Convertible Securities in Merger Transactions and the Resolution of the Double-Sided Asymmetric Information Problem

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Abstract

This paper provides a rationale for the use of convertible securities as the medium of exchange in corporate change-of-control transactions. We argue that convertible securities can resolve the information asymmetry about the bidder's value while at the same time mitigating the information asymmetry about the target's value. Prior research has analyzed the choice between cash and stock, which can resolve one information asymmetry or the other but not both. We furnish empirical support for the use of convertible securities to resolve the double-sided asymmetric information problem. We find that a bidder is more likely to offer convertible securities, rather than all cash or all stock, when both the bidder and its target face large asymmetric information problems. We also find that convertibles are more likely to be offered in a takeover to deal with the asymmetric information problem on one side of the transaction (either the bidder side or the target side) only when the other side of the transaction also has a large information asymmetry. Finally, as expected from our double-sided asymmetric information rationale, we find that bidders in convertible deals enjoy larger abnormal stock returns around takeover announcements than bidders in all-cash and all-stock deals, but that targets in convertible deals experience smaller abnormal stock returns than targets in all-cash and all-stock deals.

JEL Classification: G32, G34

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1. Introduction

The medium of exchange is a matter of indifference to both parties to a corporate change-of-control transaction in a perfect capital market. However, information asymmetries make this choice relevant in practice. Both the bidder and the target may have private information about their own values that is not shared by the other party to the transaction even after it has conducted its due diligence. In this case, the choice of the medium of exchange serves as a device for resolving the asymmetric information problem. Several theoretical papers focus on a bidder's choice between cash and stock in the presence of asymmetric information (Hansen, 1987, Fishman, 1989, and Eckbo, Giammarino, and Heinkel, 1990). They argue that a cash offer enables a bidder to avoid the mispricing arising from the information asymmetry concerning the bidder's value (the "bidder information asymmetry") and that a stock offer can help the bidder minimize the cost of overpayment arising from the information asymmetry concerning the target's value (the "target information asymmetry"). However, all-stock or all-cash offers or a mixture of cash and stock cannot resolve both problems simultaneously. We refer to this twin problem as the double-sided asymmetric information problem.

Our paper extends the literature concerning the medium of exchange in merger transactions, by studying the use of convertible securities in this double-sided asymmetric information framework. Convertible securities have different consequences from cash and stock because the entire consideration is in the form of debt (like an all-cash bid financed with debt) if the convertible is never converted, and the entire consideration becomes common stock (like an all-stock bid) upon conversion. We show that offers with convertible securities enable the bidder to resolve the double-sided asymmetric information problem by minimizing the cost of both the bidder information asymmetry and the target information asymmetry.

We first derive testable hypotheses based on a framework where both bidder and target information asymmetries exist. In this framework, a higher-value bidder chooses the method of payment that minimizes the misvaluation of its payment arising from both information asymmetries. As suggested by Hansen (1987) and others, the higher-value bidder's choice between cash and stock is determined by the

trade-off between the adverse selection cost arising from the bidder information asymmetry and the cost of overpayment due to the target information asymmetry. The higher-value bidder is more likely to offer cash when the bidder information asymmetry dominates the target information asymmetry but to offer stock when the target information asymmetry dominates. In other words, the simple choice between all cash and all stock can only help the higher-value bidder mitigate either the bidder information asymmetry or the target information asymmetry but not both at the same time.[1]

A convertible security is a hybrid of a debt-financed cash payment and a stock payment. Setting a large debt component of a convertible security enables the higher-value bidder to signal its firm type to the target. A lower-value bidder will not mimic the higher-value bidder by offering the same convertible security because its convertibles are less likely to be converted into equity in the future, and they are more likely to trigger costly financial distress (Stein, 1992). On the other hand, the common equity component of a convertible security enables a higher-value bidder to share the cost of overpayment with the target's shareholders, if its convertibles are converted in the future. Thus, the debt component and the equity component together enable a higher-value bidder to mitigate the asymmetric information existing on both the bidder side and the target side, thereby minimizing the mispricing of its takeover payment. This advantage of convertible securities over cash and stock implies that convertible securities should be preferred as the medium of exchange over cash and stock when the bidder and the target both have large information asymmetries regarding their values.

Our empirical results support the double-sided asymmetric information rationale for the use of convertible securities to finance merger transactions. We show that a corporate change-of-control transaction is more likely to involve convertible securities, rather than all cash or all common stock, as the medium of exchange when both the bidder and the target have large information asymmetries concerning their values. We then interact the degree of asymmetric information about the bidder's value with that about the target's value, and study how this interaction affects the likelihood of a convertible deal. We

[1] According to Eckbo, Giammarino, and Heinkel (1990), a mixed offer consisting of both cash and stock can help resolve the bidder information asymmetry. However, mixed offers cannot resolve the target information asymmetry as well.

show that a bidder is more likely to offer convertible securities to deal with a large target information asymmetry only when the bidder recognizes that there is also a large bidder information asymmetry. Similarly, we also show that a bidder is more likely to offer convertibles to mitigate the effect of the bidder information asymmetry only when there is a large target information asymmetry. Finally, we study the merger announcement effects for both the bidder and the target. We find that the bidder's abnormal equity returns around takeover announcements are the highest when convertible securities are the medium of exchange and are the lowest when common stock is used, with cash representing the in-between case. We also show that the target's abnormal equity returns around takeover announcements are lower when convertibles are the medium of exchange than when only cash or common stock is offered.

Our paper contributes to the literature on the medium of exchange in M&As. In addition to the theoretical research discussed earlier, there is also a large body of empirical research on the choice between cash and common stock (Martin, 1996, Travlos, 1987, Berkovitch and Narayanan, 1989, Brown and Ryngaert, 1991, Ghosh and Ruland, 1998, and Chemmanur and Paeglis, 2005).[2] However, the use of convertibles has not yet been analyzed either theoretically or empirically, even though convertible securities are frequently used as the medium of exchange.

Our paper also contributes to the large literature on the choice of securities in the presence of asymmetric information. Myers and Majluf (1984)'s seminal paper suggests a pecking order of corporate financing with debt financing above external equity financing when the managers of a firm have superior information about the firm's value relative to outsiders. Much of the subsequent corporate financing literature follows this framework and focuses on the effect of asymmetric information on the borrower. For example, Chemmanur and Fulghieri (1997) suggest that a firm can mitigate the adverse selection problem by adding warrants to a new equity issue. Convertibles could also be a preferred security to issue in such a one-sided asymmetric information situation. Brennan and Kraus (1987) suggest that convertible debt can costlessly mitigate investment inefficiencies resulting from the asymmetric information on the

[2] Two recent papers examine the use of contingent claims. Kohers and Ang (2000) study the use of earnout payments, which are call options, and Chatterjee and Yan (2005) study the use of contingent value rights, which are put options.

issuing firm's value.[3] Our paper contributes to this literature by studying convertible securities in a double-sided asymmetric information setting rather than a one-sided asymmetric information setting.

Finally, our findings extend the corporate finance literature concerning the rationale for issuing convertible securities. In addition to the signaling motive, the literature suggests that firms issue convertible securities to reduce borrowers' agency costs or to gain tax shields that common stock issuance would not provide (Green, 1984, and Mayers, 1998). Our paper provides a novel rationale for the issuance of convertible securities by showing that convertibles can resolve the double-sided asymmetric information problem, such as in a merger transaction.

The paper is organized as follows. Section 2 introduces convertible securities into the double-sided asymmetric information framework described in Hansen (1987). Section 3 develops our hypotheses. Section 4 describes our sample and specifies the variables we use in our empirical tests. Section 5 empirically investigates the relative likelihood of convertible deals versus all-cash and all-stock deals to pay for a merger. Section 6 studies the abnormal equity returns to the bidder and to the target around the takeover announcement for all-cash, all-stock, and convertible dealers. Section 7 concludes.

2. Theoretical Background

In this section, we discuss intuitively the rationale underlying the use of convertibles in takeovers, based on the double-sided asymmetric information setting in Hansen (1987). First, we briefly discuss the choice between all cash and all stock. We then introduce the possibility that the acquirer may offer convertible securities into Hansen's (1987) framework, and present an example to illustrate why the bidding firm might find this more advantageous than offering either all stock or all cash. [4]

Consider a prospective merger where the bidder can offer any combination of three different means of payment: cash, convertible debt, or common stock. The target's intrinsic value may be relatively high

[3] See also Constantinides and Grundy (1989) and Stein (1992), who suggest that securities similar to convertible bonds can signal information on a firm's type, if the firm is allowed to buy back its shares or faces a large cost of financial distress.

[4] In most part of this section, we compare convertibles with all-cash and all-stock, to simplify exposition of the paper. In Section 2.5, we will argue that the predictions on convertibles versus mixed offers consisting partially of cash and partially of stock are similar to those on convertibles versus all-cash or all-stock.

(as compared to other firms in the same industry) or relatively low. The target has private information about its own value, which the bidder can not fully discover through due diligence. Similarly, the bidder's intrinsic value may be relatively high or relatively low. The bidder also has private information about its own value, as well as about the synergy that can result from combining the two firms, while the target does not know this information. Thus, this setting is characterized by double-sided asymmetric information, in which different information sets exist to the bidder and the target about the bidder's intrinsic value (denoted in the following as the bidder information asymmetry) and the target's intrinsic value (the target information asymmetry). The bidder information asymmetry and the target information asymmetry further lead to the different perceptions between the bidder and the target on the bidder's or the target's share values.

In this setting, due to the bidder information asymmetry, a bidder with a lower intrinsic value has an incentive to mimic a bidder with a higher intrinsic value by offering the same security that the higher-value bidder would offer. By doing so, the lower-value bidder's security would be overvalued. However, the security offered by the higher-value bidder would be undervalued in this case. As a result, the higher-value bidder has an incentive to offer the kind of security that reduces the likelihood of mimicking and minimizes the misvaluation of its payment. On the other hand, due to the target information asymmetry, the bidder is also concerned about the possibility of overpaying for the target. When the bidder does not know the true value of the target, it risks overpaying since the target will only sell when its value (known to itself) is no less than the value of the offer it receives.[5] Thus, the bidder also has an incentive to offer the kind of security that can minimize its overpayment for the target. In sum, in the presence of double-sided asymmetric information, the higher-value bidder chooses the method of payment that minimizes the misvaluation of its payment arising from the information asymmetries on both sides of the transaction.

2.1 Cash Payment versus Stock Payment

In an all-stock merger, the value of the offer is determined by the combined value of the bidder and the target as well as the synergy resulting from the merger. This contingent claim feature means that the

value of a stock offer is sensitive to both the bidder and target information asymmetries. This sensitivity contributes to both the benefit and the cost of a stock offer to the higher-value bidder. In particular, the cost to the higher-value bidder is that the target may undervalue the bidder's stock because the target does not know the bidder's true value. The benefit is that it can help the higher-value bidder to mitigate the impact of the target information asymmetry. By offering stock, the higher-value bidder can share some of the overpayment with the target's shareholders, which reduces its overpayment cost.

Unlike an all-stock offer, the value of an all-cash offer is independent of the true value of the combined firm. It is therefore independent of the bidder information asymmetry and will not be mispriced by the target.[6] However, the cost of a cash offer is that the higher-value bidder fully bears the cost of overpayment, since a cash bidder cannot share the cost of overpayment with the target's shareholders.[7]

This contrast between cash and stock offers suggests that the choice between all cash and all stock as the method of payment in takeovers is determined by the trade-off between the cost of underpricing (arising from the bidder information asymmetry) and the cost of overpaying (arising from the target information asymmetry).[8] A bidder is more likely to offer cash when the bidder information asymmetry is more severe relative to the target information asymmetry. Otherwise, when the target information asymmetry dominates the bidder information asymmetry, the bidder is more likely to offer stock. As a

[5] Put differently, by designing its payment so that a higher-value target will accept it, the bidder would overpay for a lower-value target.

[6] Another benefit to the higher-value bidder from offering cash is the signaling role of a cash payment. In the case where a cash bidder finances its cash payment by borrowing, financial distress would occur when the cash bidder cannot service its debt in the future. A lower-value bidder is more likely to fall into financial distress than a higher-value bidder. As a result, by offering a cash payment, the higher-value bidder can signal its firm type to the market, since the lower-value bidder, concerned about the potential financial distress, has no incentive to mimic the higher-value bidder by offering the same cash payment.

[7] The overpayment in the case of a cash offer could be even more costly to the bidder if the cash payment is financed by debt. In this case, the overpayment could weaken the bidder's ability to service its debt and increase the probability that the bidder will incur financial distress in the future.

[8] Fishman (1989) also studies the relative use of stock versus cash, although the benefit of cash offers in his framework is different from that in Hansen's model. Fishman suggests that a cash offer signals that the bidder's valuation of its gains from acquiring the target (which is private information to the bidder ex ante) is high, thus deterring competition from other potential bidders.

result, an all-cash offer or an all-stock offer can only mitigate the information asymmetry about either the bidder's value or the target's value, but not both at the same time.[9]

2.2 Using Convertibles to Resolve Double-Sided Asymmetric Information

In this section, we discuss why a bidder might choose to offer convertible debt as the means of payment, rather than all stock or all cash. In order to do so, we make one additional assumption. We assume that the bidder is financially constrained: there is a non-negligible probability that the bidder could fall into financial distress and be forced to incur the exogenous deadweight cost of bankruptcy if it fails to service its outstanding debt. The lower-value bidder is more likely to fall into financial distress than the higher-value bidder.

