Is there an information asymmetry discount? New Insights from Mergers and Acquisitions

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Abstract

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1. Introduction

Information asymmetry, as a form of market friction, restricts the flow of information on a firm's activities, creates difficulties for investors to assess the true value of a firm, and makes it easier for entrenched managers to consume excess private benefits of control. Consistent with this premise, prior literature documents that information asymmetry is negatively related to firm value (Krishnaswami and Subramaniam (1999), Anderson, Duru and Reeb (2009), and Barth, Konchitchki and Landsman (2013)). In other words, information asymmetry induces a discount in firm value. In this study, we focus on mergers & acquisitions (M&A) as a possible channel to capture the discount in the target firm's valuation due to information asymmetry. Acquisitions are among the largest and most significant investments made by a firm. Acquirers undertake a thorough examination of the target firm's financials as a part of the due diligence process to obtain and verify both public and private information about the target (Lajoux and Elson (2000)). In addition, M&A announcements stir great public interest in the target, creating the

incentive for investors to gather information about the targets. The careful scrutiny of the target by the market and the acquirer release large amounts of relevant information about the target, and as a result, M&A announcements can potentially alleviate the discount in the target's value due to information asymmetry. The greater the information asymmetry about the target, the larger is the discount and the consequent wealth gains at the announcement of the merger. We examine this hypothesis by investigating wealth gains at M&A announcements that are attributable to the target firm's information asymmetry.

Measuring information asymmetry is a challenging task because the true level of information asymmetry cannot be directly observed and there is lack of consensus over the proxy that best captures it. In a recent paper, Karpoff, Lee, and Masulis (2013) develop a novel measure of firm level information asymmetry by employing factor analysis to construct an aggregate factor with eight proxies for information asymmetry identified from extant literature and find that their information asymmetry factor is positively related to the lockup period of seasonal equity offerings. Following Karpoff, Lee, and Masulis (2013), we use ten well-documented variables to construct a proxy for firm specific information asymmetry. These variables, identified from extant evidence, include number of analyst following the firm, firm size, firm age, tangible assets, average bid-ask spread, abnormal accruals, return volatility, analyst forecast error, analyst forecast dispersion and Amihud.

Adopting this measure of information asymmetry, we begin our analysis by exploring the relation between the information asymmetry and firm value. We find that when controlling for different sets of firm characteristics, the information asymmetry factor remains significantly and positively related to cost of equity, cost of debt, and negatively related to Tobin's Q, corroborating the evidence in previous literature of a significant discount in firm value attributable to information asymmetry (Anderson, Duru and Reeb (2009) and Barth, Konchitchki and Landsman (2013)).

After establishing the existence of an information asymmetry discount, we proceed to examine whether M&A announcements, which are usually accompanied with release of large amounts of

information about the target firm, serves as a mechanism to capture the discount in the target firm's value induced by information asymmetry. Our central hypothesis is that if the M&A announcement reduces the information asymmetry about the target's value, then we should observe a significant relation between the M&A announcement-period wealth effect and the target firm's information asymmetry factor. Based on a sample of 543 completed M&A transactions involving public targets from 1990 to 2014, we find significant evidence in support of our hypothesis that M&A announcement-period wealth gains are significantly and positively related to target firm's information asymmetry level. We find that the target's announcement-period abnormal returns, acquirer's announcement-period abnormal returns, target-acquirer combined value-weighted portfolio announcement-period abnormal returns, and the premium paid to the target all increase significantly with the aggregate factor representing target firm's information asymmetry. According to our estimate, one standard deviation increase in the target firm's information asymmetry factor increases the acquiring (target) firm's shareholder wealth by $43 million ($10.55 million) based on the median market capitalization of the acquiring (target) firm[1]. Our findings are consistent with the premise that both target and acquiring firms significantly benefit from the wealth creation arising from the acquisition of opaque targets.

An alternative explanation of the above findings is that the acquirer information asymmetry, instead of the target information asymmetry, is the main contributor to the positive wealth gains. Specifically, acquisitions by more transparent acquirers may benefit from synergies due to transparency. In other words, more transparent acquirers may make better acquisitions. We incorporate acquirer information asymmetry in the analysis and all our initial findings on the association between the wealth gains and the target information asymmetry factor continue to hold, suggesting that acquirer information asymmetry does not influence our findings. Masulis, Wang, and Xie (2007) suggest that corporate governance variables such as board characteristics and corporate governance indices significantly impact M&A performance.

[1] The acquirer dollar gain is calculated by multiplying the product of coefficient estimate of target information asymmetry on acquirer CAR (0.0211) and the target information asymmetry standard deviation (0.75) by the median acquirer market capitalization (2,714 million dollars). The target dollar gain is estimated by the same manner.

Accordingly, we control for the governance variables, including board size, independent board percent, CEO/chairman duality, and BCF index, of both acquirers and targets. We find that the inclusion of corporate governance variables doesn't alter the significantly positive relation between the wealth gains and target information asymmetry factor.

Improvement in post-merger operating performance is considered another possible reason for the announcement-period wealth creation in M&As (Wang and Xie (2009)). Next, we investigate if acquisition of an opaque targets leads to better post-merger operating performance. We measure the change in operating performance as the difference in performance-adjusted ROA of the acquirer and the target as a combined firm from one-year prior to the acquisition to one-year, two-years, and three-years after the acquisition. We adjust the ROA of the acquirer (target) by the ROA of the industry, and ROA of a matched firm of the acquirer (target). We find no significant relation between the post-merger performance improvement and target information asymmetry factor.

We next investigate if the wealth gains arising from target information asymmetry induce firms to purchase targets with high information asymmetry. Following Bena and Li (2014), we form three different control samples that are randomly drawn, drawn by industry- and matched on size, or matched by industry, size, and book-to-market. Using the three pools of control firms, we estimate the likelihood of target selection by conditional logit model. We find that across all three control samples, firms with high level of information asymmetry are more likely to become targets. In view of the significant wealth gains arising from purchasing targets with high information asymmetry, this finding is not surprising and further confirms the prior literature on the relation between acquisition synergies and M&A decisions (Betton, Eckbo, and Thorburn (2008)).

How information asymmetry affects the bargaining power between the acquirer and the target is the next issue we examine. We measure relative gain of the target versus the acquirer as the difference between target announcement-period abnormal dollar gains and acquirer announcement-period abnormal

dollar gains scaled by the sum of market capitalization of the acquirer and the target. We find that target captures significantly smaller gains than the acquirer if there is high target information asymmetry. In addition, we find that target's relative gains increase in the acquirer information asymmetry. These two findings indicate that the information asymmetry indeed impact the relative bargaining power between the acquirer and the target and the party with high information asymmetry is in a weaker position when negotiating the deal.

Finally, we investigate how deal characteristics are influenced by the target information asymmetry. Extant literature reveals that one variable closely associated with target information asymmetry is the method of payment. Hansen (1987) theorizes that stock offers dominate cash offers when there is high level of target information asymmetry so the target is forced to share the risk of the acquirer overpaying. To examine the influence of target information asymmetry level on the choice of method of payment, we estimate a probit model with all-cash dummy as the dependent variable. We find a significantly negative relation between target information asymmetry level and the likelihood of all-cash acquisitions, suggesting acquirers tend to finance deals with stocks when facing high level of information asymmetry in the targets. This finding corroborates the risk-sharing hypothesis proposed by Hansen (1987). Another deal variable that receives wide attention in the literature is diversifying versus focus-enhancing acquisitions. Krishnaswami and Subramaniam (1999) document wealth gains from focus-enhancing spin-offs when there exists a high level of information asymmetry about a firm. These findings suggest greater focus mitigates information asymmetry and induces higher firm value. We define acquisitions as diversifying if targets and acquirers belong to different industries defined by two-digit SIC codes, and examine the association between target information asymmetry and firms' choice of value-increasing, focused acquisition. Using a probit model, we find that greater target information asymmetry is associated with higher likelihood of focused acquisitions, complementing the findings by Krishnaswami and Subramaniam (1999). Next, we investigate if target information asymmetry also affects relative deal size, measured by the ratio of deal value to acquirer market capitalization. We find significant negative relation between target information

asymmetry and relative deal size, indicating that acquisitions with high information asymmetry often involves targets that are relatively smaller in size. This finding is not surprising given the uncertainty involved in acquisitions of targets with high information asymmetry.

Lastly, we examine how target information asymmetry impacts deal closure time - the number of days it takes to complete the deals, measured as the difference between announcement dates and effective dates. We find that higher target information asymmetry is associated with shorter deal closure time, possibly because of the thorough preliminary due diligence performed on the target with high information asymmetry prior to the deal announcements. Unfortunately, we don't have sufficient data available to further test this conjecture.

Our paper makes two important contributions to the current literature. First, by adopting a composite measure of information asymmetry similar to the one initially proposed by Karpoff, Lee, and Masulis (2013), we corroborate the existence of information asymmetry discount. More importantly, we provide evidence that M&As can serve as a channel to release the information asymmetry discount in the target firm. We examine the information-discovery aspect of M&A that has received but limited attention in the literature. Second, by identifying the significant relations between target information asymmetry and various aspects of M&A including announcement-period wealth effects, target selection, relative dollar gains of the target versus the acquirer, and deal characteristics, we contribute to the extensive literature on the determinants of M&A performance. In addition, we provide an alternative explanation to the well-documented positive wealth effects when purchasing private targets. Our evidence indicates that apart from the liquidity effect suggested by Fuller, Netter, and Stegemoller (2002), information asymmetry in the target firm contributes to the positive wealth gains in M&As.

