0.01	0.08***	0.09***	0.03	-0.03	-0.06**	-0.02
DISP				1	0.07**	0.27***	0.06**	0.03	0.02	-0.01	0.02	-0.04	-0.06**	-0.01
SPREAD					1	0.63***	0.21***	-0.004	0.004	-0.05**	-0.03	-0.04	-0.01	0.01
INDEX						1	0.12***	0.02	0.04	-0.05*	0.04*	-0.02	-0.11***	-0.07
SYNERGY							1	-0.04	-0.03	0.004	0.02	0.05*	-0.06***	-0.001
Conglomerate								1	0.08***	0.03	0.10***	0.05**	-0.04*	-0.08***
Toehold									1	-0.09***	-0.01	0.32***	-0.17***	-0.26***
Competition										1	0.14***	0.18***	-0.07***	-0.07***
Tender											1	0.13***	-0.23***	-0.45***
Attitude												1	-0.15***	-0.25***
Pooling													1	0.46***
Medium														1

Table 4

Premium Sorting by Information Asymmetry Level

This table shows the average bid premiums of 5 deciles sorted by information asymmetry level. *1/COV* is the reciprocal of *COV* which is the number of analysts following a target in the previous year of takeover announcement. *ERR* is the ratio of the absolute difference between the forecast earnings and the actual earnings per share in the last month of the previous year of takeover announcement to the price per share at the beginning of the month. *DISP* is the standard deviation of all earnings forecasts made in the last month of the previous year of takeover announcement. *SPREAD* is the annual average of the daily relative bid-ask spread defined as the absolute value of the bid-ask spread divided by the average of bid and ask in the previous year of announcement. *INDEX* is constructed by consolidating the four information asymmetry measures: *COV*, *ERR*, *DISP* and *SPREAD*. P values are reported in parentheses. Significance at the 10%, 5%, and 1% level is noted by *, **, and ***, respectively.

	1/COV	ERR	DISP	SPREAD	INDEX
D1 (low)	0.399*** (<.0001)	0.356*** (<.0001)	0.373*** (<.0001)	0.337*** (<.0001)	0.340*** (<.0001)
D2	0.399*** (<.0001)	0.386*** (<.0001)	0.370*** (<.0001)	0.396*** (<.0001)	0.381*** (<.0001)
D3	0.411*** (<.0001)	0.404*** (<.0001)	0.441*** (<.0001)	0.396*** (<.0001)	0.392*** (<.0001)
D4	0.433*** (<.0001)	0.459*** (<.0001)	0.435*** (<.0001)	0.431*** (<.0001)	0.449*** (<.0001)
D5 (high)	0.441*** (<.0001)	0.455*** (<.0001)	0.436*** (<.0001)	0.452*** (<.0001)	0.470*** (<.0001)
D5-D1	0.042* (0.0826)	0.099*** (0.0015)	0.063* (0.0813)	0.116*** (<.0001)	0.130*** (<.0001)

Table 5
Regression on the Bid Premium

This table presents the regression results of the following regression model:
$Premium_i = a + b*Inf\ Proxy_i + c*Deal\ Char_i + d*Firm\ Char_i + \varepsilon_i$
"Inf Proxy" consists of five information asymmetry proxies of COV, ERR, DISP, SPREAD, and INDEX. "Deal Char" is the deal characteristics of Conglomerate, Toehold, Competition, Tender, Attitude, Medium and Pooling. "Firm Char" is the firm characteristics of Sales Growth, Market-to-Book, Target Size, and Relative Size. Variable definitions are in Table 2. Significance is based on White-adjusted standard errors with *p*-values reported in parentheses. Significance at the 10%, 5%, and 1% level is noted by *, **, and ***, respectively.

	1	2	3	4	5
Intercept	0.43*** (<.0001)	0.48*** (<.0001)	0.51*** (<.0001)	0.39*** (<.0001)	0.35*** (<.0001)
COV	-0.004 (0.2056)				
ERR		0.56** (0.0410)			
DISP			2.26* (0.0976)		
SPREAD				0.71** (0.0490)	
INDEX					0.13*** (0.0096)
Conglomerate	0.01 (0.1586)	0.01 (0.7010)	0.01 (0.5173)	0.04** (0.0110)	0.02 (0.2631)
Toehold	-0.20*** (<.0001)	-0.21*** (<.0001)	-0.18*** (<.0001)	-0.18*** (<.0001)	-0.19*** (<.0001)
Competition	0.01 (0.3306)	0.02 (0.4922)	-0.003 (0.9327)	0.01 (0.7100)	0.03 (0.2979)
Tender	0.12*** (<.0001)	0.14*** (<.0001)	0.12*** (<.0001)	0.13*** (<.0001)	0.16*** (<.0001)
Attitude	-0.03 (0.4337)	-0.02 (0.4239)	0.004 (0.8940)	0.01 (0.5878)	0.01 (0.6325)
Pooling	0.05*** (0.0079)	0.05* (0.0576)	0.07*** (0.0084)	0.05** (0.0395)	0.09*** (0.0013)
Medium	-0.01 (0.7119)	-0.01 (0.5101)	-0.02 (0.1570)	0.004 (0.7529)	0.03 (0.9801)
Sales Growth	0.004 (0.2168)	0.003 (0.2645)	0.006 (0.2842)	0.004 (0.2581)	0.004 (0.4139)
Market-to-Book	0.001 (0.9283)	0.002 (0.4583)	0.002 (0.4372)	0.001 (0.4315)	-0.001 (0.7004)