Again, consider the problem faced by the higher-value bidder in choosing the medium of payment to offer. The risk of bankruptcy does not affect a bidder's incentive to pay with stock since stock payment cannot trigger bankruptcy. Thus, in this case, the bidder still has an incentive to issue stock to reduce the cost of overpayment and to mitigate the target information asymmetry. On the other hand, cash payment is more effective in resolving the bidder information asymmetry in the presence of bankruptcy risk. In addition to the rationale discussed in Section 2.1, in this case, the higher-value bidder can also signal its firm type by making a debt-financed cash payment. The lower-value bidder has a disincentive to mimic the higher-value bidder by paying cash since it would face a substantially larger probability of financial distress if it did so. Thus, even when we consider the possibility of bankruptcy, it still remains the case that all-cash and all-stock offers can only help the higher-value bidder minimize the cost of the information asymmetry existing on one side of the transaction.

Offering convertible debt as payment can resolve the bidder information asymmetry and, at the same time, mitigate the target information asymmetry. A convertible bond is a hybrid of stock and debt. First, the debt portion of the convertible bond enables the higher-value bidder to signal its firm type to the

[9] Similarly, mixed offers consisting of both cash and equity can address only the bidder information asymmetry but not both the bidder and the target information asymmetry. Eckbo, Giammarino, and Heinkel (1990) study the use of mixed offers in M&As. They suggest that revealed bidder value is monotonically increasing in the fraction of the total offer that consists of cash.

target. The rationale is similar to Stein (1992), who discusses the signaling role of convertibles in detail based on a one-sided asymmetric information framework. Compared to the higher-value bidder, the lower-value bidder faces a higher probability of financial distress if it offers convertibles, since its convertibles are less likely to be converted.[10] When the expected cost of financial distress exceeds the benefit from pooling with the higher-value bidder (i.e., the overpricing of the lower-value bidder's convertibles), the lower-value bidder will not offer convertibles. Thus, by offering convertibles with a large enough debt component, the higher-value bidder can distinguish itself from the lower-value bidder and ensure that its securities are correctly priced.

On the other hand, the equity component of convertible debt can minimize the overpayment cost for the higher-value bidder. The rationale is similar to what was discussed earlier in connection with an all-stock payment. Specifically, the contingent claim feature of the equity component allows the higher-value bidder to share the overpayment cost with the shareholders of the target. Note that, in order for the contingent claim feature of the equity component to be effective, the convertible security has to be converted into equity. This is not a problem for the higher-value bidder, since its share price will be high in the future so that its convertibles will be converted.[11]

In sum, the debt and equity components of the convertible debt together are able to reduce the mispricing of the bidder's payment by reducing the combined cost of the bidder and target information asymmetries.

2.3 A Numerical Example

[10] The issuing firm will be able to force conversion into equity by calling its convertibles only if the firm's share price rises above the effective call price per share (the ratio of the total call price to the number of conversion shares). The lower-value bidder's share price is more likely to be low in the future, and therefore its convertibles are more likely to remain as straight debt.

[11] The benefit from the contingent claim feature of convertibles may increase the incentive for the lower-value bidder to offer convertibles. But it will not destroy the separating equilibrium discussed earlier in connection with the bidder asymmetric information. The higher-value bidder's convertibles are more likely than the lower-value bidder's convertibles to be converted into equity, and the contingent claim feature of the higher-value bidder's convertibles is consequently more likely to be effective in the future. In other words, the benefit from offering convertibles is greater (whereas the expected financial distress cost is smaller) to the higher-value bidder than to the lower-value bidder, which enables the higher-value bidder to design a convertible to separate itself from the lower-value bidder.

The following numerical example further illustrates the intuition underlying the bidder's choice of convertibles discussed above. Consider a two-period model (t = 0, 1). A bidder plans to acquire a target at $t = 0$. The cash flow (payoff) of the bidder as a stand-alone firm can be either high ($80) or low ($0) when it is revealed at $t = 1$. A higher-value bidder has a 100% probability of realizing the high cash flow and zero probability of realizing the low cash flow, while the lower-value bidder has a 50% probability of realizing either the high cash flow or the low cash flow. Thus, the true value of the higher-value bidder is $80 while the true value of the lower-value bidder is $40. Similarly, the target, if stand-alone, can also generate either a high cash flow ($20) or a low cash flow ($10) at $t = 1$. The higher-value target will generate the high cash flow with a probability of 100% while the lower-value target will generate the low cash flow with a 100% probability. Thus, the true values of the higher-value target and the lower-value target are $20 and $10, respectively. For simplicity, we assume that, if the bidder takes over the target, the bidder captures all the value arising from the synergy in the merger. The synergy between the higher-value bidder and the target is $20, and the synergy between the lower-value bidder and the target is zero.

The bidder's firm type and the synergy are private information to the bidder. Outsiders, including the target, have a prior belief that a bidder is of higher-value with a 50% probability and of lower-value with a 50% probability. Similarly, the target's firm type is private information to the target. Outsiders, including the bidder, have a prior belief that the target has a 50% probability of being higher-value and 50% of being lower-value. Finally, we assume that all firms face a prohibitively large deadweight cost of bankruptcy if they fail to service their debt, so that no firm is willing to offer any security that is likely to induce bankruptcy.

In the following, we focus on the higher-value bidder's choice of the means of payment at $t = 0$. First, consider a benchmark case with perfect information. The higher-value bidder would offer any security worth $20 to a higher-value target and $10 to a lower-value target. Now consider the double-sided asymmetric information setting. If the higher-value bidder chooses to offer cash, it has to offer a

cash payment of \$20 to the target at $t = 0$ so that the higher-value target will accept the offer.[12] The cost of the \$20 cash payment to the bidder is above the expected value of the target, \$15. The \$5 expected difference arises from the bidder's overpayment if the target turns out to be of lower-value. The bidder will overpay for a lower-value target by \$10, which occurs with a 50% probability.

The higher-value bidder can also offer its target a 2/9 equity share of the combined firm. This equity share is worth (2/9) × [50% × (\$80 + \$20) + 50% × \$40 + \$20] = \$20 to the higher-value target and \$17.8 to the lower-value target. The target would accept the offer regardless of its type. The expected cost of the stock offer to the bidder is (2/9) × [\$80 + \$20 + 50% × \$20 + 50% × \$10] = \$25.5, which exceeds the expected value of the target by \$10.5. This \$10.5 difference arises from the expected cost of the higher-value bidder overpaying for the lower-value target, which is equal to 50% × [(2/9) × (\$80 + \$20 + \$10) - \$10] = \$7.2, plus the expected cost of adverse selection on the bidder side, which is equal to 50% × [(2/9) × (\$80 + \$20 + \$20) - \$20] = \$3.3. The adverse selection cost arises from the mispricing of the higher-value bidder's stock payment to a higher-value target due to the existence of the lower-value bidder.[13]

Finally, the higher-value bidder can also offer convertible debt with a \$12 call price and a face value \$12, which is convertible into 1/6 of the combined firm's equity at *t = 1*. The convertible debt will be called if the conversion value at t = 1 is above the call price.[14] This convertible payment enables the higher-value bidder to signal its type and thereby resolve the bidder information asymmetry. Recall that the lower-value bidder has a 50% probability of realizing low cash flow and a 50% probability of taking over a lower-value target. If both possibilities happen, the value of the combined firm with a lower-value bidder and a lower-value target is \$10 at *t = 1*, which is not large enough for the lower-value bidder to force conversion at that time. Also, in this case, the lower-value bidder is unable to service its debt (\$12). Thus, in equilibrium, the lower-value bidder prefers not to offer convertibles in order to avoid the cost of

[12] Otherwise, if the bidder offers a cash payment of \$10, only the lower-value target will accept the offer. The value added to the bidder in this case is less than that in the case where the bidder offers a cash payment of \$20.

[13] In this case, the expected net present value of the merger to the higher-value bidder is the difference between the synergy and the expected overpayment, \$20 - \$10.5 = \$9.5. Otherwise, if the higher-value bidder offers a 1/8 equity share, only the lower-value target accepts the offer. In that case, the expected NPV is \$8.1 because acquiring the lower-value target has an NPV of \$16.2, and there is a 50% probability this will occur.

financial distress. On the other hand, the higher-value bidder can always force conversion at *t = 1*, even if it takes over a lower-value target, in which case the value of the combined firm is \$110. Thus, the higher-value bidder has an incentive to offer convertible debt since, by doing so, it can distinguish itself from the lower-value bidder without incurring any financial distress cost.

The convertible debt also reduces the expected cost of overpaying for the target. Given the signaling role of convertibles, outsiders (including the target) infer a bidder offering convertible debt to be a higher-value bidder with probability one. The value of the convertible debt is (1/6) × (\$80 + \$20 + \$20) = \$20 to the higher-value target and (1/6) × (\$80 + \$20 + \$10) = \$18.3 to the lower-value target. Thus, the expected cost of the convertible debt to the higher-value bidder is \$19.2, which is less than the cost of both a cash offer (\$20) and a stock offer (\$25.5). The lower cost of the convertible offer is due to the smaller cost of overpayment. The higher-value bidder's expected cost of overpaying (for a lower-value target) in the convertible offer is only 50% × [(1/6) × (\$80 + \$20 + \$10) - \$10] = \$4.2. In sum, issuing convertible debt to finance the merger enables the higher-value bidder to minimize the cost of both the bidder information asymmetry and the target information asymmetry as compared to the cash-only payment and the stock-only payment.

2.4 Model Implications

We summarize the implications from the discussions in the previous sections, focusing on the bidder's choice of the medium of exchange in the presence of double-sided asymmetric information. First, when there are large bidder and target information asymmetries, the bidder is more likely to offer the target convertible debt, rather than all-cash or all-stock. This is because convertible debt can help the bidder minimize the mispricing arising from both information asymmetries while all cash or all stock can only help minimize the mispricing from one of them but not both at the same time.

Second, when the bidder information asymmetry is larger than the target information asymmetry, the bidder is more likely to offer cash. On the other hand, when the target information asymmetry is larger, the bidder is more likely to offer stock. These implications follow directly from Hansen (1987). In

[14] The conversion value of a convertible security is defined as the market value of the equity received upon

these cases, the bidder chooses not to offer convertibles even though doing so can mitigate the asymmetric information problem as well. We offer the following explanation. Convertible security investors are predominantly hedge funds, leveraged buyout funds, private equity funds, mutual funds, and other sophisticated investors who operate specialized portfolios dedicated to convertibles (Bhattacharya, 2007). Most common stockholders will not want to continue holding them following the merger. In addition, convertible bonds trade in the over-the-counter market. Transactions are less transparent than stock trades on the exchanges or in the Nasdaq stock market, so the trade execution costs are likely to be greater for selling convertible securities than for common stock for investors who infrequently invest in convertibles.[15] Thus, a bidder offering convertible securities will incur an added transaction cost either to persuade the target's shareholders to accept the convertible securities as the payment for their shares or to compensate the target's shareholders for the cost of selling them and reinvesting in other common stocks. This transaction cost of convertible offers implies that a bidder would be less likely to offer convertible securities when a payment with only cash or stock can resolve or mitigate the asymmetric information problem just as effectively, e.g., in the case where there exists a large information asymmetry on one side of the transaction but not the other.[16] Convertible payments are useful in facilitating mergers only when the reduction in double-sided asymmetric information costs exceeds the incremental transaction costs from using convertibles.

Finally, when both information asymmetries are modest, the bidder should be indifferent between offering cash or stock, but would prefer not to offer convertibles in order to avoid the incremental transaction costs.

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conversion.

[15] The lack of transparency in the corporate bond market was even more severe prior to the introduction of the Trade Reporting and Compliance Engine (TRACE) on July 1, 2002, and the additional transaction costs on target firm shareholders who did not want to retain convertible securities were also greater prior to TRACE. Bessembinder, Maxwell, and Venkataraman (2006) find that trade execution costs for TRACE-eligible bonds fell 50% and for other bonds fell 20%. These reductions lower the cost penalty to offering convertible bonds as merger consideration, but not to using convertible preferred stock, which is not TRACE-eligible.

[16] Also, convertible security offers are still relatively infrequent in merger transactions as compared to all-cash and all-stock offers. There is some evidence that firms (or investment banks acting on their behalf) incur large costs when marketing innovative or unusual securities (Tufano, 1989). Thus, a bidder is unlikely to offer somewhat

2.5 Discussion

We have compared convertible offers to all-cash and all-stock offers. If we consider the possibility of a mixed payment consisting partially of cash and partially of stock, we still reach the earlier conclusion that convertibles are the preferred medium of exchange when large information asymmetries exist on both sides of the merger transaction. If a higher-value bidder offers a mixed payment, the cash part of the payment could help the bidder to signal its firm type and the stock part of the payment could help reduce the cost of overpayment. However, the cash part of the mixed payment still suffers from a large overpayment cost. As a result, the mixed payment can only reduce the overpayment cost for the stock part of the payment package, but not for the cash part. In comparison, convertibles can reduce the overpayment cost for the entire payment package, once they are converted into equity in the future. Thus, a bidder should prefer to offer convertibles rather than a mixed payment when there exists large double-sided asymmetric information. For instance, consider again the numerical example in Section 2.3. If the higher-value bidder offers 60% cash and 40% stock, it has to offer $12 in cash and a 1/15 equity share of the combined firm to the target. Similar to the convertible payment, this mixed payment could also enable the higher-value bidder to signal its firm type. However, the expected cost of the mixed payment is $19.7, which is higher than the expected cost of the convertible ($19.2).