The paper proceeds as follows. Section 2 discusses the related literature. Section 3 describes the data and variables used in our analysis. Section 4 reports our empirical findings and discussions. Section 5 concludes the paper.

2. Literature Review

Our study builds on the extensive literature on information asymmetry. The first aspect of information asymmetry is its relation with firm value. Current literature provides overwhelming evidence that information asymmetry negatively impacts firm value. Barth, Konchitchiki, and Landsman (2013) document that earnings transparency is negatively associated with cost of equity. Anderson, Duru, and Reeb (2009) show that founders and heirs exploit firm opacity to extract private benefits, leading to lower firm value. Krishnaswami and Subramaniam (1999) find evidence of value gains from corporate spin-off decisions that mitigate information asymmetry.

Another strand of growing literature is how to capture the level of information asymmetry of a firm. Current literature has proposed numerous measures. For example, Barth, Konchitchiki, and Landsman (2013) use the explanatory power (R^2) of the return-earnings regressions. Anderson, Duru, and Reeb (2009) construct an opacity index based on the ranks of four individual proxies of information asymmetry: trading volume, bid-ask spread, analysts following and analysts forecast errors. We follow the procedure proposed by Karpoff, Lee, and Masulis (2013). They use factor analysis to construct an information asymmetry factor based on eight common measures of information asymmetry. The eight measures are firm size, firm age, number of analysts, tangible assets, number of prior stock offers, average bid-ask spread, return volatility, and abnormal accruals. They argue that factor analysis incorporates the correlated information in these eight measures without inducing multicollinarity or attenuation bias. They find that their information asymmetry factor is positively related to the likelihood and the duration of the lockup period in a seasoned equity offerings.

Also closely related to our research are the studies on the target's information asymmetry in M&As. Hansen (1987) suggests that when there is greater uncertainty of target valuation, the acquirer is likely to use stock for acquisition. Fuller, Netter, and Stegemoller (2002)) show that acquirers experience significantly positive returns when acquiring private targets but significantly negative returns when

purchasing public targets and their interpretation is that acquirers capture the liquidity discount in the private targets. We extend their work and examine the validity of an information asymmetry based explanation. We control for the liquidity effect by focusing exclusively on public targets, which allows us to directly test the wealth effects related to target information asymmetry.

3. Data and Sample Selection

3.1. Information Asymmetry Factor

Because the true level of information asymmetry cannot be observed, measuring information asymmetry is a challenge. Prior literature has proposed numerous proxies to measure information asymmetry, but there is lack of consensus on which one best captures its true level. Moreover, these proxies often produce inconsistent and even contradictory results. Karpoff, Lee, and Masulis (2013) circumvent this problem by using factor analysis to generate an aggregate measure of information asymmetry from several individual proxies. They consider two alternative approaches. The first approach is to include all relevant proxies into the analysis. However, this approach can induce multicollinearity or attenuation bias. The second approach is to construct an equally-weighted index with various information asymmetry proxies. There are two shortcomings of this approach: The first shortcoming is that it arbitrarily assigns equal weight to each measure, and the other is that units of measurement of each proxy can significantly affect the results. Therefore, a composite measure from factor analysis appears to be the optimum approach.

We extend the analysis by Karpoff, Lee, and Masulis (2013) and apply factor analysis to construct an information asymmetry factor with ten well-documented proxies for information asymmetry. These proxies are described below:

- **Number of analyst following** the firm (Barth et al. (2001), Frankel and Li (2004), and Karpoff, Lee, and Masulis (2013)): taken from I/B/E/S database, averaged over the year prior to the acquisition announcements;
- **Firm age** (Lowry, Officer, and Schwert (2010) and Karpoff, Lee, and Masulis (2013)): measured as the number of years between the firm's IPO year and the year prior to the acquisition announcements;

- **Firm size** (Hong et al.(2000), Leary and Roberts (2010), and Karpoff, Lee, and Masulis (2013)): measured as the natural log of the book value of total assets in the year prior to the acquisition announcements;

- **Tangible assets** (Leary and Roberts (2010) and Karpoff, Lee, and Masulis (2013)): measured as property, plant and equipment scaled by total assets in the year prior to the acquisition announcements;

- **Average bid-ask spread** (Clarke and Shastri (2000) and Karpoff, Lee, and Masulis (2013)): calculated as the average daily bid-ask spread over closing price over the year prior to the acquisition announcements;

- **Abnormal accruals** (Hutton, Marcus, and Tehranian (2009) and Karpoff, Lee, and, Masulis (2013)): calculated based on Kothari, Leone, and Wasley (2005) model as the absolute value of the difference between firm-specific abnormal accruals and median abnormal accruals of its corresponding industry- and performance- matched portfolio in the year prior to the acquisition announcements;

- **Return volatility** (Coles, Daniel, and Naveen (2006) and Karpoff, Lee, and Masulis (2013)): calculated as the standard deviation of daily stock returns over the year prior to the acquisition announcements;

- **Analyst forecast error** (Krishnaswami and Subramaniam (1999) and Brown, Hillegeist, and Lo(2009)): calculated as the absolute value of the difference between mean earnings per share forecast and the actual earnings per share over the price, averaged over the year prior to the acquisition announcements;

- **Analyst forecast dispersion** (Krishnaswami and Subramaniam (1999) and Leary and Roberts (2010)): calculated as the standard deviation of the earnings per share over the price, averaged over the year prior to the acquisition announcements;

- **Amihud** (Amihud(2002)): a measure of price impact per dollar of trade, calculated as daily average of the ratio of absolute value of daily stock return to daily trading volume over year prior to the acquisition announcements;

According to prior literature, the first four variables are negatively related, whereas the remaining six variables are positively related to a firm's information asymmetry. In Panel A of Table 1, we report the factor loadings of the first three factors based on all ten variables, using factor analysis with a sample of 41,570 observations from 1989 to 2013. The eigenvalues of the first three factors are 1.53, 0.56, and 0.13 respectively, suggesting that the first factor captures a substantial amount of variation in the ten proxy variables. Similar to Karpoff, Lee, and Masulis (2013), the signs of the factor loadings in the first factor are opposite to the predicted signs between these variables and information asymmetry, indicating that the

factor represents "information symmetry" characteristics of the firm. Following Karpoff, Lee, and Masulis (2013), we multiply this factor by -1 to convert it to an information asymmetry factor.

The time series distribution of the information asymmetry factor reported in Panel B of Table 1 reveals a descending trend in the mean and the median of the factor from 1989 to 2013, and a change from positive to negative in 2003, indicating that firms have become more transparent over time.

3.2. Sample Selection

We obtain our acquisition sample from Thomson One Banker. We impose the following criteria in sample selection: (1) both acquirer and target are US firms; (2) the acquisitions are announced between January 1, 1990 and December 31, 2014; (3) the deal value is more than $1 million; (4) the acquisition is completed; (5) the acquirer controls less than 50 percent of the target's share prior to the acquisition announcement and more than 50 percent after the transaction; (6) both acquirer and target have financial information in Compustat and stock returns data in CRSP; (7) the information asymmetry factor can be calculated for both acquirer and target. Based on these criteria, our final sample includes 543 M&A transactions between 1990 and 2014. We present the distribution of our sample of acquisitions by announcement year in Table 2. The number of announcements jumps notably from 1997 to 1998, peaks in 1999, and significantly declines in 2000, consistent with the general trend documented by Wang and Xie (2009). The impact of financial crisis is evident in the acquirer and target sizes in that the market capitalizations of both acquirer and target decline significantly in 2008. For every year over the sample period, the median of the acquirer information asymmetry factor is lower than the median of the target information asymmetry factor, indicating that the acquirer is persistently more transparent than the target.

We reports the summary statistics of the variables used in our analyses in Table 3. The mean (median) information asymmetry score for the full sample in Panel A is 0.00 (0.09). For the M&A subsample in Panel C, the mean (median) information asymmetry factor drops to -0.68 (-0.612) for the acquirers, indicating that the acquirers are more transparent than firms in the overall sample. Meanwhile,

the mean (median) information asymmetry score for the target is 0.31 (0.45), suggesting that targets tend to be more opaque than the acquirers.

We compute the acquirer's (target's) cumulative abnormal returns (CAR) over the 5-day (days -2 to +2) interval surrounding the announcement date as a measure of the wealth effect of the M&A announcement[2]. We obtain announcement dates from Thomson One Banker. To calculate the abnormal returns, we use the standard event study technique with CRSP equally weighted return as the market index, and model parameters estimated over 200 days ending at day -11 (designating the announcement day as day 0). The 5-day target-acquirer portfolio abnormal returns (portfolio CAR(-2,2)) are weighted-average 5-day abnormal returns of the target and the acquirer with the weights being the market capitalization of the target and the acquirer 11 trading days prior to the announcement dates. Consistent with the existing literature on the wealth effects during acquisition announcement periods (Wang and Xie (2009)), we document positive abnormal returns for the targets with mean (median) 5-day CAR of 25.24% (22.23%), negative abnormal returns for the acquirers with mean (median) 5-day CAR of -1.59% (-1.52%), and positive target-acquirer portfolio abnormal returns with mean (median) 5-day CAR of 1.74% (1.18%). To better capture the wealth effects experienced by the target shareholders, we further also the premium of the offer price to the target over its market price one week prior to the announcement date as reported in Thomson One Banker. The mean (median) premium for our sample is 36.93% (34.04%).