Target Size	-0.03*** (0.0082)	-0.02** (0.0151)	-0.02** (0.0400)	-0.02** (0.0335)	-0.01* (0.0554)
Relative Size	-0.02*** (0.0002)	-0.03*** (0.0045)	-0.03*** (0.0066)	-0.04*** (0.0044)	-0.04*** (0.0005)
N	1170	1122	968	1469	1578
Adj R-Square	0.0788	0.1050	0.1066	0.0787	0.0777

Table 6

Sensitive Analyses of Determinants of the Bid Premium

This table provides the sensitive analyses of the bid premium on information asymmetry measured with INDEX. In column 1, failed transactions and transactions in which the deal value is less than 1% of the market value of the bidder assets (defined as the book value of asset minus the book value of equity plus the market value of equity) are deleted from the total sample. In column 2 and 3, sample is divided according to the median total asset (*Target Size*) of the target. In column 4 and 5, sample is divided according to the median relative size of the target to the bidder (*Relative Size*). In column 6, 7 and 8, sample is divided according to the payment method. Variable definitions are reported in table 2. Significance is based on White-adjusted standard errors with *p*-values reported in parentheses. Significance at the 10%, 5%, and 1% level is noted by *, **, and ***, respectively.

	1 (no failure)	2 (big)	3 (small)	4 (big)	5 (small)	6 (pure cash)	7 (mixture)	8 (pure stock)
Intercept	0.43*** (<.0001)	0.23*** (0.0006)	0.25*** (0.0090)	0.30*** (<.0001)	0.32*** (<.0001)	0.32** (0.0142)	0.32** (0.0125)	0.54*** (<.0001)
INDEX	0.17*** (0.0011)	0.18*** (0.0057)	0.20*** (0.0089)	0.10* (0.0906)	0.18*** (0.0056)	0.08 (0.1232)	0.18** (0.0190)	0.11* (0.0857)
Conglomerate	-0.003 (0.8992)	0.03 (0.2262)	0.002 (0.9472)	0.03 (0.2712)	-0.01 (0.6465)	-0.02 (0.5730)	0.03 (0.3231)	0.05 (0.1171)
Toehold	-0.16*** (0.0004)	-0.16*** (0.0001)	-0.28*** (<.0001)	-0.21*** (<.0001)	-0.22*** (<.0001)	-0.15*** (0.0004)	-0.22*** (<.0001)	-0.22*** (<.0001)
Competition	0.04 (0.3997)	0.03 (0.3551)	0.04 (0.3914)	0.01 (0.8224)	0.08 (0.1024)	0.11* (0.0556)	0.02 (0.6825)	-0.08** (0.0423)
Tender	0.13*** (<.0001)	0.18*** (<.0001)	0.11*** (0.0023)	0.14*** (<.0001)	0.16*** (<.0001)	0.14*** (<.0001)	0.21*** (<.0001)	0.09 (0.2368)

Attitude	0.02 (0.6960)	0.05 (0.2244)	-0.01 (0.9177)	0.04 (0.3521)	0.04 (0.5016)	-0.07* (0.0546)	0.05 (0.2838)	0.11 (0.1328)
Pooling	0.07** (0.0289)	0.13*** (0.0001)	0.04 (0.3944)	0.11*** (0.0010)	0.08* (0.0465)	N/A	0.12 (0.1874)	0.06** (0.0386)
Medium	-0.03 (0.8674)	-0.01 (0.6548)	-0.01 (0.2653)	-0.01 (0.5681)	0.002 (0.7826)	N/A	N/A	N/A
Sales Growth	-0.001 (0.7508)	0.011 (0.5180)	0.006 (0.1284)	-0.017 (0.2771)	0.008* (0.0544)	-0.006 (0.4476)	0.006 (0.3635)	0.007 (0.6422)
Market-to-Book	-0.008** (0.0318)	0.005 (0.2092)	-0.067* (0.0538)	-0.083** (0.0196)	0.0004 (0.9150)	-0.002 (0.6183)	-0.001 (0.6736)	-0.0002 (0.9643)
Relative Size	-0.053*** (0.0033)	-0.044** (0.0262)	-0.071* (0..0820)	-0.026* (0.0502)	-0.141** (0.050)	-0.015 (0.2034)	-0.055** (0.0487)	-0.07** (0.0156)
Target Size	-0.03*** (0.0057)	-0.0001 (0.1818)	0.0006 (0.1528)	-0.0001 (0.2260)	-0.00003 (0.6264)	-0.0097 (0.5535)	-0.018 (0.1969)	-0.028** (0.0219)
N	1120	780	782	780	782	544	428	606
Adj R-Square	0.0822	0.0835	0.0847	0.0690	0.0904	0.1025	0.1142	0.0529