Further, our earlier discussion assumes the existence of financial distress cost, which applies directly to convertible debt but applies only indirectly to convertible preferred stock. Unlike missing an interest payment on convertible debt, missing a convertible preferred dividend does not have adverse legal consequences because dividend payments are at the discretion of the board of directors, and dividends can only be paid out of the funds that are legally available therefor. However, failing to pay preferred stock dividends is not costless to the firm. Missing a specified (in the preferred stock agreement) number of consecutive dividend payments usually gives the preferred stockholders the right to vote as a separate class to elect one or more directors. Skipping a preferred dividend also tends to severely depress the firm's share price because most preferred stocks have cumulative dividends, which require that all

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unusual payment packages, such as convertible securities, if it is just as well off by offering conventional payment

preferred dividend arrearages must be fully eliminated before the firm can pay any cash dividends on its common stock, or because skipping the dividend signals that financial distress may be imminent (Bhattacharya, 2007).[17] Moreover, most preferred stock provides for a sinking fund, thereby are more debt-like. The sinking fund imposes an additional demand on the firm's free cash flow, and missing a preferred stock sinking fund payment has a similar adverse impact on the firm's share price as missing a dividend.

Thus, while a lower-value bidder may have less disincentive to mimic a higher-value bidder that issues convertible preferred, it will nonetheless still have some disincentive to mimic. Consequently, the implications in Table 1 hold for convertible preferred as well as convertible debt. In the case of convertible preferred, the preferred equity component can still help the higher-value bidder signal its firm type, by preventing the lower-value bidder from offering the same convertible preferred.[18] On the other hand, the equity component of convertible preferred can still help the bidder reduce the overpayment cost (arising from the target information asymmetry). As a result, when large information asymmetries exist on both sides of the merger, it could still be cheaper for the bidder to offer convertible preferred rather than all common stock or all cash.

3 Testable Hypotheses

In this section, we derive our testable hypotheses. We start with three hypotheses concerning the relative likelihood of a convertible offer, and we follow with two hypotheses concerning the abnormal stock returns to the bidder and the target.

3.1 Likelihood of Convertible Offers

Table 1 predicts that a bidder is more likely to offer convertibles, rather than all cash or all stock, the greater are both the bidder and target information asymmetries coincidentally. This is the first hypothesis (**H1**) we test.

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packages, such as all-stock or all-cash payment.

[17] Keenan, Carty, Shtogrin, and Fons (1998) report that issuers of 98 (66 percent) of the 149 rated issues of preferred stock that omitted a dividend since 1980 subsequently defaulted on their debt.

Table 1 also predicts that the bidder's preference for convertible securities over cash to signal its firm type (in the case of a large bidder information asymmetry) is stronger the larger the target information asymmetry (i.e., the first row of Table 1), and is weaker the smaller the target information asymmetry. This prediction concerning the interaction between the bidder information asymmetry and the target information asymmetry leads to our second hypothesis (**H2**): a bidder with a larger information asymmetry as to its value is more likely to offer convertibles only when there is also a large target information asymmetry.

Similarly, the bidder's preference for convertible securities over all stock to reduce its cost of overpayment (due to the target information asymmetry) is stronger the larger the bidder information asymmetry (i.e., the first column of Table 1), and is weaker the smaller the bidder information asymmetry. Thus, the third hypothesis (**H3**) we test is: when there is a large target information asymmetry, a bidder is more likely to offer convertibles only when there is also a large bidder information asymmetry.

3.2 Announcement Effect of Convertible Offers

Bidder returns during the announcement period are affected by the information revealed by the announcement, including the information on the stand-alone value of the bidder, the value to be created through the takeover (the synergy), and the bidder's overpayment (Hietala, Kaplan, and Robinson, 2001). Since it is impossible to isolate these information effects on the bidder's return, we consider all three effects when discussing bidder returns in convertible, all-cash, and all-stock offers.

As we have discussed, convertibles and cash are offered by higher-value bidders to signal their firm type to the market. In comparison, stock is more likely to be offered by a lower-value bidder whose stock is overvalued prior to the takeover announcement. Thus, the market would perceive a bidder offering cash or convertibles as undervalued and a bidder offering stock as overvalued. In other words, if we consider only the revealed information on the bidder's stand-alone value, we would predict that the bidder's

[18] From a theoretical perspective, for a separating equilibrium to exist in this case, the cost of convertible preferred should be higher to the lower-value bidder than to the higher-value bidder. This is clearly the case. The lower-value bidder is more likely to miss preferred dividends or preferred sinking fund payments than the higher-value bidder.

announcement period abnormal equity returns in convertible and all-cash offers are positive and larger than the bidder's abnormal returns in all-stock offers.

Further, if the bidder has private information about potential takeover synergy, we would still predict that the bidder's abnormal returns in convertible and all-cash offers are positive and larger than those in all-stock offers. One reason is that a combined firm with less synergy is more likely to fall into financial distress in the future. As a result, a bidder expecting little synergy from the takeover is more likely to offer all stock, rather than convertibles or cash, to avoid future financial distress.[19]

Finally, whether the bidder overpays for the target and how much it overpays are determined by the liquidity of the target's assets. Fuller, Netter, and Stegemoller (2002) and Officer (2005) argue that the price paid by the bidder for the target is lower when the target's assets are less liquid. They also provide evidence supporting this liquidity effect. Here, we argue that a target with a larger information asymmetry is less liquid than a target with a smaller information asymmetry. The lack of liquidity could arise either because the risk of adverse selection (due to the asymmetric information) makes the target less attractive to potential buyers or because the due diligence involved in acquiring such a target is relatively costly. Bidders are more likely to offer convertibles than cash when there is a large target information asymmetry. This implies that the target in a convertible offer is on average less liquid than the target in an all-cash offer so that the bidder in a convertible offer on average pays a lower price to acquire its (illiquid) target. Bidder abnormal returns in convertible offers capture this illiquidity discount, and they are therefore greater than those in all-cash offers. To sum up, convertible offers are associated with the highest bidder announcement period abnormal returns, followed by all-cash offers and all-stock offers. This is the fourth hypothesis (**H4**) we test.

On the other hand, the target's announcement period abnormal returns are a function of the premium (or discount) the bidder offers to the target's shareholders and the perceived probability of success of the takeover. As we argued earlier, convertibles are more likely to be offered rather than all-

[19] Fishman (1989) studies the asymmetric information concerning takeover synergy and makes the same prediction. He predicts that a bidder expecting greater synergy is more likely to offer cash in a preemptive offer.

cash the larger is the target information asymmetry. Thus, in convertible offers, the target's assets are less liquid and the bidder only has to pay a smaller premium to acquire the target than what it has to pay in the case of all-cash offers. Further, convertible offers are less likely to succeed than all-cash or all-stock offers because there are uncertainties concerning both the bidder's value and the target's value in a convertible offer whereas the uncertainty in all-cash and all-stock offers only involves one side of the transaction. This leads to our fifth hypothesis (**H5**): targets in convertible offers experience smaller announcement period abnormal returns than targets in all-cash and all-stock offers.

3.3 Public Target versus Private Target

One major difference between public and private targets is that a bidder is more concerned about the bidder information asymmetry when it acquires a publicly traded target than when it takes over a private target. The dispersed investors in a public target have less incentive to obtain and analyze the information about the bidder because of a free-rider problem. In contrast, the small number of investors in a private target have more incentive to perform due diligence on the bidder, thereby mitigating the bidder information asymmetry, especially in stock offers where they will end up holding a substantial amount of the bidder's equity.[20,21] Thus, the role of convertible securities in resolving the double-sided asymmetric information problem is more important in takeovers of public targets than in takeovers of private targets. Considering the potential importance of this difference, we also study takeovers of private targets and takeovers of public targets separately. We expect the empirical results concerning the bidder's incentive to offer convertibles to be stronger in the public target subsample than in the private target subsample.

4. Sample and Variable Construction

4.1 Data and Sample Selection

[20] The adverse selection problem and the free-rider problem in the case of dispersed investors have been well documented in the literature, starting from Myers and Majluf (1984). The asymmetric information problem in the case of private investors has been analyzed by Boot and Thakor (1993) and Fulghieri and Lukin (2001).

[21] Chang (1998) tests this difference between takeovers of public targets and takeovers of private targets from the perspective of bidders' announcement effects. He finds that bidders in stock offers experience a positive announcement period abnormal return in takeovers of private targets but a negative abnormal return in takeovers of public targets.

We gather our initial takeover sample from the Securities Data Corporation's (SDC) U.S. mergers and acquisitions database. It covers the period 1980-2004. We include only completed takeovers in our sample. We extract financial statement information from the Standard & Poor's Compustat database. Data on stock prices are from the CRSP database, and data on financial analysts' earnings forecasts are from the I/B/E/S database. We select our final sample based on the following criteria: (1) the bidder is a publicly traded firm; (2) at least one firm involved in the takeover should have data available from I/B/E/S, CRSP, or Compustat; (3) the merger payment consists of all-common stock, all-cash, or convertibles (with possibly other consideration); (4) in the tests where financial analysts' forecasts are used, a firm is included only if it has at least three securities analysts covering it at the end of the fiscal year prior to the takeover announcement; and (5) the firm is neither a financial firm (SIC codes 6000 through 6999) nor a utility (SIC codes 4900 through 4999). We exclude from our sample those mergers that are associated with extreme values due to potential data reporting or recording errors by winsorizing the relevant variables at the 1% level in both tails of the distribution.

Table 2 provides an overview of the sample broken down by year, by method of payment, and by the public/private status of the target. Our final sample includes 352 deals with convertibles offered (convertible deals), 7,586 deals with cash as the only method of payment (all-cash deals), and 3,591 deals with common stock as the only method of payment (all-stock deals). For the public target subsample, we have 168 convertible deals, 4,736 all-cash deals, and 1,425 all-stock deals. For the private target subsample, we have 184 convertible deals, 2,850 all-cash deals, and 2,166 all-stock deals.

We do not distinguish between convertible preferred and convertible debt in order to maintain a reasonable sample size for each test. However, as we discussed in Section 2.5, our predictions are qualitatively the same for convertible preferred and convertible debt. Also, we do not study mixed deals (consisting partially of cash and partially of stock). In unreported results, we find that the empirical results

concerning the differences between convertible and non-convertible deals are qualitatively unchanged when we explicitly consider mixed deals in our tests.[22]

4.2 Variable Construction

Following Thomas (2002) and Krishnaswami and Subramaniam (1999), we first construct measures of information asymmetry based on securities analysts' earnings forecasts in the final month of the fiscal year prior to the announcement date of each takeover. The first measure is forecast error, ERR, calculated as the absolute difference between the average forecasted earnings and the actual earnings per share divided by the absolute value of the actual earnings. Firms with a higher forecast error are expected to have a larger information asymmetry. Our second measure of information asymmetry is STDEV, calculated as the standard deviation of analysts' earnings forecasts, deflated by the absolute value of the average earnings forecast. STDEV measures the dispersion in analyst earnings forecasts; a higher STDEV represents greater disagreement among securities analysts and therefore indicates a larger information asymmetry.

We also use firm size lagged by one year ($SIZE_{t-1}$) to measure the bidder information asymmetry. We measure SIZE as the log of the market value of total assets, which we calculate as the book value of assets minus the book value of common equity plus the market value of common equity. Larger firms have more stable cash flows and are easier to value. They also attract large investors and more securities analysts whose published reports can reduce the information asymmetry concerning their values. Thus, larger firms generally have a smaller information asymmetry than smaller firms.

However, $SIZE_{t-1}$ is likely to be a poor measure of the target information asymmetry. The target information asymmetry is of greater concern to the bidder when the target would be a significant addition to the bidder (Hansen, 1987). Thus, a larger target, on the one hand, might have a smaller information asymmetry due to its size. On the other hand, a given degree of asymmetric information could be more costly to the bidder if the target is larger relative to the bidder. Empirical studies on the method of payment in merger transactions find that relative size is a better measure for the target information

[22] Detailed results are available on request from the authors.

asymmetry than absolute size (e.g., Martin, 1996). Thus, we use the relative size of the target (RATIO) to measure the target information asymmetry. RATIO is calculated as the logarithm of the ratio of the value of the merger transaction to the market value of the bidder prior to the takeover announcement. As RATIO increases, the bidder becomes more concerned about the target information asymmetry.[23]

We also construct the following control variables. According to Jung, Kim and Stulz (1996), managers facing a richer set of growth opportunities prefer to offer stock or convertibles in order to have more discretion over their investment in the future. We measure a firm's market-to-book ratio (MB) at the end of the fiscal year prior to the takeover announcement to proxy for its investment opportunity set. MB is calculated as the ratio of the market value to the book value of common equity. MB can also serve as a proxy for overvaluation. A bidder with a small market-to-book ratio is more likely to be undervalued, and therefore more likely to offer cash or convertibles rather than undervalued equity. In addition, we use the long-term debt ratio (LDR) at the end of the prior fiscal year to measure the bidder's debt burden. LDR is calculated as the ratio of the book value of long-term liabilities to the book value of assets. A bidder with a greater debt burden is in greater danger of financial distress, and is therefore less likely to offer cash or convertibles. Finally, we control for a firm's profitability by calculating its EBITDA margin (OPINC) for the prior fiscal year. OPINC is calculated as the ratio of its earnings before interest, taxes, depreciation, and amortization (EBITDA) to the book value of its assets. A firm with relatively poor operating performance may not be able to raise enough cash (either internally or externally) to finance its bid, and is therefore more likely to offer common stock as payment. Table 3 provides sample statistics for all the variables used in the paper for the whole sample and for the public and private target subsamples.