4. Empirical Findings and Discussions

4.1. Information Asymmetry Factor and Firm Value

It has been established in the literature that information asymmetry is negatively related to firm value (Krishnaswami and Subramaniam (1999), Anderson, Duru and Reeb (2009), and Barth, Konchitchki and Landsman (2013)). However, as these studies use different measures of information asymmetry, results are not directly comparable and difficult to interpret. We follow Karpoff, Lee, and Masulis (2013) and use

[2] We use (-5,5) abnormal returns as the alternative measure of the announcement-period wealth effects in the robustness check. Our results remain unchanged.

factor analysis to aggregate the common information contained in ten different proxies to construct an information asymmetry factor. We start our analysis by examining the relation between our information asymmetry factor and firm value. To that end, we investigate three different aspects of firm value: cost of equity, cost of debt, and Tobin's Q. According the received evidence, information asymmetry is often associated with higher agency costs, which makes it difficult for outside investors to assess the true economic value of the firm. As such, if our proxy accurately captures the extent of information asymmetry in a firm, we should observe cost of equity and cost of debt increasing, and Tobin's Q decreasing in the information asymmetry factor.

In Table 4, we present our findings on the association between firm value and information asymmetry. Panel A reports OLS regression results of expected cost of equity on information asymmetry factor when controlling for year and two-digit SIC code industry fixed effects. We estimate expected cost of equity following Barth, Konchitchki, and Landsman (2013). For each firm, we first estimate the factor betas associated with the firm's return by estimating the following monthly time-series regression using the 60-month returns prior to year t:

$$(RET_{i,m} - R_{f,m}) = \alpha_i + \beta_{RMRF,i}(R_{M,m} - R_{f,m}) + \beta_{SMB,i}SMB_m + \beta_{HML,i}HML_m + \beta_{MOM,i}MOM_m + \varepsilon_{i,m} \quad (1)$$

$(RET_{i,m} - R_{f,m})$ is the firm's monthly return in excess of risk-free return. $(RET_{M,m} - R_{f,m})$ is the monthly return of market portfolio in excess of the risk-free rate. SMB_m , HML_m , MOM_m are the size, book-to-market, and momentum factor portfolio returns extracted from French's data library[3]. We use $\hat{\beta}_{RMRF,i}$, $\hat{\beta}_{SMB,i}$, $\hat{\beta}_{HML,i}$,and $\hat{\beta}_{MOM,i}$ to denote the estimated betas from (1). We then substitute the estimated betas in the following equation to calculate the expected cost of equity for firm i:

$$ECC_{i,t} = \bar{R}_{f,t} + \hat{\beta}_{RMRF,i,t}\overline{(R_M - R_f)}_t + \hat{\beta}_{SMB,i,t}\overline{SMB}_t + \hat{\beta}_{HML,i,t}\overline{HML}_t + \hat{\beta}_{MOM,i,t}\overline{MOM}_t \quad (2)$$

[3] http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html

where $\overline{(R_M - R_f)}_t$, $\overline{SMB}_t$, $\overline{HML}_t$, and $\overline{MOM}_t$ are the expected annual factor returns for year t+1, which we estimate by first calculating the average of the 60 monthly factor returns prior to month m and then compounding the resulting monthly returns over 12 months prior to year t. Column (1) reports the impact of information asymmetry factor on the expected cost of equity excluding other fundamental risk characteristics. As predicted, the coefficient estimate of information asymmetry factor is positive and significant. In column (2), we include the standard variables representing the fundamental risk characteristics including leverage, book-to-market ratio, market capitalization, market beta, and return momentum. The coefficient estimate of information asymmetry factor remains positively significant. In terms of economic impact, one standard deviation increase in information asymmetry factor results in 0.045 standard deviation increase in the cost of equity. Our findings indicate that the information asymmetry factor contains incremental information in addition to that already contained in the fundamental risk characteristics. Additionally, we find that expected cost of equity decreases in the book-to-market ratio and increases in leverage, market beta, and return momentum, consistent with the predictions by Barth, Konchitchki, and Landsman (2013).

In Panel B of Table 4, we examine the relation between information asymmetry and cost of debt for new debt issues when controlling for year and industry fixed effects. We obtain data on new debt issues from SDC Platinum database. Cost of debt is measured as the spread between yield to maturity of new debt issues and yield of maturity of benchmark Treasury Bonds with similar maturity. Since information asymmetry confounds bond investors' ability to evaluate lending risk, we expect the risk premium demanded by bond investors to increase in a firm's level of information asymmetry. Column (1) presents the regression results using information asymmetry factor as the only explanatory variable while column (2) includes other control variables that can potentially impact cost of debt. In both columns, the coefficient estimates of information asymmetry factor are positively significant. Using the coefficient estimate of information asymmetry factor in column (2), we estimate that one standard deviation increase in information asymmetry factor is associated with 0.19 standard deviation increase in the cost of debt. These

findings indicate that bond investors demand a higher risk premium to adjust for the issuing firm's high level of information asymmetry. In terms of control variables, consistent with existing literature, we find that cost of debt increases in book-to-market ratio, return risk, and leverage, and decreases in firm size as proxied by sales[4], interest coverage, Altman Z-score, and issue size.

In Panel C of Table 4, we examine the impact of information asymmetry on firm value. We measure firm value by industry-adjusted Tobin's Q. Tobin's Q is defined as the ratio of market value of total assets to the book value of total assets and industry-adjusted Tobin's Q is calculated by subtracting industry median Tobin's Q from the firm's Tobin's Q. In column (1), we control basic firm characteristics such as size proxied by sales, Delaware incorporation, S&P inclusion, and leverage, whereas in column (2), we control for additional variables that have been identified in previous literature as potential influences on Tobin's Q including capital to sales, R&D to capital, advertising to capital, and dividend yield. In both models, we find significantly negative coefficient estimates of information asymmetry, and the coefficient suggests that one standard deviation increase in the information asymmetry factor results in 0.11 standard deviation decrease in industry-adjusted Tobin's Q. Further, we find that industry-adjusted Tobin's Q is positively related to Delaware incorporation, S&P 500 inclusion, capital-to-sales ratio, and R&D-to-capital ratio, and negatively related to size and leverage.

The combined evidence on cost of equity, cost of debt, and Tobin's Q points to an information asymmetry discount in firm value. These tests confirm the validity of our information asymmetry factor as a proxy for the level of information asymmetry in a firm. In subsequent sections, we examine if M&A transactions serve as a channel to capture the information asymmetry discount in target firms. Our central premise is that since target firms are subject to careful and extensive scrutiny by the acquiring firm and the market, M&A announcements reveal large amount of information about the targets. As a result, M&A announcements mitigate information asymmetry in target firms, and unlock the discount due to information

[4] Because total assets are used in factor analysis to estimate the information asymmetry factor. To avoid multicollinearity issue, we use sales to proxy for size in the firm value regressions.

asymmetry. To test this hypothesis, we examine how the wealth gain in an M&A transaction is associated with the target's information asymmetry factor.

4.2. Target Information Asymmetry and Target-acquirer Portfolio Abnormal Returns

In the previous section, we establish the existence of information asymmetry discount using our proxy factor. In this section, our objective is to examine the hypothesis that if M&A serves as a mechanism to unlock the discount in target's value due to information asymmetry, we expect M&A announcement-period total wealth gains to be significantly related to target firm's information asymmetry. Specifically, larger the information asymmetry about the target, greater is the wealth gain. We measure total M&A announcement-period wealth effect by the value-weighted target-acquirer portfolio 5-day CAR in which the weights are determined by the market capitalization of the target and the acquiring firms 11 trading days prior to the announcement date. Table 5 reports the results from the total wealth effects regressions. In column (1), the only explanatory variable is target information asymmetry factor. In column (2), we include the acquirer and deal characteristics. In column (3), we additionally control for the target characteristics. We control for the year and industry fixed effects in all three columns. In all three models, the coefficient estimate of target information asymmetry factor is highly significant and positive. Using the coefficient estimate in column (3), we find that portfolio total abnormal returns increase by 1.92 percent per one standard deviation increase in target information asymmetry factor. In dollar terms, one standard deviation increase in target information asymmetry factor results in $57 million gain in total wealth shared by target and acquirer shareholders based on the median market capitalization of the target and the acquirer firm[5]. Our findings confirm that target information asymmetry is associated with significantly positive total wealth creation during the M&A announcement period. In addition, we find that the portfolio abnormal returns

5 We multiply the product of coefficient estimate of target information asymmetry factor in column (3) and standard deviation of target information asymmetry by the sum of the median market capitalization of the targets and the acquirers.

increase in acquirer's Tobin's Q and decreases in target's Tobin's Q, consistent with the evidence documented by Lang, Stulz, and Walkling (1989).