Table 7
Target Abnormal Returns Sorting by Information Asymmetry Level

This table shows the average target cumulative abnormal return (TCAR) of 5 deciles sorted by information asymmetry level. *1/COV* is the reciprocal of *COV* which is the number of analysts following a target in the previous year of takeover announcement. *ERR* is the ratio of the absolute difference between the forecast earnings and the actual earnings per share in the last month of the previous year of takeover announcement to the price per share at the beginning of the month. *DISP* is the standard deviation of all earnings forecasts made in the last month of the previous year of takeover announcement. *SPREAD* is the annual average of the daily relative bid-ask spread defined as the absolute value of the bid-ask spread divided by the average of bid and ask in the previous year of announcement. *INDEX* is constructed by consolidating the four information asymmetry measures: *COV*, *ERR*, *DISP* and *SPREAD*. P values are reported in parentheses. Significance at the 10%, 5%, and 1% level is noted by *, **, and ***, respectively.

	1/COV	ERR	DISP	SPREAD	INDEX
D1 (low)	0.200***	0.166***	0.172***	0.184***	0.148***
	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)
D2	0.210***	0.175***	0.209***	0.192***	0.199***
	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)
D3	0.209***	0.196***	0.211***	0.209***	0.217***
	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)
D4	0.207***	0.280***	0.214***	0.202***	0.241***
	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)
D5 (high)	0.228***	0.241***	0.222***	0.264***	0.243***
	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)
D5-D1	0.029*	0.075***	0.05**	0.08***	0.095***
	(0.0846)	(0.0034)	(0.0440)	(0.0003)	(<.0001)

Table 8
Regression on Target Abnormal Returns

This table presents the regression results of the following regression model:
$TCAR_i = a + b*Inf\ Proxy_i + c*Deal\ Char_i + d*Firm\ Char_i + e*ResPremium_i + \varepsilon_i$

"Inf Proxy" consists of five information asymmetry proxies of COV, ERR, DISP, SPREAD, and INDEX. "Deal Char" is the deal characteristics of Conglomerate, Toehold, Competition, Tender, Attitude, Medium and Pooling. "Firm Char" is the firm characteristics of Sales Growth, Market-to-Book, Target Size, and Relative Size. "ResPremium" is the residual of the bid premium from orthogonalizing against each information asymmetry proxy. Variable definitions are in Table 2. Significance is based on White-adjusted standard errors with *p*-values reported in parentheses. Significance at the 10%, 5%, and 1% level is noted by *, **, and ***, respectively.

	1	2	3	4	5
Intercept	0.40*** (<.0001)	0.34*** (<.0001)	0.25*** (<.0001)	0.37*** (<.0001)	0.28*** (<.0001)
COV	-0.001 (0.2346)				
ERR		0.07** (0.0362)			
DISP			2.20 (0.1454)		
SPREAD				0.33* (0.0990)	
INDEX					0.12*** (0.0028)
Conglomerate	0.01 (0.2834)	0.01 (0.3101)	0.01 (0.3347)	0.01 (0.2532)	0.02 (0.1765)
Toehold	-0.02 (0.3087)	-0.04* (0.0933)	-0.05** (0.0566)	-0.05** (0.0180)	-0.05** (0.0151)
Competition	-0.09*** (<.0001)	-0.07*** (0.0021)	-0.09*** (<.0001)	-0.09*** (<.0001)	-0.09*** (<.0001)
Tender	0.06*** (0.0006)	0.06** (0.0018)	0.05** (0.0234)	0.04** (0.0134)	0.04*** (0.0069)
Attitude	0.003 (0.8804)	0.03 (0.1610)	0.03 (0.1306)	0.02 (0.3049)	0.02 (0.2042)
Pooling	0.01 (0.5479)	0.03 (0.1436)	0.02 (0.4132)	0.02 (0.3205)	0.02 (0.2572)
Medium	-0.04*** (0.0002)	-0.04*** (0.0002)	-0.04*** (0.0003)	-0.04*** (<.0001)	-0.04*** (<.0001)
Sales Growth	0.002 (0.5751)	0.002 (0.6521)	0.005 (0.2043)	0.001 (0.6698)	0.005 (0.1966)
Market-to-Book	-0.0002 (0.8900)	-0.001 (0.4682)	-0.001 (0.3568)	0.0004 (0.9998)	0.0003 (0.7854)
Target Size	-0.006 (0.3000)	-0.002 (0.7372)	-0.003 (0.6220)	-0.001 (0.9016)	0.004 (0.4989)
Relative Size	-0.003 (0.6313)	-0.002 (0.7849)	-0.005 (0.4328)	-0.003 (0.5924)	-0.003 (0.6600)
ResPremium	0.39*** (<.0001)	0.41*** (<.0001)	0.39*** (<.0001)	0.40*** (<.0001)	0.42*** (<.0001)