5. Likelihood of Convertible Securities as a Medium of Payment

In this section, we empirically test the first three hypotheses. In particular, we study the likelihood that a bidder offers convertible securities in a merger transaction by testing hypotheses **H1**, **H2**, and **H3**.

[23] An advantage of using RATIO as the proxy for the target information asymmetry is that we do not have to sacrifice the sample size since SDC provides the information needed to calculate RATIO. In comparison, the sample size of the targets with information on ERR, STDEV, or $SIZE_{t-1}$ is small since many targets in our sample were not covered by I/B/E/S or Compustat.

We first study the sample distribution when the bidder and the target face differing degrees of asymmetric information. Descriptive statistics for each subsample are presented in Table 4, including the numbers and the proportions of all-cash deals, all-stock deals, and convertible deals in each subsample. The proportions presented in the table are calculated with respect to the total number of deals in each subsample. In panel A of Table 4, we use an analyst forecast variable, STDEV, to measure the degree of asymmetric information for both the bidder and the target. In panel B, we use STDEV and RATIO as the measures of the bidder information asymmetry and the target information asymmetry, respectively. In panel C, we use $SIZE_{t-1}$ to measure the bidder information asymmetry and RATIO to measure the target information asymmetry. The sample size in panel C is larger than that in panel B, which in turn is larger than that in panel A. This is because most targets are not covered in I/B/E/S and more firms are covered in Compustat than in I/B/E/S. The result based on ERR, the other asymmetric information measure, is similar to those presented in Table 4 and are not reported in the paper.

In general, the qualitative nature of the sample statistics in the three panels is similar. First, all three panels strongly suggest that most convertible deals occur in those cases where both the bidder and the target have large information asymmetries. For example, in panel C, bidders offer convertibles as a means of payment in 5.2% of the deals involving small bidders (with small $SIZE_{t-1}$ and thus a large bidder information asymmetry) and relatively large targets (with large RATIO and thus a large target information asymmetry). In contrast, deals with convertibles offered as a means of payment account for only 1.1% of the deals involving bidders with small $SIZE_{t-1}$ and targets with small RATIO, 0.3% of the deals with large $SIZE_{t-1}$ and large RATIO, and 2.6% of the deals with large $SIZE_{t-1}$ and small RATIO. This pattern on the use of convertible securities in merger transactions is consistent with hypothesis **H1**.

Table 4 also reveals that, in the case of a large bidder information asymmetry or a large target information asymmetry, the likelihood of a convertible deal is higher only when the other side of the transaction also has a large information asymmetry. For example, in panel C, when the bidder has small $SIZE_{t-1}$ (and a large bidder information asymmetry), the frequency of convertible deals is greater in the subsample with large RATIO (and a large target information asymmetry) than that in the subsample with

small RATIO. However, we do not observe the same relation between the frequency of convertible deals and target RATIO when the bidder's size is large (and a small bidder information asymmetry). Similarly, among the targets with large RATIO (and a large target information asymmetry), the frequency of convertible deals is greater when the bidder has small $SIZE_{t-1}$ than when the bidder has large $SIZE_{t-1}$. But this relation between the frequency of convertible deals and bidder $SIZE_{t-1}$ is not observed among targets with small RATIO. These patterns suggesting the relative importance of the information asymmetries on both sides of the merger transaction are consistent with our hypotheses **H2** and **H3**.

In the next two sections, we formally test hypotheses **H1**, **H2,** and **H3**. We test hypothesis **H1** using both univariate comparisons and logistic regressions and then test hypotheses **H2** and **H3** using logistic regressions.

5.1 Univariate Comparison

We first compare convertible deals with all-cash deals. The results are presented in Table 5. Panel A reports the results based on the full sample with both takeovers of public targets and takeovers of private targets. Panels B and C report the results based on takeovers of only public targets and takeovers of only private targets, respectively. The results reported in the three panels are similar.

Securities analysts' forecast error on bidders, ERR, is larger for convertible deals than for all-cash deals. The same result holds for the dispersion in analysts' earnings forecasts (STDEV) on bidders. The differences in ERR and STDEV between the bidders in convertible deals and the bidders in all-cash deals are significant at the 1% level according to both *t*-tests and Wilcoxon tests. Similarly, the differences in ERR and STDEV between the targets in convertible deals and the targets in all-cash deals are also positive and significant at the 1% level. Thus, securities analysts covering bidders' stock and those covering targets' stock are more likely to make errors and to disagree in their earnings forecasts in those cases where the bidder issues convertible securities to pay for the deal. Further, we find that the average size ($SIZE_{t-1}$) of bidders is significantly smaller and that the size of the target relative to the bidder (RATIO) is significantly greater in convertible deals than in all-cash deals. In general, these results are

consistent with hypothesis **H1**. They suggest that both the bidders and the targets in convertible deals have larger information asymmetries than the bidders and targets in all-cash deals.

Next, we compare convertible deals with all-stock deals in Table 5. These results are mostly similar to those from the comparison between convertible deals and all-cash deals. For example, as compared to the corresponding party in all-stock deals, both the bidders and the targets in convertible deals have larger forecast error (ERR) and greater dispersion in analysts' earnings forecasts (STDEV); the bidders in convertible deals are smaller in size ($SIZE_{t-1}$); and the targets in convertible deals are larger in relative size (RATIO). Again, these results in general support hypothesis **H1**, suggesting both greater bidder information asymmetry and greater target information asymmetry in mergers where convertibles are used as a method of payment than in all-stock mergers. Panels B and C further confirm the robustness of these results: Our results on the different degrees of bidder information asymmetry between convertible deals and non-convertible deals are virtually the same for mergers with public targets and mergers with private targets.

Table 5 also reports the results of the sample comparisons based on the control variables. Compared to all-cash mergers, the bidders in mergers with convertibles have significantly weaker operating performance (smaller OPINC), and the targets in mergers with convertibles have significantly greater leverage (larger LDR). Compared to all-stock mergers, both the bidders and the targets in mergers with convertibles have significantly less valuable growth options (smaller MB) and significantly greater leverage (larger LDR). Similar results on bidders hold in the subsamples of public targets and private targets.

5.2 Multivariate Regressions

In this section, we study the whole sample of takeovers that includes both public targets and private targets. We test hypothesis **H1** by running the following logistic regression:

$$\text{Log}[\frac{\text{P(y = 1)}}{\text{1 - P(y = 1)}}] = \beta_0 + \beta_1 INFO + \beta_2 X_{t-1} + \varepsilon, \quad (1)$$

The dependent variable y takes on the value one if a firm issues convertibles to pay for the merger, and zero if it offers all cash or all stock as the medium of payment. The independent variable INFO refers to an asymmetric information measure. It is ERR, STDEV, or $SIZE_{t-1}$ for bidders, and ERR, STDEV, or RATIO for targets. X_{t-1} refers to a vector of control variables consisting of MB_{t-1}, LDR_{t-1}, and $OPINC_{t-1}$. All the control variables are calculated for the fiscal year prior to the takeover announcement. For regression (1) and also for all subsequent regressions in the paper, we allow correlated residuals within each cross section. Significance tests are conducted using heteroskedasticity-consistent standard errors following the Huber-White procedure.[24] Note that a larger value for ERR, STDEV, or RATIO, or a smaller value for $SIZE_{t-1}$ indicates a larger information asymmetry. Thus, to be consistent with hypothesis **H1**, β_1 is expected to be positive for ERR, STDEV, and RATIO, and negative for $SIZE_{t-1}$.

To motivate the analysis, we investigate how the choice of payment method in merger transactions is affected by the degree of asymmetric information on one side of the transaction. First, we include only measures of bidder asymmetric information in the independent variables. The results are presented in the first three columns of Table 6. As expected, the coefficients of both STDEV and ERR for the bidder are positive and significant at the 1% level; and the coefficient of bidder $SIZE_{t-1}$ is negative and significant at the 1% level. These results suggest that a bidder is more likely to offer convertibles, rather than all cash or all stock, the larger is the bidder information asymmetry. Next, we study the effect of the target information asymmetry by including only measures of target asymmetric information. The results are presented in the last three columns of Table 6. We find that the coefficients of STDEV, ERR, and RATIO of the target are positive and significant. These results suggest that a bidder is more likely to offer convertibles, instead of all cash or all stock, the larger is the target information asymmetry.

Next, we analyze the impact of asymmetric information on both sides of the transaction at the same time by including measures for the bidder information asymmetry and for the target information asymmetry. The results are presented in Table 7. In columns (1) and (2), we use STDEV and ERR,

[24] We also conducted estimations controlling for standard firm fixed effects. We obtain similar results from the fixed effect regressions. Details are available upon request from the authors.

respectively, to measure the degree of asymmetric information about the bidder and the target. In column (3), we use $SIZE_{t-1}$ and RATIO to measure the degree of asymmetric information about the bidder and the target, respectively. Our result based on STDEV as the asymmetric information measure (reported in column (1)) is consistent with hypothesis **H1**: both the coefficient of bidder STDEV and the coefficient of target STDEV are positive and significant at the 1% level. Similarly, our result in column (3) is consistent with hypothesis **H1** as well: the coefficient of bidder $SIZE_{t-1}$ is negative and the coefficient of RATIO is positive. Both coefficients are significant at the 1% level. However, our result based on ERR as the asymmetric information measure (reported in column (2)) is weak. This weak result could be due to the small sample size when we regress on target ERR. As reported in Table 3, there are only 22 target firms with information on ERR. In order to avoid the potential small sample bias, we also re-run the regressions reported in columns (1) and (2), with target STDEV and target ERR replaced by RATIO as the measure of the target information asymmetry. In this way, we can maintain a reasonable sample size in our regressions. The results from these regressions are presented in columns (4) and (5). In these new regressions, the coefficient of RATIO is positive and significant at the 1% level; the coefficient of bidder STDEV remains positive and significant at the 1% level; and the coefficient of bidder ERR becomes positive and significant at the 5% level.

We can use the regression results in Table 7 to calculate the marginal effect of asymmetric information on the likelihood of a deal that includes convertibles, rather than an all-cash or an all-stock deal. We calculate the marginal effect of each asymmetric information measure as the sample mean of the individual marginal effects of that measure, where we calculate the individual marginal effect based on each firm in our sample. The results concerning the marginal effect of asymmetric information are available upon request. For example, for the regression presented in column (3), we find that the marginal effect is -0.0055 for bidder $SIZE_{t-1}$ and 0.011 for RATIO. Thus, on average, a decrease of bidder $SIZE_{t-1}$ by one standard deviation (2.130 for the sample in the regression) would cause the probability of a convertible deal, rather than an all-cash or an all-stock deal, to increase by 1.15%. An increase of target RATIO by one standard deviation (0.853 for the sample in the regression) would cause the probability of

a convertible deal to increase by 0.94%. Further, according to the marginal effects calculated based on the results in column (4), a one-standard-deviation increase in bidder STDEV would cause the probability of a convertible deal to increase by 0.55%. According to column (5), a one-standard-deviation increase in bidder ERR would cause the probability of a convertible deal to increase by 0.29%. Given that convertible deals account for only 2.6% of the transactions in column (3) and only 1.4% of those in columns (4) and (5), these marginal effects demonstrate that asymmetric information does have an economically significant impact on the likelihood of a convertible deal. In sum, the results reported in Tables 6 and 7 generally support hypothesis **H1**, suggesting that convertibles are more likely to be offered in those mergers where the bidder information asymmetry and the target information asymmetry are both large.

We also construct INFO in regression (1) as a dummy variable to proxy for the situation where both the bidder and the target have large information asymmetries. We present the results in Table 8. In column (1) of Table 8, we measure INFO based on bidder STDEV and target STDEV. Thus, INFO equals one if a bidder's STDEV is greater than the median STDEV of all bidders in our sample and a target's STDEV is also greater than the median STDEV of all targets in our sample. In column (2), INFO equals one if a bidder's ERR and the target's ERR are greater than the corresponding median ERR. In column (3), INFO equals one if a bidder's SIZE is less than the median bidder SIZE and a target's RATIO is greater than the median RATIO. In column (4), INFO equals one if a bidder's STDEV and a target's RATIO are greater than their corresponding medians; and in column (5), INFO equals one if a bidder's ERR and a target's RATIO are greater than their corresponding medians. The results based on the new dummy variable INFO are consistent in all five regressions. They show that β_1, the coefficient of INFO, is positive and statistically significant. β_1 is economically significant as well. The marginal effects calculated based on the results in column (1) (not reported in tables) show that takeover deals involving both a large target information asymmetry and a large bidder information asymmetry (i.e., INFO=1) are 2.85% more likely to include convertibles as a means of payment than deals involving only a small information asymmetry on one side or both sides of the transaction (i.e., INFO=0). The difference in the

likelihood that the bidder offers convertibles, rather than an all-cash or an all-stock deal, is 2%, 4.16%, 1.82%, and 1.85%, in the regressions reported in columns (2) to (5), respectively. These results provide further support for hypothesis **H1**.