4.3. Target Information Asymmetry Factor and Acquirer Abnormal Returns

In this section we examine the acquiring firm's benefit from the information discovery in M&As by examining the relation between the acquirer's market reaction and the target's information asymmetry. We measure the acquirer market reaction by the acquiring firms' 5-day CAR surrounding the announcement date. Table 6 presents the results of OLS regressions of acquirer 5-day abnormal returns on target information asymmetry factor controlling for year and industry fixed effects. In column (1) where we include target information asymmetry factor as the only explanatory variable, the coefficient estimate is significantly positive. In column (2), we include acquiring firm's and the deal characteristics. The coefficient estimate of target information asymmetry factor decreases in magnitude but remains significant. Finally, in column (3), we control for target, acquirer, and deal characteristics. The coefficient estimate of target information asymmetry is still significant. Based on the coefficient estimate of target information asymmetry in column (3), we determine that the acquirer's abnormal returns increase by 1.58 percent in response to one standard deviation increase in target information asymmetry. Baed on median acquirer market capitalization of $2,714 millions, this gain translates to $43 millions. Our findings indicate that acquiring firm's shareholders benefit greatly from acquisitions of firms with high information asymmetry. In addition, we find that acquirers experience higher abnormal returns in acquisitions made by smaller acquirers and in those financed with all cash, consistent with the findings of Masulis, Wang, and Xie (2007).

4.4. Target Information Asymmetry, Target Abnormal Returns, and Premium

Next, we examine whether the target shareholders also benefit from their firm's information asymmetry. To better capture the wealth effects experienced by the target shareholders, we also examine the premium, defined as the premium of the offer price over the target firm's market price one week prior to the announcement date of the merger. Columns (1) and (2) of Table 7 report the effects of target

information asymmetry factor on target abnormal returns, while columns (3) and (4) report the effects of target information asymmetry factor on the premium. In columns (1) and (3), we only include target information asymmetry factor as the explanatory variable. In columns (2) and (4), we control for the characteristics of the target and acquiring firms, and the deal. The results across all four columns show the significantly positive effects of target information asymmetry on target shareholder wealth. The coefficient estimate of target information asymmetry factor is highly significant in all columns. In terms of economic significance, the estimates in column (2) and (4) indicate that one standard deviation increase in target information asymmetry leads to 4.2 percent increase in target abnormal returns and 9.38 percent increase in premium, respectively. In dollar terms, using the median target capitalization of $247 million, the impact of one standard deviation of target information asymmetry factor is $10.55 million. Finally, we find that the target's abnormal returns increase in acquirer's Tobin's Q and decrease in target's Tobin's Q, while premium decreases in target size and increases in target leverage.

4.5. Controlling for Acquirer Information Asymmetry

Finally, we investigate if the acquirer's information asymmetry is an alternative source for the wealth creation in an M&A. The acquirer's information environment can create value in two ways. One, transparent acquirers are easier to monitor and less prone to agency costs. Thus, they are likely to be more efficient at target selection. Alternatively, transparent acquirers may induce an improvement in the information environment in the target firms, creating more value. To test this hypothesis, we include acquirer information asymmetry factor in our analysis. In Table 8, we report the results controlling for acquirer information asymmetry factor as an additional explanatory variable. The coefficient estimates of target information asymmetry factor on target-acquirer portfolio abnormal returns, acquirer abnormal returns, target abnormal returns and premium, all remain significantly positive. Clearly, the inclusion of acquirer information asymmetry factor doesn't materially impact our previous findings. Furthermore, although the coefficient of target information asymmetry on target-acquirer portfolio abnormal returns is less significant than in the original model, the impact of target information asymmetry on the other

dependent variables remain at the same magnitude and significance level as those reported in Tables 6 and 7. These results suggest that acquirer information asymmetry does not fully explain the positive wealth gains related to target information asymmetry. Interestingly, the acquirer information asymmetry factor has a significantly negative impact on acquirer abnormal returns. A potential implication of this finding is that that transparent acquirers make better acquisitions.

4.6. Controlling for Corporate Governance

Previous literature documents that corporate governance contributes significantly to the firm's overall performance and investment efficiency. Masulis, Wang, and Xie (2007) show that corporate governance mechanisms, especially corporate governance indices, significantly impact the acquiring firm's M&A announcement-period abnormal returns. Specifically, better governed firms make superior acquisitions. Wang and Xie (2009) report that when the acquirer has better corporate governance than the target, the acquisition improves the target's corporate governance, generating greater shareholder value for both acquirer and target firms. In this section, we examine how the previously documented relation between M&A wealth effects and target information asymmetry is influenced by the corporate governance of the acquirer and the target. We present the regression results when controlling for corporate governance variables in Table 9. We control for two separate sets of corporate governance variables: board characteristics and the corporate governance index (BCF index)[6]. Because the data on board characteristics are available from 1996 and the BCF index is available from 1990, we regress them separately to retain the maximum possible number of observations. The board characteristics include board size, percentage of independent directors, and CEO/Chairman duality. Column (1), (3), (5), and (7) report the effects of target information asymmetry on portfolio abnormal returns, acquirer abnormal returns, target abnormal returns and premium, respectively, after controlling for board characteristics. Compared to the original coefficient estimates of target information asymmetry reported in Tables 5, 6, and 7, the effect of target information

[6] ISS (formerly RiskMetrics) changes their data gathering practice after 2006, which unfortunately fails to provide enough information to construct the GIM index, which is used by Wang and Xie (2008).

asymmetry on target premium weakens slightly but remains significantly positive at conventional levels, while the effect of target information asymmetry on the remaining dependent variables stays qualitatively similar in both magnitude and significance levels.

In terms of the corporate governance index, we control for BCF index and target-acquirer difference in BCF Index to capture the effects of acquirer shareholder rights, and transfer of shareholder rights from the acquirer to the target. Columns (2), (4), (6), and (8) report the effects of target information asymmetry on portfolio abnormal returns, acquirer abnormal returns, target abnormal returns and premium, respectively, when controlling for corporate governance index. The impact of target information asymmetry on portfolio abnormal returns after controlling for corporate governance index remains positive and becomes more significant. The impact of target information asymmetry on acquirer abnormal returns remains similar in magnitude, but less significant. The impact of target information asymmetry on target abnormal returns and premium remains qualitatively similar in both magnitude and significance level. These findings indicate that corporate governance does not explain the positive M&A wealth effect arising from target information asymmetry. Finally, the regression results show that only target board size has a significantly positive relation with target abnormal returns; the rest of the corporate governance variables are not significant. The discrepancy between our findings and those of Masulis, Wang, and Xie (2007) could be because of the different samples we use. Our sample includes only public targets while the sample employed by Masulis, Wang, and Xie (2007) includes private, subsidiary, and public targets.

4.7. Long-term Operating Performance Change and Target Information Asymmetry

An alternative explanation for the announcement-period wealth gains is that the market expects long-term operating performance of the target firm to improve following the acquisition. To test this hypothesis, we investigate the long-term operating performance of targets when controlling for information asymmetry. Following Wang and Xie (2009), we measure improvement in operating performance by the change in return on assets (ROA) of the acquirer and the target firms as a combined firm from prior to the

acquisition to three years after the acquisition. We adjust the ROA of the acquirer (target) by the ROA of acquirer's (target's) pre-merger performance- and industry- matched firm. We first select the matched firm for the acquirer (target) by matching the two-digit SIC codes, and then from the industry-matched firms, we choose the firm that has the closest pre-merger ROA compared to the acquiring firm (target firm). We create a hypothetical firm by combining the matched firms for the target and the acquirer in proportion of their total assets. We adjust the pre-merger period ROA, and one-year, two-year, three-year post-merger ROA of the merged firm by the corresponding numbers of the combined firm and calculate the change in the adjusted ROA from its pre-merger period value to the value one-year, two-year, and three-years after merger. We report the regression results in Table 10. We find no significant relation between target information asymmetry factor and change in adjusted ROA over three years following the acquisition. As such, improvement in operating efficiency has no influence on the association between wealth gains induced by M&A announcements and target information asymmetry.

4.8. Information Asymmetry and Target Selection

How do the wealth gains in a merger influence selection of the target firms? Bena and Li (2014) argue that potential synergistic gains drive merger decisions. Given the significant gains in value arising from acquisition of targets with high information asymmetry, we examine how information asymmetry impacts target selection. For these tests, we form three control samples following Bena and Li (2014). The first control sample is formed with five firms randomly drawn from the control sample of firms that are not targets or acquirers over a three year period prior to the acquisition announcement, and have information asymmetry factor available. The second control sample includes five industry- and size-matched firms drawn from the control sample of firms that are not targets or acquirers over the three years prior to the acquisition announcement, and have information asymmetry factor available. The final control sample is formed by five industry-, size-, and book-to-market ratio-matched firms drawn from the control sample of firms that are not targets or acquirers over the three years prior to the acquisition announcements, and have information asymmetry factor available. With these three control samples, we estimate the effect of

information asymmetry on target selection choice using a conditional logit model. Table 11 reports the results. Consistent with our expectation, across the three different control samples, we find consistent evidence that firms with high information asymmetry are more likely to be targets. Additionally, we find that firms with higher R&D, higher ROA, cash, and lower stock returns are more likely to be chosen as targets, consistent with the evidence presented by Bena and Li (2014).

4.9. Relative Dollar Gains and Target Information Asymmetry

We next examine how the division of M&A announcement-period gains between the acquirer and the target is related to target information asymmetry. According to Ahern (2012), the division of gains reflects the relative bargaining power between the acquirer and the target. We measure the relative dollar gains as the difference between the target firm's 5-day announcement-period dollar gains minus acquiring firm's 5-day announcement-period dollar gains scaled by the sum of the market capitalization of the acquirer and the target 50 days prior to the announcement date. Table 12 reports the estimation results. We find that in the presence of high target information asymmetry, the target's gains are significantly smaller than the acquirer's. In addition, we also find that the target's relative gains increase in the acquirer information asymmetry. These two findings indicate that information asymmetry impacts the relative bargaining power between the acquirer and the target and the party with high information asymmetry is in a relatively weaker position when negotiating the deal.