N	910	858	716	1139	1276
Adj R-Square	0.3081	0.3455	0.3205	0.3532	0.3355

Table 9
Target Abnormal Returns Sorting by Information Asymmetry Proxy, INDEX

This table presents the 2 decile target cumulative abnormal return (TCAR) sorted by information asymmetry INDEX. In column A, the sample is divided into three groups according to the payment method in takeovers-pure cash offer, mixture offer, and pure stock offer. In column B, the sample is divided into three groups according to the bidder year-end market value of common equity in the year before takeover announcement. In column C, the sample is divided into three groups according to the target year-end market value of common equity in the year before takeover announcement. In column D, the sample is divided into three groups according to the relative size of the target year-end market value of common equity to that of the bidder in the year before takeover announcement. P values are reported in parentheses. Significance at the 10%, 5%, and 1% level is noted by *, **, and ***, respectively.

	A: Payment Method			B: Bidder Size			C: Target Size			D: Relative Size		
	CASH	MIXTURE	STOCK	SMALL	MEDIUM	BIG	SMALL	MEDIUM	BIG	SMALL	MEDIUM	BIG
Low	0.23***	0.18***	0.16***	0.17***	0.16***	0.22***	0.19***	0.20***	0.19***	0.24***	0.20***	0.13***
	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)
High	0.29***	0.24***	0.20***	0.21***	0.23***	0.27***	0.26***	0.24***	0.20***	0.30***	0.23***	0.17***
	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)
High - Low	0.054**	0.059*	0.036*	0.04*	0.065***	0.057**	0.07***	0.04	0.01	0.062**	0.026	0.042**
	(0.0271)	(0.0667)	(0.0652)	(0.0595)	(0.0015)	(0.0242)	(0.0050)	(0.1134)	(0.6173)	(0.0270)	(0.2148)	(0.0161)

Table 10
Determinants of Target Abnormal Returns by Payment Method

This table provides the sensitive analysis of the relationship between information asymmetry measured with INDEX and target cumulative abnormal returns by dividing the sample into three groups according to the payment method in takeovers- pure cash offer, mixture offer, and pure stock offer. "ResPremium" is the residual of the bid premium from orthogonalizing against information asymmetry INDEX. Variable definitions are reported in table 2. Significance is based on White-adjusted standard errors with *p*-values reported in parentheses. Significance at the 10%, 5%, and 1% level is noted by *, **, and ***, respectively.

	pure cash	mixture	pure stock
Intercept	0.25*** (0.0046)	0.18** (0.0483)	0.14** (0.0162)
INDEX	0.127** (0.0214)	0.139** (0.0277)	0.093* (0.0600)
Conglomerate	0.02 (0.3283)	0.02 (0.3615)	0.01 (0.7255)
Toehold	-0.08*** (0.0075)	0.02 (0.6927)	-0.17*** (0.0009)
Competition	-0.14*** (<.0001)	-0.09*** (0.0007)	-0.02 (0.4585)
Tender	0.03 (0.2450)	0.06** (0.0199)	0.12** (0.0246)
Attitude	0.06** (0.0327)	-0.03 (0.2879)	0.03 (0.4817)
Pooling	N/A	0.05 (0.6068)	0.01 (0.4138)
Sales Growth	0.02*** (<.0001)	-0.003 (0.2226)	0.02*** (0.0030)
Market-to-Book	0.0001 (0.9832)	0.002 (0.2060)	-0.002 (0.3122)
Target Size	0.01 (0.3554)	0.004 (0.7306)	-0.0002 (0.9816)
Relative Size	0.004 (0.5991)	-0.008 (0.3958)	-0.03* (0.0540)
ResPremium	0.41*** (<.0001)	0.42*** (<.0001)	0.39*** (<.0001)
N	433	357	486
Adj R-Square	0.3221	0.3334	0.3266

Table 11
Bidder Abnormal Returns Sorting by Information Asymmetry Level

This table shows the average bidder cumulative abnormal return (BCAR) of 5 deciles sorted by information asymmetry level. *1/COV* is the reciprocal of *COV* which is the number of analysts following a target in the previous year of takeover announcement. *ERR* is the ratio of the absolute difference between the forecast earnings and the actual earnings per share in the last month of the previous year of takeover announcement to the price per share at the beginning of the month. *DISP* is the standard deviation of all earnings forecasts made in the last month of the previous year of takeover announcement. *SPREAD* is the annual average of the daily relative bid-ask spread defined as the absolute value of the bid-ask spread divided by the average of bid and ask in the previous year of announcement. *INDEX* is constructed by consolidating the four information asymmetry measures: *COV*, *ERR*, *DISP* and *SPREAD*. P values are reported in parentheses. Significance at the 10%, 5%, and 1% level is noted by *, **, and ***, respectively.