Finally, we focus on how the interaction between the bidder information asymmetry and the target information asymmetry affects the use of convertibles in merger transactions. In particular, we test hypotheses **H2** and **H3** by running the following logistic regression for either a sample of bidders or a sample of targets:

$$\text{Log}[\frac{\text{P(y = 1)}}{\text{1 - P(y = 1)}}] = \beta_0 + \beta_1 INFO \times HINF + \beta_1^{'} INFO \times (1 - HINF) + \beta_2 X_{t-1} + \varepsilon, \qquad (2)$$

where the dependent variable y, the information asymmetry measure INFO, and control variables X_{t-1} are defined the same as those in regression (1). Again, INFO is an asymmetric information measure, consisting of ERR, STDEV, or $SIZE_{t-1}$ for bidders, and ERR, STDEV, or RATIO for targets. HINF is a dummy variable that measures the degree of asymmetric information about the other party in the merger transaction (other than the party underlying INFO and X_{t-1}). For example, if INFO measures the bidder information asymmetry, then HINF proxies for the target information asymmetry in the same transaction. HINF equals one if there is a high degree of asymmetric information and zero if the information asymmetry is small.

To test hypothesis **H2**, we run regression (2) on a sample of bidders. We calculate independent variables INFO and X_{t-1} for the bidder and HINF for the target. In these regressions, β_1 measures the sensitivity of the likelihood of convertible deals with respect to the bidder information asymmetry when the target has a large information asymmetry. $\beta_1^{'}$ measures the sensitivity when the target has a relatively moderate information asymmetry. Hypothesis **H2** predicts that β_1 is more significant than $\beta_1^{'}$.

The results from these regressions are presented in columns (1) to (5) of Table 9. In column (1), we use STDEV to measure the degree of asymmetric information about both the bidder and the target. Thus, INFO is STDEV of the bidder and HINF equals one if STDEV of the target is above the median STDEV

of all the targets in the sample. In column (2), we use ERR to measure the degree of asymmetric information about both the bidder and the target. In column (3), we use $SIZE_{t-1}$ and RATIO to measure the degree of asymmetric information about the bidder and the target, respectively. In columns (4) and (5), we use STDEV and ERR to measure the bidder information asymmetry, and we use RATIO as the measure for the target information asymmetry in order to avoid the reduction in sample size due to the missing values on target STDEV and target ERR.

In the regressions reported in columns (1), (4), and (5), we find that β_1 is positive and significant at the 1% level while $\beta_1^{'}$ is insignificant, as expected. However, β_1 and $\beta_1^{'}$ are both insignificant in the regression reported in column (2). This result could be due to the small sample size in the regression. Also, in the regression results reported in column (3), both β_1 and $\beta_1^{'}$ are negative and significant at the 1% level. In general, our results are consistent with hypothesis **H2**, suggesting that a bidder with a larger information asymmetry as to its value is more likely to offer convertibles only when there is also a large target information asymmetry.

In order to test hypothesis **H3**, we run regression (2) on a sample of targets. Independent variables INFO and X_{t-1} are calculated for the target, and HINF is calculated for the bidder. Thus, in these regressions, β_1 measures the sensitivity of the likelihood of a convertible deal with respect to the target asymmetric information when the bidder also has a large information asymmetry. $\beta_1^{'}$ measures the sensitivity when there is only a moderate bidder information asymmetry. Hypothesis **H3** predicts that β_1 is more significant than $\beta_1^{'}$.

The results for these regressions are presented in Table 9 in columns (6) to (8). In column (6), we use STDEV to measure the degree of asymmetric information about both the bidder and the target. Thus, INFO is STDEV of the target, and HINF equals one if STDEV of the bidder is above the median STDEV of all the bidders in the sample. In column (7), we use ERR to measure the degree of asymmetric information about both the bidder and the target. In column (8), we use $SIZE_{t-1}$ and RATIO to measure

the degree of asymmetric information about the bidder and the target, respectively. In this regression, HINF equals one if $SIZE_{t-1}$ of the bidder is below the median $SIZE_{t-1}$ of all the bidders in the sample.

In all three regressions, the results are consistent with hypothesis H3: β_1 is positive and more significant than $\beta_1^{'}$. In particular, β_1 is significant at the 1% level in all three regressions, and $\beta_1^{'}$ is insignificant in two of them. Thus, our results support hypothesis **H3**, suggesting that the likelihood of a merger with convertibles offered increases with the target information asymmetry only when there is also a large bidder information asymmetry. On the other hand, when the bidder information asymmetry is only moderate, the bidder may not offer convertibles even if the target information asymmetry is large.

5.3 Robustness Check

In this section, we check the robustness of our logistic regression results concerning hypothesis **H1**. In the previous section, we did not distinguish between all-cash and all-stock deals. In the first robustness check, we distinguish between all-cash and all-stock deals in our comparison with convertible deals. We estimate the following multinomial logistic model:[25]

$$\Pr(y = j) = \frac{e^{Z\beta_j}}{e^{Z\beta_1} + e^{Z\beta_2} + e^{Z\beta_3}}, \qquad (3)$$

where j = 1, 2, 3 stands for unordered choices for mergers with convertibles, all-stock mergers, and all-cash mergers, respectively. The vector of independent variables Z consists of the asymmetric information measure, INFO, and the control variables, X_{t-1}. The model is estimated using the method of maximum likelihood estimation. Standard errors are controlled for heteroskedasticity across firms. We treat the mergers with convertibles (j = 1) as the base category so that in this regression model, we estimate the likelihood of a bidder offering all stock or all cash relative to the likelihood of offering convertibles. Under hypothesis **H1,** we expect the coefficients of STDEV, ERR, and RATIO to be negative and the coefficient of $SIZE_{t-1}$ to be positive.

[25] We also ran separate logistic regressions comparing all-stock and convertible offers and comparing all-cash and convertible offers. The results from these regressions are similar to what we report in Table 10. Details are available upon request from the authors.

The results of this robustness check are presented in Table 10. Similar to the results presented in Table 7, we use STDEV and ERR in columns (1) and (2), respectively, as the measure of the degree of both the bidder asymmetric information and the target asymmetric information. In column (3), we use $SIZE_{t-1}$ and RATIO to measure the degree of asymmetric information for the bidder and the target, respectively. In order to increase the sample size in the regressions, we also re-run the regressions reported in columns (1) and (2) with RATIO as the measure of the target information asymmetry, rather than target STDEV or target ERR. The results of these regressions are reported in columns (4) and (5).

In general, the results reported in Table 10 support the results reported in Table 7. The coefficients of the asymmetric information measures in columns (1), (3), (4), and (5) exhibit the expected signs, and they are significant for both the regressions on the likelihood of all-cash deals relative to convertible deals (the cash regression hereafter) and the regressions on the likelihood of all-stock deals relative to convertible deals (the stock regression hereafter). However, in column (2), the coefficient of bidder ERR is insignificant in both the cash regression and the stock regression while the coefficient of target ERR is significant at the 10% level in the stock regression but insignificant in the cash regression. Again, the insignificance of the coefficients in column (2) could be due to the small sample sizes in the regression with target ERR as the asymmetric information measure. In sum, the results in Table 10 are consistent with hypothesis **H1** and thus confirm the robustness of our earlier test results.

We also run regression (3), constructing INFO as a dummy variable to proxy for the situation where both the bidder and the target have large information asymmetries. The construction of INFO is the same as in the regressions reported in Table 8. It distinguishes those transactions that have large information asymmetries on both sides. The results from fitting these regressions are reported in Table 11. The coefficient of INFO is negative and significant for both the stock regression and the cash regression in all five columns. These test results are consistent with hypothesis **H1** and thus support the robustness of our earlier results.

In our second robustness check, we divide our sample into public targets and private targets. As suggested in the literature (Chang, 1998, and Fuller, Netter, and Stegemoller, 2002), different factors can

influence decisions concerning takeovers of private targets and takeovers of public targets. Thus, in order to test the robustness of our previous results, we re-run the regressions reported in Table 7, on subsamples of takeovers of public targets and takeovers of private targets.

The results from running these regressions are presented in Table 12. In general, the results for takeovers of both public targets and private targets are consistent with the results reported in Table 7, lending further support for hypothesis **H1**. However, the regression results for takeovers of private targets are weaker, both statistically and economically, than the results for takeovers of public targets. For example, the bidder information asymmetry measures, such as bidder STDEV and bidder ERR, are insignificant for takeovers of private targets but they are significant for takeovers of public targets. As we discussed in Section 3.3, investors in private targets have a greater incentive to conduct research and produce information about bidders than investors in public targets. Thus, the bidder information asymmetry could be somewhat less of a concern to a bidder when it takes over a private target. This private target effect could explain why the coefficients of the bidder asymmetric information measures are less significant when the targets are private.

In regressions not reported in the paper, we also perform further robustness checks for the regression results reported in Tables 6, 8, and 9. For example, we run multinomial logistic regressions (similar to the regressions in the first robustness check) for private targets and public targets separately. We also check the robustness of our test results for hypotheses **H2** and **H3** by running multinomial logistic regressions for the whole sample and by running separate logistic regressions for the subsamples of private targets and public targets. The results from these robustness checks are qualitatively similar to those reported in the paper. They are available upon request from the authors.

6. Announcement Effects

In this section, we test hypotheses **H4** and **H5** by investigating the bidder's and the target's abnormal equity returns around takeover announcements. We calculate abnormal returns using the standard event-study methodology. We first estimate the market model parameters for each bidder and each target, based on a period of 200 days ending 15 days prior to the announcement of the takeover.

Then we use these parameters to calculate the cumulative abnormal return for each bidder and each target in four event windows: announcement day (0), three-day event window (-1, 1), seven-day event window (-3, 3), and eleven-day event window (-5, 5), where date 0 denotes the announcement date, date 1 denotes one day after the announcement date, and so on.

The results on the announcement effects for the bidder and the target are presented in Table 13. To make our results more easily comparable to those reported in the existing literature, Table 13 is organized by takeovers of public targets and takeovers of private targets separately. In panels A and B, we first report the announcement effects in all-cash deals and all-stock deals, respectively. For the sample of takeovers of public targets, we find that the average target abnormal return is positive and significant at the 1% level in all-cash and all-stock deals. The average bidder abnormal return around the takeover announcement is positive in all-cash deals and negative in all-stock deals. Both returns are significant at the 1% level in all event windows. The bidder return is greater in all-cash deals than in all-stock deals.

In takeovers of private targets, however, the average bidder abnormal return around the takeover announcement is positive and significant at the 1% level for both all-cash and all-stock deals. The average bidder abnormal return is greater in all-stock deals than in all-cash deals. Thus, our results on bidder returns and target returns in all-cash deals and all-stock deals are consistent with those reported in the existing literature (Travlos, 1987, and Chang, 1998).

In panel C, we report the announcement effects of convertible deals. First, we find that bidders in takeovers of public targets experience an average (median) cumulative abnormal return of 2.39% (0.29%) on the announcement date, 4.22% (1.93%) in event window (-1, 1), 4.32% (3.01%) in event window (-3, 3), and 4.10% (2.69%) in event window (-5, 5). Second, the average announcement period bidder abnormal return in takeovers of private targets is also positive, and it is similar in magnitude to that in takeovers of public targets.[26] On the other hand, the mean (median) target abnormal return upon the

[26] Our finding on the positive announcement effect of convertibles in takeovers of public targets is different from the announcement effect of public offerings of convertible debt documented in the literature. For example, Dann and Mikkelson (1984), Eckbo (1986), and Mikkelson and Partch (1986) document a negative announcement effect for firms that issue convertible debt publicly. However, the positive announcement effect of convertible securities in

announcement of a merger with convertible securities is 6.31% (3.39%) on the announcement date, 10.10% (8.51%) in event window (-1, 1), 9.52% (6.41%) in event window (-3, 3), and 9.52% (5.67%) in event window (-5, 5). Both bidder returns and target returns in mergers with convertible securities elicit positive reactions that are significant at the 1% level in all event windows based on the *t*-test and the Wilcoxon test.

In panel D, we report the difference in the announcement period abnormal returns between convertible deals and all-cash deals. In panel E, we report the difference in the announcement period abnormal returns between convertible deals and all-stock deals. We find that bidder abnormal returns around takeover announcements are larger for convertible deals than for both all-cash and all-stock deals. The differences are significant at the 1% level in all event windows, regardless of whether public targets or private targets are acquired. For example, in takeovers of public targets, the difference in bidder returns between convertible deals and all-cash deals is on average 3.05% in event window (-1, 1), and the difference between convertible deals and all-stock deals is on average 5.24% in the same event window. Thus, our results on bidder returns are consistent with hypothesis **H4**: bidder returns in mergers with convertibles are greater than those in all-cash or all-stock mergers.