4.10. Deal Characteristics and Target Information Asymmetry

Prior literature documents that certain deal characteristics of a merger are influenced by information asymmetry level of the target firm. One critical characteristic closely associated with target information asymmetry is the method of payment. Hansen (1987) theorizes that stock offers dominate cash offers when there is high level of target information asymmetry so the target is forced to share the risk of the acquirer overpaying. To examine the influence of target information asymmetry level on the choice of method of payment, we estimate a probit model with all-cash dummy as the dependent variable controlling for year

and industry fixed effects. All-cash dummy takes a value of one if the acquisition is financed entirely by cash and zero if the acquisition is financed partly or entirely by stock. The estimation results are reported in column 1 of Table 13. The coefficient all-cash dummy is negative and significant, indicating that target information asymmetry is associated with higher likelihood of stock-financed acquisitions. This finding is consistent with the risk-sharing of acquirer overpaying hypothesis proposed by Hansen (1987).

Another deal characteristic that has receive wide attention is diversifying versus focus-enhancing acquisitions. Krishnaswami and Subramaniam (1999) document that a focus-enhancing spin-off generates wealth gains when there is high level of information asymmetry about a firm. Their findings imply that greater focus mitigates information asymmetry, leading to higher firm value. On the other hand, Amihud and Lev (1981) suggest that managers engage in diversifying acquisitions to reduce the exposure to firm-specific risk. We use a probit model to examine whether target information asymmetry induces acquiring firms to make value-increasing focused acquisitions, or risk-reducing diversifying acquisitions. We define acquisitions as diversifying if targets and acquirers belong to different industries defined by two-digit SIC codes. We report the results in column 2 of Table 13. The coefficient of target information asymmetry on diversifying dummy is negative and significant. This finding corroborates the findings of Krishnaswami and Subramaniam (1999) that firms resort to focus-increasing activities when facing high information asymmetry. This finding indicates that better understanding of acquirers of their own industry allows them competitive advantage when purchasing opaque target in the same industry.

The third feature we look at is relative deal size. We posit that deals of relatively smaller size are better integrated and thus target information asymmetry should be associated with smaller relative deal size. We measure relative deal size as the ratio of deal value as reported by Thomson One Banker to acquirer market capitalization eleven trading days prior to the announcement date. Column (3) of Table 13 reports that the coefficient of target information asymmetry on relative deal size is negative and significant, suggesting that targets with high information asymmetry are often involved in deals small in size relative to the acquirer market capitalization.

The last aspect we examine is how target information asymmetry impacts the number of days it takes for the deal to close, measured as the difference between announcement dates and effective dates. Because of the skewness of the distribution of deal closure time, we use the logarithm transformation of the variable plus one. We find that target information asymmetry negatively affects the deal closure time. We conjecture that the due diligence prior to the official announcements of the deals contributes to this finding. In particular, in unreported results, we find that this relation is concentrated in focused acquisitions, further confirming the information advantage of acquisitions of targets in the same industry.

4.11. Robustness check

Our primary measure of M&A announcement-period wealth effects are 5-day cumulative abnormal returns during the (-2,2) window surrounding the announcement date. In this section, we use the 11-day cumulative abnormal returns during the (-5,5) window surrounding the announcement date as the alternative measure of shareholder wealth effects and re-examine how target information asymmetry factor impacts shareholder wealth during the M&A announcement periods. Table 14 reports the regression results using the 11-day cumulative abnormal returns. We find that our previous findings regarding the relation between target information asymmetry factor and target-acquirer portfolio abnormal returns, acquirer abnormal returns, and target abnormal returns stay robust.

5. Conclusion

In this paper, we study the target information asymmetry as a possible contributor to the wealth gains in M&A. We argue that because M&A usually is usually accompanied by large amounts of information-gathering on the targets, M&A can serve as a channel to release the information asymmetry discount in the targets. Using a novel measure of information asymmetry, we first confirm the existence of information asymmetry discount in firm value. We then test the relation between M&A wealth effects and target information asymmetry and find that significantly positive relations between target information asymmetry and all measures of the announcement-period wealth effects including target-acquirer portfolio

abnormal returns, acquirer abnormal returns, target abnormal returns, and premium. We test and precludes acquirer information asymmetry, corporate governance, and long-term operating performance improvement as the alternative explanations of the wealth gains. Our findings confirm the information-discovery aspect of M&A. In addition, we find that firms with high information asymmetry are more likely to become targets and the bargaining power between the acquirer and the target weakens in the party's information asymmetry level. Our probit regressions analysis shows that target information asymmetry is associated with higher likelihood of stock-financed acquisitions and focused acquisitions. Finally, both the relative deal size and deal closure time decrease in the target information asymmetry. In summary, we show that target information asymmetry is an important determinants of the M&A performance.

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Appendix : Variable Definitions

Variable	Description
Panel A: Information Asymmetry Factor and Variables	
Information asymmetry factor	The first factor obtained from factor analysis using 10 well-documented information asymmetry proxy variables, multiplying by (-1)
Number of analyst following the firm	taken from I/B/E/S database, averaged over the year prior to the acquisition announcements
Firm age	measured as the number of years between the firm's IPO year and the year prior to the acquisition announcements
Firm size	measured as the natural log of the book value of total assets in the year prior to the acquisition announcements
Tangible assets	measured as property, plant and equipment scaled by total assets in the year prior to the acquisition announcements
Average bid-ask spread	calculated as the average daily bid-ask spread over closing price over the year prior to the acquisition announcements
Abnormal accruals	calculated based on Kothari, Leone, and Wasley (2005) model as the absolute value of the difference between firm-specific abnormal accruals and median abnormal accruals of its corresponding industry- and performance- matched portfolio in the year prior to the acquisition announcements
Return volatility	calculated as the standard deviation of daily stock returns over the year prior to the acquisition announcements
Analyst forecast error	calculated as the absolute value of the difference between mean earnings per share forecast and the actual earnings per share over the price, averaged over the year prior to the acquisition announcements.
Analyst forecast dispersion	calculated as the standard deviation of the earnings per share over the price, averaged over the year prior to the acquisition announcements
Amihud	a measure of price impact per dollar of trade, calculated as daily average of the ratio of absolute value of daily stock return to daily trading volume over year prior to the acquisition announcements
Panel B: Dependent Variables	
Expected cost of equity	Estimated based on size, book-to-market, and momentum factors (Barth, Konchitchki, and Landsman (2013))
Cost of debt	The yield spread between yield to maturity of new debt issues and yield of maturity of benchmark Treasury Bonds with similar maturity
Deal Closure Time	Number of days to close the deal, measured as the difference between date announced and date effective
Industry-adjusted Tobin's Q	Tobin's Q is calculated as market value of assets divided by book value of assets, where market value of assets is computed as book value of assets less book value of common stock plus the market value of common stock ((item6-item60+item25*item199)/item6). Industry-adjusted Tobin's Q is the firm Tobin's Q less industry-median Tobin's Q where industry is defined by two-digit SIC code
Portfolio CAR (-2,2)	Value-weighted 5-day target-acquirer portfolio abnormal returns where the weight is determined by the market value of equity 11 trading days prior to the announcement date
Portfolio CAR (-5,5)	Value-weighted 11-day target-acquirer portfolio abnormal returns where the weight is determined by the market value of equity 11 trading days prior to the announcement date
Acquirer CAR (-2,2)	5-day acquirer announcement-period abnormal returns where day 0 is the announcement date
Acquirer CAR (-5,5)	11-day acquirer announcement-period abnormal returns where day 0 is the announcement date

Target CAR (-2,2)	5-day target announcement-period abnormal returns where day 0 is the announcement date
Target CAR (-5,5)	11-day target announcement-period abnormal returns where day 0 is the announcement date
Premium	Premium of offer price to target trading price one week prior to the announcement date as reported in Thomson One Banker
Change in ROA	The difference between post-acquisition performance-adjusted ROA and pre-acquisition performance-adjusted ROA. Performance-adjusted ROA is computed as the ROA of the acquirer or the target less ROA of its corresponding control firm. ROA is calculated as operating income before depreciation (item 13) over book value of total assets (item6)
Target Selection	Dummy variable, equals one for the target firms and zero for the control firms
Relative dollar gains	Measured as the difference in target 5-day announcement-period dollar gains minus acquirer 5-day announcement-period dollar gains scaled by the sum of the acquirer market capitalization and target market capitalization 50 trading days prior to the announcement date
Panel C: Characteristics Variables	
All-Cash deal	Dummy variable, equals one for purely cash-financed acquisitions, zero otherwise
BCF index	Constructed based on BCF (2009), the sum of 6 shareholder rights provisions
Board size	Number of directors on the firm's board
Cash	Measured as cash (item 1) over book value of total assets (item 6)
CEO/Chairman duality	Dummy variable, equals one if the CEO is also the chairman of the board
Competing offer	Dummy variable, equals one for deals that have competing bidders
Diversifying	Dummy variable, equals one if the acquirer and the target don't share the same two-digit SIC code
High tech combination	Dummy variable, equals one if the acquirer and the target are both from high tech industry with SIC codes 3571, 3572, 3575, 3577,3578, 3661, 3663,3669, 3674, 3812,3823, 3825, 3826, 3827, 3829, 3841, 3845, 4812, 4813, 4899,7370, 7371, 7372, 7373, 7374, 7375, 7378 and 7379
Independent board	The percentage of board members that are independent
Leverage	Computed as book value of debts (item34+item9) over market value of total assets(item6-item60+item25*item199).
Market Cap	Market capitalization, calculated as number of shares outstanding multiplied by the stock price at the 6th trading day prior to the announcement date
R&D	Competed as the research & development expenditure (item13) scaled by total assets (item 6)
Relative deal size	Computed as deal value over acquirer's market capitalization
Return on Assets (ROA)	Computed as operating income before depreciation (item 13) over book value of total assets (item6)
Book to market	Measured as book value of equity (item 60) over market value of equity (item25*item199)
Sales	Taken as item 12
Sales growth	The annual growth rate of sales
Stock return	Buy-and-hold stock return over the year prior to the acquisition announcements
Tobin's Q	Calculated as market value of assets divided by book value of assets, where market value of assets is computed as book value of assets less book value of common stock plus the market value of common stock ((item6-item60+item25*item199)/item6)