	1/COV	ERR	DISP	SPREAD	INDEX
D1 (low)	-0.032***	-0.025***	-0.027***	-0.032***	-0.027***
	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)
D2	-0.023***	-0.016***	-0.018***	-0.015***	-0.020***
	(<.0001)	(<.0001)	(<.0001)	(0.0026)	(<.0001)
D3	-0.013**	-0.020***	-0.023***	-0.012*	-0.014***
	(0.0294)	(0.0010)	(<.0001)	(0.0586)	(<.0001)
D4	-0.007***	-0.009***	-0.017**	0.00013	-0.005
	(0.0097)	(<.0001)	(0.0154)	(0.9769)	(0.7834)
D5 (high)	0.001	-0.009*	-0.007	0.00015	0.003
	(0.5020)	(0.0612)	(0.2191)	(0.9782)	(0.5307)
D5-D1	0.033***	0.016**	0.02***	0.033***	0.03***
	(<.0001)	(0.0190)	(0.0014)	(<.0001)	(<.0001)

Table 12
Regression on Bidder Abnormal Returns

This table presents the regression results of the following regression model:
$BCAR_i = a + b*Inf\ Proxy_i + c*Deal\ Char_i + d*Firm\ Char_i + e*Premium_i + \varepsilon_i$

"Inf Proxy" consists of five information asymmetry proxies of COV, ERR, DISP, SPREAD, and INDEX. "Deal Char" is the deal characteristics of Conglomerate, Toehold, Competition, Tender, Attitude, Medium and Pooling. "Firm Char" is the firm characteristics of Sales Growth, Market-to-Book, Target Size, and Relative Size. Variable definitions are in Table 2. Significance is based on White-adjusted standard errors with *p*-values reported in parentheses. Significance at the 10%, 5%, and 1% level is noted by *, **, and ***, respectively.

	1	2	3	4	5
Intercept	0.03** (0.0492)	0.04** (0.0202)	0.04* (0.0626)	0.01 (0.5368)	-0.004 (0.8101)
COV	-0.002*** (0.0075)				
ERR		0.01 (0.2217)			
DISP			0.15* (0.0609)		
SPREAD				0.13* (0.0641)	
INDEX					0.03*** (0.0015)
Conglomerate	-0.003 (0.6862)	-0.004 (0.5597)	-0.005 (0.4869)	-0.005 (0.3592)	-0.006 (0.2140)
Toehold	0.004 (0.6314)	0.001 (0.9442)	0.002 (0.8520)	0.006 (0.3814)	0.006 (0.3176)
Competition	0.02** (0.0232)	0.01** (0.0499)	0.02* (0.0571)	0.03** (0.0183)	0.02*** (0.0081)
Tender	0.01* (0.0969)	0.01 (0.1602)	0.01 (0.1723)	0.01 (0.1927)	0.01 (0.1017)
Attitude	0.003 (0.7480)	0.004 (0.6825)	0.004 (0.7153)	-0.006 (0.4884)	-0.004 (0.6111)
Pooling	-0.004 (0.6845)	-0.003 (0.7413)	0.001 (0.9304)	0.0005 (0.9543)	0.001 (0.8902)
Medium	-0.01** (0.0109)	-0.01*** (0.0068)	-0.02*** (0.0014)	-0.01*** (0.0034)	-0.01*** (0.0005)
Sales Growth	-0.004*** (0.0017)	-0.003*** (0.0014)	-0.003*** (0.0012)	-0.004*** (<.0001)	-0.003*** (0.0026)
Market-to-Book	-0.001** (0.0427)	-0.001** (0.0134)	-0.001* (0.0503)	-0.0001 (0.8443)	-0.0003 (0.6096)
Target Size	-0.01* (0.0594)	-0.01*** (0.0025)	-0.01** (0.0267)	-0.005** (0.0447)	-0.003 (0.1039)
Relative Size	-0.01 (0.3289)	-0.01 (0.2633)	-0.01 (0.2137)	-0.02 (0.1130)	-0.01 (0.2112)
Premium	0.01 (0.5386)	0.01 (0.3909)	0.002 (0.8481)	0.002 (0.7888)	0.003 (0.7423)
N	872	835	712	996	1078
Adj R-Square	0.0598	0.0535	0.0568	0.0519	0.0543

Table 13
Bidder Abnormal Returns Sorting by Information Asymmetry Proxy, INDEX

This table presents the 2 decile bidder cumulative abnormal return (BCAR) sorted by information asymmetry INDEX. In column A, the sample is divided into three groups according to the payment method in takeovers-pure cash offer, mixture offer, and pure stock offer. In column B, the sample is divided into three groups according to the bidder year-end market value of common equity in the year before takeover announcement. In column C, the sample is divided into three groups according to the target year-end market value of common equity in the year before takeover announcement. In column D, the sample is divided into three groups according to the relative size of the target year-end market value of common equity to that of the bidder in the year before takeover announcement. P values are reported in parentheses. Significance at the 10%, 5%, and 1% level is noted by *, **, and ***, respectively.