Further, as reported in panels D and E, the differences in target abnormal returns between mergers with convertibles and all-stock or all-cash mergers are negative and significant at the 1% level in all event windows. For example, in event window (-1, 1), target returns in convertible deals are less than those in all-cash deals by an average of 17.63%; and they are less than those in all-stock deals by an average of 5.93%. Thus, our results on target returns are consistent with hypothesis **H5:** target returns in mergers with convertibles are less than those in all-cash or all-stock mergers.

7. Conclusion

This paper investigates the use of convertible securities as the medium of exchange in corporate change-of-control transactions in the presence of double-sided asymmetric information. We extend the corporate change-of-control literature and suggest that convertible securities can simultaneously resolve

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takeovers of private targets is similar to the positive announcement effect of private placements of convertible debt

the bidder information asymmetry and the target information asymmetry in corporate acquisitions. In contrast, cash or stock deals can only resolve one information asymmetry or the other but not both simultaneously. This advantage of convertible securities over cash and stock implies that convertible securities should be preferred as the medium of exchange over cash and stock when both the bidder and the target have large information asymmetries regarding their values.

Our empirical findings support the double-sided asymmetric information explanation for the use of convertible securities in certain merger transactions. We find that a bidder is more likely to offer convertible securities, rather than all cash or all stock, when both the bidder and its target have large information asymmetries. We also find that convertibles are more likely to be offered in a takeover to deal with the information asymmetry on one side of the transaction (either the bidder side or the target side) only when the other side of the transaction also has a large information asymmetry. Finally, we find that bidder shareholders in convertible deals experience larger abnormal announcement period stock returns than bidder shareholders in all-cash and all-stock deals. In contrast, target shareholders in convertible deals experience smaller abnormal announcement period stock returns than target shareholders in all-cash and all-stock deals. These empirical findings document a special role for convertible securities in change-of-control transactions that involve large information asymmetries on both sides of the transaction.

(Fields and Mais, 1991).

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Table 1: **The Choice of the Medium of Exchange in a Takeover Transaction When There Exists Double-Sided Asymmetric Information**. This table summarizes the implications concerning the choice among convertibles, cash, and stock as the medium of exchange in takeovers with varying degrees of bidder and target asymmetric information.

Degree of Asymmetric Information	**Large on Bidder Side**	**Small on Bidder Side**
Large on Target Side	Convertibles	Stock
Small on Target Side	Cash	Cash or Stock

Table 2: Sample Characteristics This table reports the number of takeover deals by year between 1980 and 2004, grouped by the medium of payment and the public/private status of the target. The convertible sample consists of merger transactions in which convertible securities were used as a method of payment; the cash sample consists of mergers in which cash was the only method of payment; and the stock sample consists of mergers in which common stock was the only method of payment.

	Whole Sample			Sample with Public Targets			Sample with Private Targets		
Year	Convt.	Cash	Common Stock	Convt.	Cash	Common Stock	Convt.	Cash	Common Stock
1980	3	8	1	3	7	1	0	1	0
1981	2	5	2	2	4	1	0	1	1
1982	1	0	0	1	0	0	0	0	0
1983	1	0	0	1	0	0	0	0	0
1984	4	19	6	4	16	5	0	3	1
1985	5	125	34	5	105	26	0	20	8
1986	5	188	40	4	145	15	1	43	25
1987	10	160	49	6	124	22	4	36	27
1988	8	199	45	5	159	27	3	40	18
1989	8	194	72	4	147	38	4	47	34
1990	13	188	61	4	141	35	9	47	26
1991	12	167	89	5	118	42	7	49	47
1992	20	222	151	11	143	43	9	79	108
1993	22	303	177	11	205	63	11	98	114
1994	33	382	209	10	243	80	23	139	129
1995	27	427	292	10	263	120	17	164	172
1996	28	536	363	18	315	119	10	221	244
1997	28	683	383	8	394	144	20	289	239
1998	35	735	373	20	415	164	15	320	209
1999	36	633	397	15	371	142	21	262	255
2000	15	496	435	6	295	132	9	201	303
2001	8	430	185	3	283	93	5	147	92
2002	11	420	84	6	264	38	5	156	46
2003	7	482	79	4	286	43	3	196	36
2004	10	584	64	2	293	32	8	291	32
Total	352	7,586	3,591	168	4,736	1,425	184	2,850	2,166

Table 3: Descriptive Statistics. This table reports means and medians of the variables used in the paper. Convertible deals consist of those takeovers in which convertibles were used as a method of payment; and cash and stock deals consist of those takeovers in which cash or stock was used as the only method of payment, respectively. ERR is the absolute value of the difference between the average earnings forecast and the actual earnings deflated by the mean earnings forecast; STDEV is the standard deviation of analysts' earnings forecasts, deflated by the absolute value of the average forecast; RATIO is the ratio of the deal value to the bidder's market value; SIZE is the log of the market value of total assets; MB is the ratio of the market value to the book value of equity; LDR is the ratio of the book value of long-term liabilities to the book value of total assets; and OPINC is the ratio of earnings before interest, taxes, depreciation, and amortization to the book value of total assets.

	Convertible Deals			**Cash Deals**			**Stock Deals**		
Variables	**# of Obs.**	**Mean**	**Median**	**# of Obs.**	**Mean**	**Median**	**# of Obs.**	**Mean**	**Median**
Panel A: Full sample									
STDEV (Bidder)	127	0.10	0.04	5,339	0.05	0.02	2,244	0.06	0.03
ERR (Bidder)	125	0.15	0.05	5,314	0.08	0.03	2,232	0.10	0.04
$SIZE_{t-1}$ (Bidder)	241	4.96	4.83	6,303	6.90	6.86	2,643	6.30	6.20
MB_{t-1} (Bidder)	241	2.09	1.64	6,303	2.14	1.66	2,643	4.79	2.78
LDR_{t-1} (Bidder)	241	0.22	0.17	6,292	0.21	0.17	2,636	0.11	0.03
$OPINC_{t-1}$ (Bidder)	241	-0.05	0.05	6,283	0.09	0.10	2,629	0.00	0.08
STDEV (Target)	23	0.47	0.05	315	0.11	0.04	503	0.08	0.04
ERR (Target)	22	0.58	0.06	305	0.25	0.06	495	0.14	0.05
RATIO	241	-1.21	-1.25	6,303	-3.14	-3.00	2,643	-2.56	-2.53
$SIZE_{t-1}$ (Target)	38	5.59	5.75	631	4.85	4.76	866	5.20	5.01
MB_{t-1} (Target)	38	1.51	1.26	631	1.67	1.36	866	2.62	1.81
LDR_{t-1} (Target)	38	0.27	0.18	627	0.14	0.08	863	0.13	0.04
$OPINC_{t-1}$ (Target)	38	-0.01	0.06	624	-0.01	0.07	862	-0.04	0.05
Panel B: Public target subsample									
STDEV (Bidder)	76	0.12	0.04	3,476	0.05	0.02	964	0.06	0.03
ERR (Bidder)	75	0.15	0.05	3,464	0.08	0.03	956	0.09	0.03
$SIZE_{t-1}$ (Bidder)	111	5.46	5.24	3,906	7.18	7.16	1,022	6.72	6.77
MB_{t-1} (Bidder)	111	1.93	1.63	3,906	2.04	1.61	1,022	3.75	2.31
LDR_{t-1} (Bidder)	111	0.24	0.19	3,899	0.22	0.19	1,019	0.14	0.08
$OPINC_{t-1}$ (Bidder)	111	-0.01	0.07	3,891	0.09	0.10	1,015	0.01	0.08
RATIO	111	-1.02	-1.00	3,906	-3.01	-2.84	1,022	-1.99	-1.81
Panel C: Private target subsample									
STDEV (Bidder)	51	0.08	0.04	1,863	0.05	0.02	1,280	0.05	0.03
ERR (Bidder)	50	0.14	0.05	1,850	0.08	0.03	1,276	0.10	0.05
$SIZE_{t-1}$ (Bidder)	130	4.53	4.53	2,397	6.44	6.43	1,621	6.03	5.97
MB_{t-1} (Bidder)	130	2.22	1.67	2,397	2.30	1.74	1,621	5.45	3.21
LDR_{t-1} (Bidder)	130	0.21	0.15	2,393	0.19	0.13	1,617	0.09	0.02
$OPINC_{t-1}$ (Bidder)	130	-0.07	0.05	2,392	0.09	0.10	1,614	-0.01	0.08
RATIO	130	-1.38	-1.44	2,397	-3.35	-3.21	1,621	-2.92	-2.91

Table 4: Sample Distribution of Convertible, Cash, and Stock Deals Grouped by Degrees of Information Asymmetry. This table reports the numbers of convertible deals, all-cash deals, and all-stock deals when bidders and targets face various degrees of information asymmetry. STDEV is the standard deviation of analysts' earnings forecasts, deflated by the absolute value of the average forecast; RATIO is the ratio of the deal value to the bidder's market value; SIZE is the log of the market value of total assets. Large and small bidder STDEV equal one if a bidder's STDEV is above or below the median STDEV of all bidders, respectively, and is zero otherwise. Large and small target STDEV equal one if a target's STDEV is above or below the median STDEV of all targets, respectively. Large and small $SIZE_{t-1}$ equal one if a bidder's $SIZE_{t-1}$ is above or below the median $SIZE_{t-1}$ of all bidders, respectively. Large and small RATIO equal one if RATIO is above or below the median RATIO of all deals, respectively.

Panel A: STDEV as the asymmetric information measure for both bidders and targets

	Large Bidder STDEV				**Small Bidder STDEV**			
	Large Target STDEV		**Small STDEV (Target)**		**Large Target STDEV**		**Small Target STDEV**	
	Frequency	Percent	Frequency	Percent	Frequency	Percent	Frequency	Percent
Convertibles	14	4.5%	3	1.4%	2	0.7%	7	3.2%
Cash	103	33.1%	64	29.8%	75	24.7%	85	38.6%
Stock	194	62.4%	148	68.8%	227	74.7%	128	58.2%
Total	311	100.0%	215	100.0%	304	100.0%	220	100.0%

Panel B: STDEV as the asymmetric information measure for bidders and RATIO as the measure for targets

	Large Bidder STDEV				**Small Bidder STDEV**			
	Large RATIO		**Small RATIO**		**Large RATIO**		**Small RATIO**	
	Frequency	Percent	Frequency	Percent	Frequency	Percent	Frequency	Percent
Convertibles	65	2.9%	8	0.4%	39	2.2%	5	0.2%
Cash	1333	59.4%	1291	70.7%	1056	58.3%	1615	72.4%
Stock	847	37.7%	526	28.8%	717	39.6%	611	27.4%
Total	2,245	100.0%	1,825	100.0%	1,812	100.0%	2,231	100.0%

Panel C: SIZE $_{t-1}$ as the asymmetric information measure for bidders and RATIO as the measure for targets

	Small Bidder $SIZE_{t-1}$				**Large Bidder $SIZE_{t-1}$**			
	Large RATIO		**Small RATIO**		**Large RATIO**		**Small RATIO**	
	Frequency	Percent	Frequency	Percent	Frequency	Percent	Frequency	Percent
Convertibles	211	5.2%	24	1.1%	11	0.3%	58	2.6%
Cash	2491	61.4%	1611	71.4%	2893	71.3%	1281	56.8%
Stock	1357	33.4%	621	27.5%	1155	28.5%	917	40.7%
Total	4,059	100.0%	2,256	100.0%	4,059	100.0%	2,256	100.0%

Table 5: Univariate Comparison of Convertible Deals to Cash and Stock Deals This table reports the differences between convertible deals and non-convertible deals (i.e., cash-only and stock-only deals). Convertible deals consist of those takeovers in which convertibles are used as a method of payment; and cash and stock deals consist of those takeovers in which cash or stock is used as the only method of payment, respectively. ERR is the absolute difference between the average earnings forecast and the actual earnings, deflated by the absolute value of the mean earnings forecast; STDEV is the standard deviation of analysts' earnings forecasts, deflated by the absolute value of the average forecast; RATIO is the ratio of the deal value to the bidder's market value; SIZE is the log of the market value of total assets; MB is the ratio of the market value to the book value of common equity; LDR is the ratio of the book value of long-term liabilities to the book value of total assets; and OPINC is the ratio of earnings before interest, taxes, depreciation, and amortization to the book value of total assets. *, **, and *** indicate significant differences from zero at the 10, 5, and 1 percent levels, respectively.