Table 1: Information Asymmetry Factor

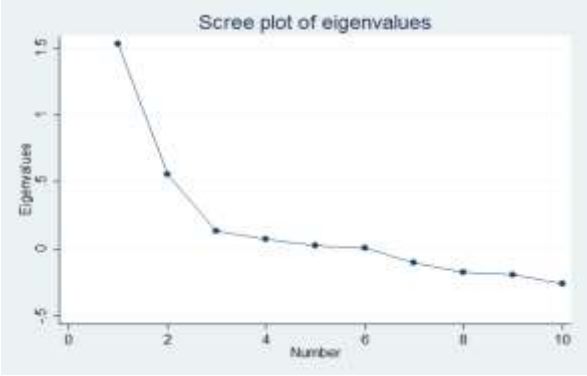
Panel A: Factor Loadings

This table reports the factor loadings for the first three factors from the factor analysis used to construct one information asymmetry factor. The sample contains 41,570 observations from 1989 to 2013. Following Karpoff, Lee, and Masulis (2013), we apply factor analysis using ten well-documented information asymmetry proxy variables to construct the information asymmetry factor. Similar to Karpoff, Lee, and Masulis (2013), the factor loadings of factor 1 has opposite signs with information asymmetry as predicted. We transform it by multiplying the factor by (-1). The Kaiser-Meyer-Olkin (KMO) measures the sampling adequacy. All variables are defined in the Appendix.

Variable	Predicted Correlation with Information Asymmetry	Factor 1	Factor 2	Factor 3	KMO
No. of Analysts	-	0.5846	-0.0571	-0.1524	0.6346
Firm age	-	0.4442	-0.0087	0.1598	0.7749
Firm size	-	0.7437	-0.0348	0.0484	0.6175
Tangible assets	-	0.1562	0.0774	0.2376	0.6098
Average bid-ask spread	+	-0.0584	0.0890	-0.0844	0.6687
Abnormal accruals	+	-0.1309	0.1119	-0.0120	0.6390
Return volatility	+	-0.4638	0.3996	-0.1714	0.6910
Analyst forecast error	+	-0.0449	0.4755	0.0297	0.6133
Analyst forecast	+	-0.0713	0.4966	0.0479	0.6066
Amihud	+	-0.1292	0.1633	-0.0591	0.7202
KMO overall					0.6524
Eigenvalue		**1.5258**	0.5566	0.1344	

Graph 1: Scree Plot

This graph depicts the eigenvalues of the factors based on the 10 original information asymmetry proxy variables. It provides a visual assessment on which factor explains most variations in the original variables.



Panel B: Time Series Distribution of Information Asymmetry Factor

This table presents times series distribution of information asymmetry factor. The sample contains 41,570 observations of from 1989 to 2013.All variables are defined in the Appendix.

Year	N	Percentage of Sample (%)	Information asymmetry Factor (Median)	Information asymmetry Factor (Mean)
1989	605	1.46	0.39	0.34
1990	689	1.66	0.48	0.44
1991	740	1.78	0.48	0.40
1992	941	2.26	0.51	0.40
1993	1,149	2.76	0.47	0.37
1994	1,366	3.29	0.46	0.36
1995	1,514	3.64	0.42	0.32
1996	1,936	4.66	0.48	0.38
1997	2,089	5.03	0.42	0.33
1998	2,124	5.11	0.40	0.34
1999	2,106	5.07	0.35	0.29
2000	2,054	4.94	0.39	0.32
2001	1,772	4.26	0.32	0.26
2002	1,668	4.01	0.10	0.04
2003	1,590	3.82	-0.09	-0.16
2004	1,735	4.17	-0.13	-0.22
2005	1,833	4.41	-0.17	-0.26
2006	1,918	4.61	-0.17	-0.25
2007	2,022	4.86	-0.19	-0.27
2008	1,966	4.73	-0.05	-0.11
2009	1,848	4.45	-0.17	-0.25
2010	1,889	4.54	-0.35	-0.43
2011	1,967	4.73	-0.34	-0.43
2012	1,987	4.78	-0.38	-0.48
2013	2,062	4.96	-0.45	-0.51
Total	41,570	100.00	0.08	0.00

Table 2: M&A Distribution by Announcement Year

The sample consists of 543 completed U.S. M&A transactions between 1990 and 2014. Both acquirers and targets have information asymmetry factor scores available. Information asymmetry factor is the first factor obtained from factor analysis using 10 well-documented information asymmetry proxy variables. All variables are defined in the Appendix.

Year	N	Percentage of Sample (%)	Median acquirer information asymmetry Factor	Median target information asymmetry Factor	Median acquirer market cap ($mil)	Median target market cap ($mil)
1990	4	0.74	0.08	1.20	431.59	43.16
1991	4	0.74	-0.11	0.42	683.67	127.41
1992	5	0.92	-0.09	0.50	735.52	204.68
1993	5	0.92	0.35	0.79	239.39	87.25
1994	11	2.03	-0.30	0.55	1,970.39	87.98
1995	21	3.87	-0.35	0.76	2,281.43	148.25
1996	20	3.68	-0.61	0.80	3,186.70	149.52
1997	31	5.71	-0.20	0.76	1,124.00	172.69
1998	46	8.47	-0.27	0.64	1,399.88	126.42
1999	47	8.66	-0.16	0.66	2,368.67	210.76
2000	33	6.08	-0.05	0.65	1,587.21	225.79
2001	29	5.34	-0.00	0.85	2,174.97	107.87
2002	22	4.05	-0.25	0.79	2,304.31	134.01
2003	24	4.42	-0.90	0.54	4,609.85	270.18
2004	28	5.16	-0.78	0.16	3,583.82	702.07
2005	21	3.87	-1.37	0.11	3,736.06	509.36
2006	19	3.50	-1.09	0.20	9,950.35	389.78
2007	25	4.60	-1.33	-0.28	6,326.10	819.68
2008	28	5.16	-0.95	0.22	3,475.77	205.47
2009	23	4.24	-0.90	0.09	6,450.87	386.09
2010	22	4.05	-0.78	0.43	2,545.41	411.01
2011	10	1.84	-1.03	-0.35	3,102.89	802.64
2012	16	2.95	-1.21	-0.07	4,474.46	390.48
2013	22	4.05	-1.35	-0.23	5,027.49	966.12
2014	27	4.97	-1.42	-0.50	8,025.13	1,427.02
Total	543	100	-0.62	0.45	2,713.92	247.38

Table 3: Summary Statistics

This table reports the summary statistics of the key variables. Panel A reports the summary statistics of information asymmetry factor and variables constituting information asymmetry factor. Panel B reports the summary statistics of variables related to firm values. Panel C reports the summary statistics of abnormal returns and information asymmetry factor in M&A sample. Panel D reports the summary statistics of characteristics variables in M&A sample. Information asymmetry factor is the first factor obtained from factor analysis using 10 well-documented information asymmetry proxy variables. All variables are defined in Appendix.

Panel A: Information Asymmetry Factor and Variables

Variables	N	Mean	S.D.	25% percentile	50% percentile	75% percentile
Information asymmetry	41,570	0.00	0.81	-0.48	0.09	0.58
No. of Analysts	41,570	6.75	5.87	2.67	4.75	8.78
Firm age	41,570	8.23	7.35	3.00	6.00	12.00
Firm size	41,570	6.05	1.80	4.75	5.86	7.16
Tangible assets	41,570	0.43	0.40	0.14	0.31	0.64
Average bid-ask spread	41,570	0.04	0.26	0.03	0.04	0.06
Abnormal accruals	41,570	0.40	0.73	0.07	0.18	0.42
Return volatility (%)	41,570	3.60	1.86	2.32	3.20	4.41
Analyst forecast error (%)	41,570	3.66	22.15	0.33	0.90	2.45
Analyst forecast dispersion	41,570	1.12	4.64	1.14	0.36	0.93
Amihud	41,570	0.40	4.51	0.00	0.01	0.11

Panel B: Firm Value Variables

Variables	N	Mean	S.D.	25% percentile	50% percentile	75% percentile
Expected cost of equity	26,277	0.11	0.14	0.03	0.10	0.19
Cost of debt (%)	11,746	1.06	1.07	0.54	0.86	1.28
Industry-adjusted Tobin's Q	32,229	0.54	1.94	-0.30	0.05	0.78