	A: Payment Method			B: Bidder Size			C: Target Size			D: Relative Size		
	CASH	MIXTURE	STOCK	SMALL	MEDIUM	BIG	SMALL	MEDIUM	BIG	SMALL	MEDIUM	BIG
Low	0.0003 (0.1225)	-0.022*** (0.0053)	-0.038*** (<.0001)	-0.027*** (0.0003)	-0.023*** (<.0001)	-0.02*** (<.0001)	-0.01*** (0.0085)	-0.023*** (0.0002)	-0.019*** (0.0003)	-0.009*** (0.0032)	-0.023*** (<.0001)	-0.037*** (<.0001)
High	0.0105*** (0.0009)	-0.004 (0.1535)	-0.016*** (0.0091)	0.0045 (0.5151)	0.0002 (0.9688)	-0.008* (0.0531)	0.0033 (0.6330)	-0.001 (0.6919)	-0.004 (0.2815)	0.0013 (0.7099)	-0.003 (0.5488)	-0.007 (0.3826)
High – Low	0.01** (0.0349)	0.018** (0.0205)	0.022*** (0.0076)	0.032*** (0.0019)	0.023*** (0.0004)	0.012** (0.0407)	0.014** (0.0401)	0.022*** (0.0086)	0.015** (0.0312)	0.01** (0.0269)	0.02*** (0.0045)	0.03*** (0.0042)

Table 14
Determinants of Bidder Abnormal Returns by Payment Method

This table provides the test of the relationship between information asymmetry measured with INDEX and bidder cumulative abnormal returns by dividing the sample into three groups according to the payment method in takeovers- pure cash offer, mixture offer, and pure stock offer. Variable definitions are reported in table 2. Significance is based on White-adjusted standard errors with *p*-values reported in parentheses. Significance at the 10%, 5%, and 1% level is noted by *, **, and ***, respectively.

	pure cash	mixture	pure stock
Intercept	-0.02 (0.4228)	-0.02 (0.7419)	-0.06* (0.0527)
INDEX	0.037** (0.0176)	0.021 (0.4500)	0.055** (0.0371)
Conglomerate	-0.002 (0.8058)	-0.01 (0.6189)	-0.02* (0.0564)
Toehold	-0.006 (0.4953)	0.04*** (<.0001)	0.02 (0.1983)
Competition	-0.01 (0.1892)	0.03* (0.0939)	0.04** (0.0172)
Tender	0.002 (0.7370)	0.03** (0.0410)	0.001 (0.9732)
Attitude	-0.01 (0.1623)	0.01 (0.6487)	0.007 (0.5990)
Pooling	N/A	-0.03 (0.1689)	0.01 (0.2910)
Sales Growth	-0.0006 (0.6891)	-0.01 (0.4456)	-0.002 (0.6992)
Market-to-Book	0.0003 (0.7310)	0.001 (0.2228)	-0.0005 (0.6888)
Target Size	0.0003 (0.9241)	-0.004 (0.4859)	-0.004 (0.2284)
Relative Size	0.008** (0.0440)	-0.04 (0.1435)	-0.01* (0.0982)
Premium	0.03*** (0.0006)	-0.01 (0.5975)	-0.01 (0.5985)
N	383	285	410
Adj R-Square	0.0419	0.1191	0.0306

Table 15
Regression on Synergetic Gains

This table presents the regression results of the following regression model:
$\text{Synergetic Gain}_i = a + b*\text{Inf Proxy}_i + c*\text{Deal Char}_i + d*\text{Firm Char}_i + e*\text{Premium}_i + \varepsilon_i$

Following Bradley et al. (1988), the synergetic gain is defined as the cumulative abnormal return over the (-2, +2) event window for a value-weighted portfolio of the bidder and target return. The weights for the bidder and the target are based on the market value of equity two days prior to the announcement of the deal. The target weight adjusts for the percentage of target shares held by the acquirer prior to the announcement of the deal. Abnormal returns are defined as market model residuals, where the parameters are estimated over the (-205,-6) event window relative to the announcement day. "Inf Proxy" consists of five information asymmetry proxies of COV, ERR, DISP, SPREAD, and INDEX. "Deal Char" is the deal characteristics of Conglomerate, Toehold, Competition, Tender, Attitude, Medium and Pooling. "Firm Char" is the firm characteristics of Sales Growth, Market-to-Book, Target Size, and Relative Size. Variable definitions are in Table 2. Significance is based on White-adjusted standard errors with *p*-values reported in parentheses. Significance at the 10%, 5%, and 1% level is noted by *, **, and ***, respectively.