	Convertible Deals - Cash Deals			Convertible Deals - Stock Deals		
Variables	**# of Obs.**	**Mean**	**Median**	**# of Obs.**	**Mean**	**Median**
Panel A: Full sample						
STDEV (Bidder)	5,466	0.049***	0.016***	2,371	0.046***	0.013***
ERR (Bidder)	5,439	0.066***	0.026***	2,357	0.047***	0.013*
$SIZE_{t-1}$ (Bidder)	6,544	-1.943***	-2.034***	2,884	-1.340***	-1.375***
MB_{t-1} (Bidder)	6,544	-0.049	-0.014	2,884	-2.708***	-1.136***
LDR_{t-1} (Bidder)	6,533	0.013	-0.004	2,877	0.110***	0.136***
$OPINC_{t-1}$ (Bidder)	6,524	-0.136***	-0.044***	2,870	-0.047**	-0.024***
STDEV (Target)	338	0.360***	0.010**	526	0.391***	0.016***
ERR (Target)	327	0.334***	0.000	517	0.439***	0.016*
RATIO	6,544	1.928***	1.744***	2,884	1.350***	1.279***
$SIZE_{t-1}$ (Target)	669	0.742***	0.989***	904	0.393	0.741*
MB_{t-1} (Target)	669	-0.166	-0.103	904	-1.110***	-0.548***
LDR_{t-1} (Target)	665	0.136***	0.106***	901	0.148***	0.146***
$OPINC_{t-1}$ (Target)	662	0.000	-0.010	900	0.033	0.012
Panel B: Public target subsample						
STDEV (Bidder)	3,552	0.062***	0.015***	1,040	0.054***	0.012***
ERR (Bidder)	3,539	0.072***	0.027***	1,031	0.059***	0.020**
$SIZE_{t-1}$ (Bidder)	4,017	-1.721***	-1.919***	1,133	-1.255***	-1.537***
MB_{t-1} (Bidder)	4,017	-0.103	0.023	1,133	-1.819***	-0.682***
LDR_{t-1} (Bidder)	4,010	0.013	-0.004	1,130	0.093***	0.109***
$OPINC_{t-1}$ (Bidder)	4,002	-0.106***	-0.026***	1,126	-0.028	-0.006**
RATIO	4,017	1.994***	1.840***	1,133	0.976***	0.801***
Panel C: Private target subsample						
STDEV (Bidder)	1,914	0.030***	0.018**	1,331	0.029***	0.014**
ERR (Bidder)	1,900	0.057***	0.020**	1,326	0.035*	0.005
$SIZE_{t-1}$ (Bidder)	2,527	-1.914***	-1.900***	1,751	-1.506***	-1.442***
MB_{t-1} (Bidder)	2,527	-0.080	-0.077	1,751	-3.234***	-1.547***
LDR_{t-1} (Bidder)	2,523	0.024	0.015	1,747	0.117***	0.134***
$OPINC_{t-1}$ (Bidder)	2,522	-0.159***	-0.047***	1,744	-0.067**	-0.029**
RATIO	2,527	1.973***	1.774***	1,751	1.542***	1.473***

Table 6: Logistic Regressions: Likelihood of Offering Convertibles in Acquisitions and Asymmetric Information Concerning the Bidder's or the Target's Value. The dependent variable equals one for deals with convertibles as a means of payment, and zero for all-cash deals or all-stock deals. The independent variables consist of ERR, defined as the absolute value of difference between the average earnings forecast and the actual earnings deflated by the mean earnings forecast; STDEV, calculated as the standard deviation of analysts' earnings forecasts deflated by the absolute value of the average forecast; RATIO, the ratio of the deal value to the bidder's market value; SIZE, the log of the market value of total assets; MB, the ratio of the market value to the book value of common equity; LDR, the ratio of the book value of long-term liabilities to the book value of total assets; and OPINC, the ratio of earnings before interest, taxes, depreciation, and amortization to the book value of total assets. All variables are calculated for bidders in columns (1) to (3) and for targets in columns (4) to (6). *, **, and *** indicate significant differences from zero at the 10, 5, and 1 percent levels, respectively.

	Regressions on Bidder Information Asymmetry			**Regressions on Target Information Asymmetry**		
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Constant	-4.293***	-3.929***	-1.256***	-4.061***	-3.873***	-3.361***
	[0.000]	*[0.000]*	*[0.000]*	*[0.000]*	*[0.000]*	*[0.002]*
MB_{t-1}	-0.382***	-0.374***	-0.111***	-0.511*	-0.401*	-0.626**
	[0.003]	*[0.003]*	*[0.003]*	*[0.081]*	*[0.084]*	*[0.039]*
LDR_{t-1}	0.168	0.419	1.376***	2.816**	3.083***	3.669***
	[0.796]	*[0.523]*	*[0.000]*	*[0.014]*	*[0.007]*	*[0.001]*
$OPINC_{t-1}$	3.899**	1.958	-0.940***	4.016**	0.299	-1.047
	[0.011]	*[0.131]*	*[0.001]*	*[0.034]*	*[0.832]*	*[0.197]*
STDEV	6.617***			3.521***		
	[0.000]			*[0.000]*		
ERR		2.227***			1.185***	
		[0.006]			*[0.000]*	
$SIZE_{t-1}$			-0.405***			0.048
			[0.000]			*[0.775]*
RATIO						0.401*
						[0.066]
Obs.	6,362	6,355	9,135	758	749	1,134
Chi^2	39.34	20.65	157.65	62.64	47.99	20.89
Pseudo R^2	0.057	0.036	0.096	0.23	0.14	0.139

Table 7: Logistic Regressions: Likelihood of Offering Convertibles in Acquisitions and Double-Sided Asymmetric Information. The dependent variable equals one for convertible deals and zero for all-cash deals and all-stock deals. The independent variables consist of ERR, defined as the absolute value of the difference between the average earnings forecast and the actual earnings deflated by the mean earnings forecast; STDEV, calculated as the standard deviation of analysts' earnings forecasts deflated by the absolute value of the average forecast; RATIO, the ratio of the deal value to the bidder's market value; SIZE, the log of the market value of total assets; MB, the ratio of the market value to the book value of common equity; LDR, the ratio of the book value of long-term liabilities to the book value of total assets; and OPINC, the ratio of earnings before interest, taxes, depreciation, and amortization to the book value of total assets. *, **, and *** indicate significant differences from zero at the 10, 5, and 1 percent levels, respectively.

	(1)	(2)	(3)	(4)	(5)
Constant	-4.792***	-3.602***	-1.395***	-3.040***	-2.667***
	[0.000]	*[0.010]*	*[0.000]*	*[0.000]*	*[0.000]*
MB_{t-1}	-0.646**	-0.585**	-0.059**	-0.225**	-0.230**
	[0.037]	*[0.011]*	*[0.022]*	*[0.023]*	*[0.019]*
LDR_{t-1}	1.484	2.338	0.913**	-0.067	0.119
	[0.575]	*[0.390]*	*[0.014]*	*[0.913]*	*[0.850]*
$OPINC_{t-1}$	9.24	3.077	-0.678**	3.164**	1.603
	[0.226]	*[0.668]*	*[0.023]*	*[0.012]*	*[0.117]*
STDEV (Bidder)	10.893***			5.509***	
	[0.008]			*[0.000]*	
STDEV (Target)	2.277***				
	[0.006]				
ERR (Bidder)		0.47			1.688**
		[0.779]			*[0.049]*
ERR (Target)		0.534			
		[0.413]			
$SIZE_{t-1}$ (Bidder)			-0.226***		
			[0.000]		
RATIO			0.456***	0.555***	0.569***
			[0.000]	*[0.000]*	*[0.000]*
Obs.	561	550	9,135	6,362	6,355
Chi^2	30.17	11.49	260.16	106.32	83.3
Pseudo R^2	0.185	0.074	0.134	0.119	0.102

Table 8: Logistic Regressions: Likelihood of Offering Convertibles in Acquisitions Using Dummy for Large Information Asymmetry. The dependent variable equals one for convertible deals and zero for all-cash deals and all-stock deals. The independent variables consist of MB, the ratio of the market value to the book value of common equity; LDR, the ratio of the book value of long-term liabilities to the book value of total assets; OPINC, the ratio of earnings before interest, taxes, depreciation, and amortization to the book value of total assets, and INFO, a dummy variable for firms facing both large target information asymmetry and large bidder information asymmetry. We define transactions with large target and bidder information asymmetries in column (1) as those with bidder STDEV above the median of all bidders and target STDEV above the median of all targets; in column (2) as those with bidder ERR and target ERR above their corresponding medians; in column (3) as those with bidder $SIZE_{t-1}$ below the median and RATIO above the median; in column (4) as those with bidder STDEV and RATIO above their corresponding medians; and in column (5) as those with bidder ERR and RATIO above their corresponding medians. We calculate ERR as the absolute value of the difference between the average earnings forecast and the actual earnings deflated by the mean forecast; STDEV as the standard deviation of analysts' earnings forecasts deflated by the absolute value of the average forecast; RATIO as the ratio of the deal value to the bidder's market value; and SIZE as the log of the market value of total assets. *, **, and *** indicate significant differences from zero at the 10, 5, and 1 percent levels, respectively.

	(1)	(2)	(3)	(4)	(5)
Constant	-4.244***	-3.948***	-4.435***	-4.342***	-4.324***
	[0.002]	*[0.001]*	*[0.000]*	*[0.000]*	*[0.000]*
MB_{t-1}	-0.614**	-0.637**	-0.114***	-0.290***	-0.299***
	[0.034]	*[0.027]*	*[0.001]*	*[0.009]*	*[0.007]*
LDR_{t-1}	2.705	2.339	0.867**	0.412	0.366
	[0.280]	*[0.366]*	*[0.013]*	*[0.512]*	*[0.557]*
$OPINC_{t-1}$	4.484	4.763	-1.507***	1.696	1.532
	[0.517]	*[0.551]*	*[0.000]*	*[0.135]*	*[0.136]*
INFO	1.541**	1.145**	1.677***	1.335***	1.368***
	[0.022]	*[0.038]*	*[0.000]*	*[0.000]*	*[0.000]*
Obs.	561	550	9,135	6,362	6,355
Chi^2	15.44	10.18	176.86	52.37	50.89
Pseudo R^2	0.133	0.097	0.102	0.064	0.066

Table 9: Logistic Regressions on the Likelihood of Offering Convertibles: Interaction of Information Asymmetry between the Bidder Side and the Target Side. The dependent variable equals one for convertible deals and zero for all-cash and all-stock deals. The independent variables consist of ERR, defined as the absolute value of the difference between the average earnings forecast and the actual earnings deflated by the mean earnings forecast; STDEV, calculated as the standard deviation of analysts' earnings forecasts, deflated by the absolute value of the average forecast; RATIO, the ratio of the deal value to the bidder's market value; SIZE, the log of the market value of total assets; MB, the ratio of the market value to the book value of common equity; LDR, the ratio of the book value of long-term liabilities to the book value of total assets; and OPINC, the ratio of earnings before interest, taxes, depreciation, and amortization to the book value of total assets. Regressions (1) to (5) are based on a sample of bidders, and regressions (6) to (8) are based on a sample of targets. HINF is a dummy variable. In regression (1), it equals one if target STDEV is above the median STDEV of all targets and zero otherwise. In regression (2), it equals one if target ERR is above the median ERR of all targets. In regressions (3) to (5), it equals one if RATIO is above the median. In regressions (6) and (7), it equals one if bidder STDEV or bidder ERR is above the corresponding medians. In regression (8), it equals one if bidder $SIZE_{t-1}$ is below the median. *, **, and *** indicate significant differences from zero at the 10, 5, and 1 percent levels, respectively.

	A Sample of Bidders (Interacted with Target HINF)					**A Sample of Targets (Interacted with Bidder HINF)**		
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**
Constant	-4.437*** *[0.000]*	-3.415** *[0.017]*	-1.994*** *[0.000]*	-4.340*** *[0.000]*	-3.744*** *[0.000]*	-3.846*** *[0.000]*	-3.943*** *[0.000]*	-2.915*** *[0.000]*
MB_{t-1}	-0.752** *[0.026]*	-0.635** *[0.014]*	-0.072 *[0.145]*	-0.277** *[0.011]*	-0.292*** *[0.009]*	-0.568 *[0.112]*	-0.399 *[0.120]*	-0.700** *[0.027]*
LDR_{t-1}	1.901 *[0.475]*	2.27 *[0.406]*	0.792 *[0.127]*	-0.602 *[0.486]*	-0.371 *[0.676]*	2.469** *[0.033]*	3.017*** *[0.010]*	3.624*** *[0.001]*
$OPINC_{t-1}$	9.859 *[0.154]*	3.448 *[0.650]*	-1.314*** *[0.006]*	2.499 *[0.137]*	0.122 *[0.914]*	3.586 *[0.107]*	-0.704 *[0.497]*	-1.139 *[0.144]*
STDEV * HINF	13.123*** *[0.006]*			8.511*** *[0.000]*		3.805*** *[0.000]*		
STDEV * (1-HINF)	7.653 *[0.164]*			3.902 *[0.228]*		2.792 *[0.388]*		
ERR * HINF		1.223 *[0.427]*			3.211*** *[0.000]*		1.481*** *[0.000]*	
ERR * (1-HINF)		-0.067 *[0.990]*			-3.066 *[0.376]*		0.493 *[0.675]*	
$SIZE_{t-1}$ * HINF			-0.212*** *[0.003]*					
$SIZE_{t-1}$ * (1-HINF)			-0.426*** *[0.000]*					
RATIO * HINF								0.763*** *[0.006]*
RATIO * (1-HINF)								0.328* *[0.073]*
Obs.	559	548	5,007	3,687	3,685	684	672	1,129
Chi^2	19.92	10.3	45.73	43.12	26.04	74.56	49.62	29.64
Pseudo R^2	0.153	0.07	0.105	0.064	0.042	0.223	0.173	0.15

Table 10: Multinomial Logistic Regressions on the Likelihood of Offering Convertibles. This table reports the results from multinomial logistic regressions for unordered choices of convertible deals, all-stock deals, and all-cash deals. The group of convertible deals is treated as the base category. The independent variables consist of ERR, defined as the absolute value of the difference between the average earnings forecast and the actual earnings deflated by the mean forecast; STDEV, calculated as the standard deviation of analysts' earnings forecasts deflated by the absolute value of the average forecast; RATIO, the ratio of the deal value to the bidder's market value; SIZE, the log of the market value of total assets; MB, the ratio of the market value to the book value of common equity; LDR, the ratio of the book value of long-term liabilities to the book value of total assets; and OPINC, the ratio of earnings before interest, taxes, depreciation, and amortization to the book value of total assets. *, **, and *** indicate significant differences from zero at the 10, 5, and 1 percent levels, respectively.