Panel C: Abnormal Returns and Information Asymmetry Factors

Variables	N	Mean	S.D.	25% percentile	50% percentile	75% percentile
Portfolio CAR (-2, 2) (%)	543	1.74	10.14	-3.67	1.18	6.42
Portfolio CAR (-5,5) (%)	543	2.04	11.94	-4.26	1.40	7.83
Acquirer CAR (-2, 2) (%)	543	-1.59	10.19	-7.04	-1.52	3.24
Acquirer CAR (-5, 5) (%)	543	-1.48	12.01	-7.28	-1.96	4.08
Target CAR (-2,2) (%)	543	25.24	24.19	9.88	22.23	36.60
Target CAR (-5,5) (%)	543	27.73	25.67	10.78	24.30	39.69
Premium (%)	509	36.93	34.82	17.37	34.04	50.54
Acquirer information	543	-0.68	0.99	-1.29	-0.62	0.03
Target information	543	0.31	0.75	-0.14	0.45	0.83

Panel D: Characteristics Variables

Variables	N	Mean	S.D.	25% percentile	50% percentile	75% percentile
Log (acquirer market cap)	543	7.90	1.91	6.62	7.85	9.11
Acquirer Tobin's q	543	3.18	3.45	1.54	2.24	3.63
Acquirer leverage	543	0.09	0.12	0.00	0.05	0.14
Acquirer ROA	543	0.13	0.17	0.09	0.14	0.21
Log (target market cap)	543	5.63	1.60	4.53	5.48	6.81
Target Tobin's q	543	2.44	2.14	1.34	1.78	2.74
Target leverage	543	0.10	0.14	0.01	0.03	0.16
Target ROA	543	0.03	0.23	-0.01	0.09	0.15
Relative deal size	543	0.38	0.54	0.07	0.20	0.50
High-tech combination	543	0.26	0.46	0	0	1
Competing offer (dummy)	543	0.04	0.19	0	0	0
Diversifying (dummy)	543	0.28	0.45	0	0	1
Deal Closure Time	543	115.52	76.27	66.50	98.00	138.00
All cash (dummy)	543	0.33	0.47	0	0	1

Table 4: Firm Value and Information Asymmetry Factor

Panel A: Cost of Equity and Information Asymmetry Factor

This table reports results of OLS regressions with expected cost of equity as dependent variable on information asymmetry factor. The sample covers the period from 1990 to 2014. The regressions control for year and industry fixed effects where industry is defined by the two-digit SIC codes. The regressions standard errors are adjusted for heteroskedasticity. Information asymmetry factor is the first factor obtained from factor analysis using 10 well-documented information asymmetry proxy variables. All variables are defined in the Appendix. ***, **, and * denote the significance at 1%, 5%, and 10% levels

	OLS	
	Expected Cost of Equity	
Information asymmetry factor	**0.0055*** **	**0.0078*** **
	(5.1326)	**(3.1928)**
Leverage		0.0128**
		(2.4709)
Book-to-market		-0.0022*
		(-1.7187)
Log(market cap)		0.0008
		(0.7540)
Beta		0.0499***
		(26.2549)
Momentum		0.0198***
		(10.5657)
Intercept	0.1398***	0.1011***
	(27.4090)	(12.1871)
Number of Obs	26,277	26,277
R^2	0.2790	0.3465

Panel B: Cost of Debt of New Debt Issues and Information Asymmetry Factor

This table reports results of OLS regressions with cost of debt of new debt issues as dependent variable on information asymmetry factor. The sample covers the period from 1990 to 2012. The regressions control for year and industry fixed effects where industry is defined by the two-digit SIC codes. The regressions standard errors are adjusted for heteroskedasticity. Information asymmetry factor is the first factor obtained from factor analysis using 10 well-documented information asymmetry proxy variables. All variables are defined in the Appendix. ***, **, and * denote the significance at 1%, 5%, and 10% levels.

	OLS	
	Cost of Debt	
Information asymmetry factor	**1.2062*** **	**0.2455** **
	(21.3918)	**(2.2788)**
Return on assets		-0.6511
		(-1.0680)
Log (sales)		-0.3356***
		(-5.8642)
Book-to-market		0.0959***
		(8.5764)
Volatility		3.0746*
		(1.8557)
Stock return		-6.9621
		(-0.9176)
Leverage		1.8275***
		(5.9209)
Interest coverage		-0.3118***
		(-5.5397)
Altman Z-Score (dummy)		-0.3920***
		(-3.6235)
Log (issue size)		-0.0631***
		(-4.8220)
Benchmark yield		-0.0380
		(-0.4319)
Intercept	2.2580***	3.9441***
	(15.1520)	(5.0927)
Number of Obs	11,746	11,746
R^2	0.4925	0.5321

Panel C: Firm Value and Information Asymmetry Factor

This table reports results of OLS regressions with industry-adjusted Tobin's Q as dependent variable on information asymmetry factor. The sample covers the period from 1990 to 2014. The regressions control for year and industry fixed effects where industry is defined by the two-digit SIC codes. The regressions standard errors are adjusted for heteroskedasticity. Information asymmetry factor is the first factor obtained from factor analysis using 10 well-documented information asymmetry proxy variables. All variables are defined in the Appendix. ***, **, and * denote the significance at 1%, 5%, and 10% levels.

	OLS	
	Industry-adjusted Tobin's Q	
Information asymmetry factor	**-0.2404*** **	**-0.2606*** **
	(-6.3784)	**(-3.5702)**
Log (sales)	-0.2063***	-0.1216***
	(-11.5043)	(-4.0313)
Delaware incorporation	0.1355***	0.2214***
	(6.1309)	(5.6559)
S&P 500 inclusion	0.5727***	0.4664***
	(13.4176)	(5.3609)
Leverage	-2.3851***	-3.0410***
	(-40.9292)	(-24.7686)
Capital to sales		0.0014***
		(8.5737)
R&D to capital		0.0167**
		(2.1376)
Advertising to capital		-0.0191
		(-1.0984)
Dividend yield		0.3261
		(1.1330)
Intercept	2.1871***	1.2954***
	(11.3566)	(4.9376)
Number of Obs	32,229	8,328
R^2	0.0813	0.0858

Table 5: Acquirer-target Portfolio Abnormal Returns and Target Information Asymmetry

This table reports results of OLS regressions with 5-day acquirer-target value-weighted portfolio abnormal returns as dependent variable on target information asymmetry factor. The sample consists of 543 completed U.S. M&A transactions between 1990 and 2014. The regressions control for year and industry fixed effects where industry is defined by the two-digit SIC codes. The regressions standard errors are adjusted for heteroskedasticity. Information asymmetry factor is the first factor obtained from factor analysis using 10 well-documented information asymmetry proxy variables. All variables are defined in the Appendix. ***, **, and * denote the significance at 1%, 5%, and 10% levels.

	OLS		
	Portfolio CAR (-2, 2)		
Target information asymmetry factor	**0.0248*** **	**0.0284*** **	**0.0256** **
	(2.9722)	**(3.3514)**	**(2.5259)**
Log (acquirer market cap)		-0.0000	-0.0000
		(-0.3998)	(-0.4275)
Acquirer Tobin's q		0.0018	0.0036*
		(0.8949)	(1.6891)
Acquirer leverage		0.0604	0.0651
		(0.9689)	(0.9808)
Acquirer ROA		-0.0613	-0.0419
		(-1.2604)	(-0.9083)
Log(target market cap)			0.0011
			(0.9750)
Target Tobin's q			-0.0065**
			(-2.2239)
Target leverage			-0.0189
			(-0.3987)
Target ROA			-0.0575*
			(-1.9127)
High-tech combination		-0.0128	-0.0126
		(-0.7320)	(-0.7153)
Competing offer		-0.0068	-0.0144
		(-0.2236)	(-0.4432)
Relative deal size		0.0352***	0.0387***
		(2.6186)	(2.8541)
Diversifying		-0.0205	-0.0225
		(-1.5307)	(-1.5980)
All-cash deal		0.0289**	0.0286*
		(1.9824)	(1.8755)
Intercept	0.0911	0.0680	0.0770
	(1.3463)	(1.0418)	(1.1132)
Number of Obs	543	543	543
R^2	0.2130	0.2726	0.2961

Table 6: Acquirer Abnormal Returns and Target Information Asymmetry

This table reports results of OLS regressions with 5-day acquirer abnormal returns as dependent variable on target information asymmetry factor. The sample consists of 543 completed U.S. M&A transactions between 1990 and 2014. The regressions control for year and industry fixed effects where industry is defined by the two-digit SIC codes. The regressions standard errors are adjusted for heteroskedasticity. Information asymmetry factor is the first factor obtained from factor analysis using 10 well-documented information asymmetry proxy variables. All variables are defined in the Appendix. ***, **, and * denote the significance at 1%, 5%, and 10% levels.