	1	2	3	4	5
Intercept	0.04*** (0.0088)	0.04** (0.0431)	0.04* (0.0804)	0.03 (0.1475)	0.01 (0.5608)
COV	-0.001* (0.0633)				
ERR		0.01 (0.2839)			
DISP			0.13 (0.1053)		
SPREAD				0.13* (0.0621)	
INDEX					0.03*** (0.0079)
Conglomerate	0.003 (0.6485)	-0.002 (0.8041)	-0.004 (0.5879)	-0.005 (0.3566)	-0.005 (0.3660)
Toehold	-0.007 (0.3814)	-0.01 (0.1575)	-0.007 (0.4743)	-0.003 (0.6696)	-0.006 (0.3803)
Competition	0.004 (0.5264)	0.01 (0.5518)	0.01 (0.4637)	0.01 (0.2878)	0.008 (0.3406)
Tender	0.01 (0.2984)	0.01 (0.1645)	0.01 (0.2483)	0.01 (0.2041)	0.01 (0.1373)
Attitude	-0.0002 (0.9846)	0.02* (0.0765)	0.01 (0.3034)	0.007 (0.4578)	0.01 (0.1188)
Pooling	0.005 (0.4863)	0.003 (0.7630)	0.008 (0.4334)	0.009 (0.2656)	0.01 (0.2203)
Medium	-0.01*** (0.0010)	-0.02*** (0.0008)	-0.02*** (<.0001)	-0.01*** (0.0002)	-0.02*** (<.0001)

Sales Growth	-0.002** (0.0246)	-0.002*** (0.0089)	-0.002*** (0.0098)	-0.005*** (0.0008)	-0.003*** (0.0029)
Market-to-Book	-0.002*** (0.0050)	-0.002** (0.0122)	-0.002*** (0.0073)	-0.0001 (0.8884)	-0.0004 (0.5994)
Target Size	-0.0008 (0.6890)	-0.003 (0.2912)	-0.001 (0.6448)	-0.002 (0.3455)	-0.0008 (0.6987)
Relative Size	0.02*** (0.0022)	0.02*** (0.0041)	0.02*** (0.0083)	0.01 (0.1353)	0.02*** (0.0012)
Premium	0.01** (0.0346)	0.03*** (0.0012)	0.03*** (0.0033)	0.03*** (0.0003)	0.03*** (<.0001)
N	731	653	546	805	927
Adj R-Square	0.0898	0.1174	0.1230	0.0684	0.1157

Table 16
Regression on Synergy and Information Asymmetry INDEX

This table provides the test for determinants of the bid premium, the target, and the bidder abnormal returns. Variable definitions are in table 2. Significance is based on White-adjusted standard errors with *p*-values reported in parentheses. Significance at the 10%, 5%, and 1% level is noted by *, **, and ***, respectively.

	1 Premium	2 TCAR	3 BCAR
Intercept	0.27*** (0.0004)	0.26 (<.0001)	-0.07** (0.0222)
INDEX	0.11** (0.0142)	0.11*** (<.0001)	0.03*** (0.0045)
SYNERGY	0.05** (0.0238)	0.02* (0.0864)	0.003 (0.5361)
Conglomerate	0.02 (0.2397)	0.02 (0.1688)	-0.01 (0.1883)
Toehold	-0.18*** (<.0001)	-0.05** (0.0123)	0.01 (0.3603)
Competition	0.03 (0.2534)	-0.09** (0.0456)	0.02** (0.0116)
Tender	0.16*** (<.0001)	0.05*** (0.0033)	0.01 (0.1487)
Attitude	0.01 (0.7483)	0.02 (0.2379)	-0.004 (0.5982)
Pooling	0.09*** (0.0060)	0.02 (0.1949)	0.0001 (0.9876)
Medium	0.001 (0.9623)	-0.04*** (<.0001)	-0.01*** (0.0008)
Sales Growth	0.003 (0.3486)	0.005 (0.2777)	-0.003** (0.0182)
Market-to-Book	0.001 (0.7912)	0.0004 (0.7441)	-0.0003 (0.5427)
Target Size	-0.02* (0.0699)	0.003 (0.5272)	-0.01* (0.0586)
Relative Size	-0.04*** (0.0080)	-0.002 (0.7740)	-0.01** (0.0125)
Premium/ ResPremium	N/A	0.41*** (<.0001)	0.02 (0.7290)
N	1578	1276	1078
Adj R-Square	0.0831	0.3368	0.0591

Table 17
Regression on Synergy and Information Asymmetry proxy R^2

This table provides the test for determinants of the bid premium, the target, and the bidder abnormal return. Variable definitions are in Table 2. Significance is based on White-adjusted standard errors with *p*-values reported in parentheses. Significance at the 10%, 5%, and 1% level is noted by *, **, and ***, respectively.