	(1)		(2)		(3)		(4)		(5)	
	stock	**cash**	**stock**	**cash**	**stock**	**cash**	**stock**	**cash**	**stock**	**cash**
Constant	3.953***	4.256***	2.808*	3.017**	0.648**	1.038***	2.209***	2.576***	1.828***	2.202***
	[0.001]	*[0.001]*	*[0.053]*	*[0.038]*	*[0.016]*	*[0.000]*	*[0.000]*	*[0.000]*	*[0.000]*	*[0.000]*
MB_{t-1}	0.813**	0.435	0.745***	0.378	0.187***	-0.214***	0.478***	0.017	0.475***	0.014
	[0.013]	*[0.189]*	*[0.003]*	*[0.135]*	*[0.000]*	*[0.000]*	*[0.000]*	*[0.887]*	*[0.000]*	*[0.906]*
LDR_{t-1}	-1.146	-1.435	-2.115	-2.462	-0.225	-2.258***	-1.292**	0.573	-1.453**	0.398
	[0.681]	*[0.606]*	*[0.453]*	*[0.379]*	*[0.558]*	*[0.000]*	*[0.039]*	*[0.358]*	*[0.024]*	*[0.530]*
$OPINC_{t-1}$	-10.368	-7.506	-4.522	-1.275	-0.025	2.566***	-4.899***	-1.776	-3.228***	-0.11
	[0.185]	*[0.346]*	*[0.568]*	*[0.874]*	*[0.941]*	*[0.000]*	*[0.000]*	*[0.181]*	*[0.004]*	*[0.923]*
STDEV (Bidder)	-8.731**	-12.540***					-5.652***	-5.347***		
	[0.037]	*[0.007]*					*[0.000]*	*[0.000]*		
STDEV (Target)	-4.257***	-1.721**								
	[0.000]	*[0.049]*								
ERR (Bidder)			0.399	-1.305					-1.775**	-1.582*
			[0.505]	*[0.825]*					*[0.044]*	*[0.072]*
ERR (Target)			-1.227*	-0.147						
			[0.076]	*[0.831]*						
$SIZE_{t-1}$ (Bidder)					0.193***	0.226***				
					[0.000]	*[0.001]*				
RATIO					-0.274***	-0.589***	-0.261***	-0.678***	-0.278***	-0.693***
					[0.000]	*[0.000]*	*[0.002]*	*[0.000]*	*[0.000]*	*[0.001]*
Obs.	561		550		9,135		6,362		6,355	
Chi^2	68.39		55.58		921.9		613.4		602.7	
Pseudo R^2	0.112		0.103		0.190		0.199		0.198	

Table 11: Multinomial Logistic Regressions on the Likelihood of Offering Convertibles: A Dummy Variable Approach. This table reports the results from multinomial logistic regressions for unordered choices of convertible deals, all-stock deals, and all-cash deals. The group of convertible deals is treated as the base category. The independent variables consist of MB, the ratio of the market value to the book value of common equity; LDR, the ratio of the book value of long-term liabilities to the book value of total assets; OPINC, the ratio of earnings before interest, taxes, depreciation, and amortization to the book value of total assets, and INFO, a dummy variable for transactions with both large target information asymmetry and large bidder information asymmetry. We define transactions with large target and bidder information asymmetries in column (1) as those with bidder STDEV above the median of all bidders and target STDEV above the median of all targets; in column (2) as those with bidder ERR and target ERR above their corresponding medians; in column (3) as those with bidder $SIZE_{t-1}$ below the median and RATIO above the median; in column (4) as those with bidder STDEV and RATIO above their corresponding medians; and in column (5) as those with bidder ERR and RATIO above their corresponding medians. We calculate ERR as the absolute value of the difference between the average earnings forecast and the actual earnings deflated by the mean forecast; STDEV as the standard deviation of analysts' earnings forecasts deflated by the absolute value of the average forecast; RATIO as the ratio of the deal value to the bidder's market value; and SIZE as the log of the market value of total assets. *, **, and *** indicate significant differences from zero at the 10, 5, and 1 percent levels, respectively.

	(1)		(2)		(3)		(4)		(5)	
	Stock	**Cash**	**Stock**	**Cash**	**Stock**	**Cash**	**Stock**	**Cash**	**Stock**	**Cash**
Constant	3.410**	3.734***	3.101**	3.447***	2.840***	4.421***	2.572***	4.217***	2.553***	4.200***
	[0.015]	*[0.008]*	*[0.010]*	*[0.004]*	*[0.000]*	*[0.000]*	*[0.000]*	*[0.000]*	*[0.000]*	*[0.000]*
MB_{t-1}	0.770**	0.388	0.793**	0.41	0.237***	-0.102**	0.519***	0.153	0.524***	0.161
	[0.012]	*[0.209]*	*[0.011]*	*[0.195]*	*[0.000]*	*[0.024]*	*[0.000]*	*[0.216]*	*[0.000]*	*[0.192]*
LDR_{t-1}	-2.569	-2.839	-2.199	-2.496	-2.238***	-0.341	-1.772***	-0.016	-1.700***	0.031
	[0.312]	*[0.262]*	*[0.403]*	*[0.340]*	*[0.000]*	*[0.335]*	*[0.006]*	*[0.980]*	*[0.008]*	*[0.961]*
$OPINC_{t-1}$	-6.019	-2.433	-6.288	-2.67	0.555**	3.392***	-3.445***	-0.676	-3.259***	-0.495
	[0.409]	*[0.742]*	*[0.457]*	*[0.755]*	*[0.041]*	*[0.000]*	*[0.004]*	*[0.575]*	*[0.004]*	*[0.657]*
INFO	-1.488**	-1.606**	-1.037*	-1.254**	-1.222***	-1.886***	-0.838***	-1.493***	-0.864***	-1.530***
	[0.029]	*[0.019]*	*[0.064]*	*[0.026]*	*[0.000]*	*[0.000]*	*[0.000]*	*[0.000]*	*[0.000]*	*[0.000]*
Obs.	561		550		9,135		6,362		6,355	
Chi^2	44.78		38.8		777.3		438.1		428.6	
Pseudo R^2	0.091		0.089		0.162		0.150		0.151	

Table 12: Logistic Regressions, Grouped by Takeovers of Public Targets and Takeovers of Private Targets. This table reports the results from logistic regressions based on a subsample of takeovers of public targets and a subsample of takeovers of private targets, respectively. The dependent variable for all regressions equals one for convertible deals and zero for all-cash and all-stock deals. The independent variables consist of ERR, defined as the absolute value of the difference between the average earnings forecast and the actual earnings deflated by the mean earnings forecast; STDEV, calculated as the standard deviation of analysts' earnings forecasts deflated by the absolute value of the average forecast; RATIO, the ratio of the deal value to the bidder's market value; SIZE, the log of the market value of total assets; MB, the ratio of the market value to the book value of common equity; LDR, the ratio of the book value of long-term liabilities to the book value of total assets; and OPINC, the ratio of earnings before interest, taxes, depreciation, and amortization to the book value of total assets. *, **, and *** indicate significant differences from zero at the 10, 5, and 1 percent levels, respectively.

	Takeovers of Private Targets			**Takeovers of Public Targets**		
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Constant	-2.601***	-2.540***	-1.234***	-3.009***	-2.703***	-2.115***
	[0.000]	*[0.000]*	*[0.000]*	*[0.000]*	*[0.000]*	*[0.000]*
MB_{t-1}	-0.272	-0.259	-0.071*	-0.200**	-0.194**	-0.029
	[0.167]	*[0.167]*	*[0.052]*	*[0.024]*	*[0.023]*	*[0.362]*
LDR_{t-1}	1.013	1.193	1.341***	-0.97	-0.706	0.477
	[0.275]	*[0.188]*	*[0.005]*	*[0.200]*	*[0.357]*	*[0.316]*
$OPINC_{t-1}$	3.897*	3.164	-0.433	2.540*	1.157	-1.301***
	[0.074]	*[0.140]*	*[0.247]*	*[0.055]*	*[0.317]*	*[0.008]*
STDEV	4.051			5.828***		
	[0.121]			*[0.000]*		
ERR		1.695			1.930**	
		[0.280]			*[0.025]*	
$SIZE_{t-1}$			-0.227***			-0.106*
			[0.007]			*[0.068]*
RATIO	0.633***	0.627***	0.456***	0.581***	0.599***	0.551***
	[0.000]	*[0.000]*	*[0.000]*	*[0.000]*	*[0.000]*	*[0.000]*
Obs.	2,675	2,670	4,128	4,727	4,722	6,554
Chi^2	77.32	77.5	193.57	64.3	46.08	127.98
Pseudo R^2	0.148	0.140	0.147	0.109	0.093	0.113

Table 13. Announcement Effects: This table reports the announcement period abnormal returns for bidders and targets. Convertible deals consist of those takeovers where convertibles are offered as a method of payment; and cash and stock deals consist of those takeovers where cash or stock is offered as the only method of payment, respectively. The differences in announcement period returns among these three subsamples are also reported. The means and medians are in percentages. All panels are based on four event windows. (0) stands for the announcement date; (-1, 1) stands for a three-day window from one day prior to the takeover announcement to one day following the takeover announcement; etc. The significance of the difference in means is determined based on *t* -tests and the significance of the difference in medians is determined based on Wilcoxon signed-rank tests. Asterisks *, **, and *** indicate significant differences from zero at the 10, 5, and 1 percent levels, respectively.

	Deals with Public Targets						**Deals with Private Targets**		
Event	**Bidders**			**Targets**			**Bidders**		
Window	**# of Obs.**	**Mean**	**Median**	**# of Obs.**	**Mean**	**Median**	**# of Obs.**	**Mean**	**Median**
Panel A: Cash deals where cash is offered as the only method of payment									
(0)	4,413	0.49***	0.12***	656	19.40***	12.97***	2,614	0.50***	0.16***
(-1, 1)	4,412	1.17***	0.57***	650	27.73***	24.47***	2,612	0.98***	0.46***
(-3, 3)	4,410	1.26***	0.71***	649	30.00***	26.87***	2,610	0.99***	0.56***
(-5, 5)	4,399	1.12***	0.62***	643	31.01***	28.44***	2,601	0.85***	0.36***
Panel B: Stock deals where stock is offered as the only method of payment									
(0)	1,328	-0.64***	-0.70***	846	10.61***	6.65***	1,908	0.81***	0.23***
(-1, 1)	1,328	-1.02***	-1.23***	843	16.03***	13.58***	1,908	1.23***	0.47***
(-3, 3)	1,328	-1.12***	-1.99***	843	17.49***	16.30***	1,908	1.45***	0.83***
(-5, 5)	1,325	-1.09***	-1.59***	841	18.20***	17.18***	1,905	1.14***	0.51***
Panel C: Convertible deals where convertibles are offered as one method of payment									
(0)	147	2.39***	0.29***	39	6.31***	3.39***	158	2.90***	1.21***
(-1, 1)	147	4.22***	1.93***	39	10.10***	8.51***	158	4.47***	2.16***
(-3, 3)	147	4.32***	3.01***	38	9.52***	6.41***	158	5.23***	2.93***
(-5, 5)	147	4.10***	2.69***	38	9.52***	5.67***	156	3.48***	1.74**
Panel D: Difference between convertible deals and all-cash deals									
(0)	4,560	1.90***	0.17*	695	-13.09***	-9.58***	2,772	2.40***	1.05***
(-1, 1)	4,559	3.05***	1.36***	689	-17.63***	-15.96***	2,770	3.49***	1.70***
(-3, 3)	4,557	3.06***	2.29**	687	-20.48***	-20.46***	2,768	4.25***	2.37***
(-5, 5)	4,546	2.98***	2.07*	681	-21.49***	-22.77***	2,757	2.64***	1.37*
Panel E: Difference between convertible deals and all-stock deals									
(0)	1,475	3.03***	0.99***	885	-4.29*	-3.27	2,066	2.08***	0.98***
(-1, 1)	1,475	5.24***	3.16***	882	-5.93**	-5.07*	2,066	3.24***	1.70***
(-3, 3)	1,475	5.44***	5.00***	881	-7.96***	-9.89**	2,066	3.79***	2.10***
(-5, 5)	1,472	5.19***	4.28***	879	-8.68***	-11.51***	2,061	2.34**	1.23