	1 Premium	2 TCAR	3 BCAR
Intercept	0.42*** (<.0001)	0.39*** (<.0001)	0.02 (0.3236)
R^2	-0.11** (0.0177)	-0.10** (0.0382)	0.01 (0.1986)
SYNERGY	0.06** (0.0413)	0.03** (0.0366)	0.002 (0.6987)
Conglomerate	0.03 (0.2081)	0.02 (0.2473)	-0.002 (0.6736)
Toehold	-0.18*** (<.0001)	-0.01 (0.6880)	0.01 (0.3040)
Competition	0.01 (0.7106)	-0.09** (0.0128)	0.01 (0.1897)
Tender	0.11*** (0.0005)	0.02 (0.4382)	0.02** (0.0241)
Attitude	0.02 (0.6884)	0.02 (0.5708)	0.004 (0.6971)
Pooling	0.11*** (0.0077)	0.005 (0.8543)	0.01 (0.2643)
Medium	-0.01 (0.7667)	-0.03** (0.0124)	-0.01*** (0.0018)
Sales Growth	-0.03 (0.2454)	0.06** (0.0474)	0.003 (0.7600)
Market-to-Book	-0.002 (0.5824)	-0.001 (0.7258)	-0.001* (0.0544)
Target Size	-0.02* (0.0894)	-0.003 (0.6619)	-0.01** (0.0268)
Relative Size	-0.02* (0.0756)	0.002 (0.8419)	-0.01*** (0.0004)
Premium	N/A	0.42*** (<.0001)	0.01 (0.2495)
N	925	793	647
Adj R-Square	0.0738	0.3293	0.0719

Table 18
Regression on Information Asymmetry INDEX by Sample Period

This table provides the test for determinants of the bid premium, the target, and the bidder abnormal returns. In this table, the sample is divided into two parts, according to the sample period, 1995-2001, and 1986-1994 & 2002-2006. Variable definitions are in table 2. Significance is based on White-adjusted standard errors with *p*-values reported in parentheses. Significance at the 10%, 5%, and 1% level is noted by *, **, and ***, respectively.

	1986-1994 &2002-2006 Together			1995-2001		
	Premium	TCAR	BCAR	Premium	TCAR	BCAR
Intercept	0.74* (0.0542)	0.16 (0.3677)	0.03 (0.5854)	0.024 (0.9425)	0.47** (0.0346)	0.05 (0.5148)
INDEX	0.19** (0.0169)	0.08* (0.0800)	0.03** (0.0431)	0.12** (0.0282)	0.09** (0.0192)	0.02 (0.1741)
Conglomerate	-0.024 (0.5011)	0.038* (0.0574)	0.001 (0.9290)	0.03 (0.2031)	-0.01 (0.5381)	-0.006 (0.3246)
Toehold	-0.26*** (<.0001)	-0.07*** (0.0033)	-0.001 (0.9269)	-0.16*** (<.0001)	-0.05* (0.0899)	0.005 (0.6419)
Competition	0.05 (0.2275)	-0.07*** (0.0006)	0.01 (0.4098)	0.03 (0.4022)	-0.08*** (0.0013)	0.01 (0.1518)
Tender	0.05 (0.2133)	0.04* (0.0618)	-0.01 (0.1241)	0.15*** (<.0001)	0.07*** (0.0013)	0.008 (0.3793)
Attitude	0.067 (0.1371)	0.005 (0.8133)	-0.002 (0.7217)	-0.011 (0.7740)	0.05* (0.0804)	-0.01 (0.3662)
Pooling	0.24*** (0.0025)	0.11*** (0.0068)	-0.008 (0.5340)	0.054* (0.0611)	0.01 (0.6494)	0.01 (0.3825)
Medium	-0.049** (0.0153)	-0.04*** (0.0003)	-0.01*** (<.0001)	0.01 (0.5472)	-0.02* (0.0927)	-0.02*** (0.0008)
Sales Growth	-0.052* (0.0682)	0.004 (0.8906)	-0.002 (0.6026)	0.004 (0.1756)	0.01 (0.2231)	-0.002 (0.2145)
Market-to-Book	-0.003 (0.3509)	-0.0004 (0.7775)	0.0004 (0.4418)	0.001 (0.6808)	0.0004 (0.8631)	-0.0001 (0.4199)
Target Size	-0.005 (0.7402)	-0.004 (0.6163)	-0.01** (0.0197)	0.0002 (0.9877)	0.007 (0.4101)	-0.01* (0.0785)
Relative Size	-0.032** (0.0370)	0.01 (0.1889)	-0.0004 (0.8881)	-0.038** (0.0432)	-0.02 (0.1531)	-0.02*** (<.0001)
Premium/ResPremium	N/A	0.002*** (<.0001)	0.004 (0.5550)	N/A	0.003*** (<.0001)	-0.001 (0.1120)
Industry Control	Yes	Yes	Yes	Yes	Yes	Yes
Year Control	Yes	Yes	Yes	Yes	Yes	Yes
N	655	516	425	923	760	653
Adj R-Square	0.1691	0.3343	0.0612	0.1190	0.3455	0.1215