	OLS		
	Acquirer CAR (-2, 2)		
Target information asymmetry factor	**0.0327*** **	**0.0215** **	**0.0211** **
	(3.8661)	**(2.5246)**	**(2.0026)**
Log (acquirer market cap)		-0.0089*	-0.0085*
		(-1.9077)	(-1.7348)
Acquirer Tobin's q		0.0035	0.0044**
		(1.6327)	(2.1487)
Acquirer leverage		0.0904*	0.0864
		(1.9023)	(1.6003)
Acquirer ROA		-0.0443	-0.0214
		(-1.0034)	(-0.4978)
Log(target market cap)			0.0030**
			(2.5067)
Target Tobin's q			-0.0042
			(-1.4944)
Target leverage			0.0228
			(0.5595)
Target ROA			-0.0855***
			(-2.8795)
High-tech combination		0.0073	0.0057
		(0.5495)	(0.4370)
Competing offer		-0.0171	-0.0248
		(-0.5106)	(-0.7145)
Relative deal size		-0.0122	-0.0080
		(-1.1655)	(-0.7480)
Diversifying		-0.0046	-0.0018
		(-0.4606)	(-0.1687)
All-cash deal		0.0394***	0.0409***
		(2.6311)	(2.6089)
Intercept	-0.0627	0.0017	0.0048
	(-1.3322)	(0.0287)	(0.0779)
Number of Obs	543	543	543
R^2	0.1829	0.2261	0.2603

Table 7: Target Abnormal Returns and Target Information Asymmetry

This table reports results of OLS regressions with 5-day target abnormal returns and target premium as dependent variables on target information asymmetry factor. The sample consists of 543 completed U.S. M&A transactions between 1990 and 2014. The regressions control for year and industry fixed effects where industry is defined by the two-digit SIC codes. The regressions standard errors are adjusted for heteroskedasticity. Information asymmetry factor is the first factor obtained from factor analysis using 10 well-documented information asymmetry proxy variables. All variables are defined in the Appendix. ***, **, and * denote the significance at 1%, 5%, and 10% levels.

	OLS			
	Target CAR (-2, 2)		Premium	
Target information asymmetry factor	**0.0740*** **	**0.0569** **	**0.0892*** **	**0.1250*** **
	(4.2653)	**(2.2838)**	**(3.1371)**	**(3.2694)**
Log (acquirer market cap)		-0.0015		-0.0042
		(-0.1455)		(-0.2568)
Acquirer Tobin's q		0.0109***		0.0150
		(2.5969)		(0.8815)
Acquirer leverage		0.2553*		0.1743
		(1.9101)		(0.7119)
Acquirer ROA		-0.0144		0.3029
		(-0.1348)		(1.4396)
Log(target market cap)		-0.0036*		-0.0072**
		(-1.7555)		(-2.0814)
Target Tobin's q		-0.0194***		-0.0116
		(-3.3701)		(-0.8328)
Target leverage		-0.0812		0.3622*
		(-0.7045)		(1.8130)
Target ROA		0.0337		-0.1891
		(0.5228)		(-1.0814)
High-tech combination		-0.0611*		0.0224
		(-1.6726)		(0.3581)
Competing offer		0.0234		0.1583
		(0.4054)		(1.4722)
Relative deal size		-0.0462*		0.0433
		(-1.8595)		(0.8039)
Diversifying		-0.0276		0.0132
		(-0.9950)		(0.3078)
All-cash deal		0.0492*		0.0525
		(1.6500)		(1.1828)
Intercept	0.4806***	0.5483***	0.9151***	0.7733***
	(3.1538)	(3.3494)	(3.3410)	(2.6266)
Number of Obs	543	543	509	509
R^2	0.1990	0.2496	0.1938	0.2364

Table 8: Controlling for Acquirer Information Asymmetry

This table reports results of OLS regressions controlling for acquirer information asymmetry factor. The sample consists of 543 completed U.S. M&A transactions between 1990 and 2014. The regressions control for year and industry fixed effects where industry is defined by the two-digit SIC codes. The regressions standard errors are adjusted for heteroskedasticity. Information asymmetry factor is the first factor obtained from factor analysis using 10 well-documented information asymmetry proxy variables. All variables are defined in the Appendix. ***, **, and * denote the significance at 1%, 5%, and 10% levels.

	OLS			
	Portfolio CAR (-2, 2)	Acquirer CAR (-2, 2)	Target CAR (-2, 2)	Premium
Target information asymmetry factor	**0.0181***	**0.0261****	**0.0598****	**0.1232*****
	(1.6692)	**(2.4566)**	**(2.3918)**	**(3.1693)**
Acquirer information asymmetry factor	0.0139	-0.0417***	-0.0241	0.0158
	(1.4091)	(-2.8759)	(-0.6787)	(0.3120)
Log (acquirer market cap)	0.0001	-0.0268***	-0.0121	0.0027
	(0.6002)	(-2.9675)	(-0.6163)	(0.0910)
Acquirer Tobin's q	0.0034	0.0064***	0.0120***	0.0143
	(1.5924)	(3.2488)	(2.6841)	(0.8009)
Acquirer leverage	0.0830	0.0639	0.2423*	0.1824
	(1.2347)	(1.2383)	(1.7911)	(0.7545)
Acquirer ROA	-0.0282	-0.0304	-0.0196	0.3059
	(-0.6475)	(-0.7043)	(-0.1828)	(1.4490)
Log(target market cap)	0.0011	0.0032**	-0.0035*	0.0071**
	(0.9679)	(2.3994)	(-1.6770)	(2.0650)
Target Tobin's q	-0.0058*	-0.0039	-0.0192***	-0.0118
	(-1.9468)	(-1.3776)	(-3.3336)	(-0.8505)
Target leverage	-0.0204	0.0161	-0.0851	0.3654*
	(-0.4340)	(0.3914)	(-0.7291)	(1.8191)
Target ROA	-0.0625**	-0.0734***	0.0406	-0.1934
	(-2.0334)	(-2.6287)	(0.6382)	(-1.1031)
High-tech combination	-0.0081	0.0003	-0.0642*	0.0246
	(-0.4592)	(0.0249)	(-1.7340)	(0.3922)
Competing offer	-0.0153	-0.0278	0.0216	0.1594
	(-0.4731)	(-0.8094)	(0.3722)	(1.4803)
Relative deal size	0.0336***	-0.0101	-0.0475*	0.0439
	(2.6997)	(-0.9218)	(-1.9002)	(0.8174)
Diversifying	-0.0206	-0.0033	-0.0285	0.0135
	(-1.5073)	(-0.3103)	(-1.0278)	(0.3141)
All-cash deal	0.0330**	0.0349**	0.0458	0.0546
	(2.0635)	(2.4307)	(1.5029)	(1.2048)
Intercept	0.0880	0.0891	0.5970***	0.7419**
	(1.2603)	(1.3072)	(3.3181)	(2.4622)
Number of Obs	543	543	543	509
R^2	0.3003	0.2791	0.2507	0.2366

Table 9: Controlling for Corporate Governance

This table reports results of OLS regressions controlling for corporate governance variables. The board characteristics sample consists of 448 completed U.S. M&A transactions between 1997 and 2014. The BCF index sample consists of 507 completed U.S. M&A transactions between 1991 and 2014. The regressions control for year and industry fixed effects where industry is defined by the two-digit SIC codes. The regressions standard errors are adjusted for heteroskedasticity. Information asymmetry factor is the first factor obtained from factor analysis using 10 well-documented information asymmetry proxy variables. All variables are defined in the Appendix. ***, **, and * denote the significance at 1%, 5%, and 10% levels.

	OLS							
	Portfolio CAR (-2, 2)		Acquirer CAR (-2, 2)		Target CAR (-2, 2)		Premium	
Target information asymmetry factor	**0.0300****	**0.0261*****	**0.0263****	**0.0200***	**0.0561****	**0.0585****	**0.0775****	**0.1146*****
	(2.5353)	**(2.5912)**	**(2.2294)**	**(1.9417)**	**(2.2082)**	**(2.3840)**	**(1.9958)**	**(2.9682)**
Board Size	-0.0029		-0.0002		-0.0005		-0.0119	
	(-0.8592)		(-0.0675)		(-0.0748)		(-1.1965)	
Independent board	0.0550		0.0352		0.1367		0.2314	
	(1.3465)		(0.8720)		(1.2580)		(1.3036)	
CEO/Chairman duality	0.0029		0.0022		0.0133		-0.0168	
	(0.2428)		(0.2010)		(0.5202)		(-0.4503)	
Target board Size	0.0437		0.0146		0.2928**		-0.0576	
	(0.6394)		(0.2370)		(2.2362)		(-0.2240)	
Target independent board	0.0025		0.0007		0.0077		0.0103	
	(0.4160)		(0.1572)		(0.6408)		(0.5559)	
Target CEO/Chairman duality	-0.0106		-0.0209		0.0446		0.0988	
	(-0.6989)		(-1.4905)		(1.3645)		(1.4923)	
BCF index		0.0035		-0.0043		0.0138		-0.0123
		(0.2862)		(-0.4272)		(0.4782)		(-0.3053)
Target-acquirer BCF difference		-0.0007		-0.0065		0.0147		-0.0001
		(-0.0676)		(-0.8068)		(0.6148)		(-0.0030)
Log (acquirer market cap)	-0.0000	-0.0000	-0.0096*	-0.0088*	0.0004*	0.0054	0.0001	0.0030
	(-0.1285)	(-0.3236)	(-1.7310)	(-1.7316)	(1.6831)	(0.5747)	(0.1780)	(0.2027)
Acquirer Tobin's q	0.0038*	0.0036*	0.0044**	0.0043**	0.0107***	0.0101**	0.0168	0.0120
	(1.7751)	(1.6842)	(2.3061)	(2.3681)	(2.6181)	(2.4786)	(0.9572)	(0.6917)
Acquirer leverage	0.0515	0.0633	0.0917	0.0843	0.2080	0.2004	0.3070	0.1311

	(0.6600)	(0.9535)	(1.4989)	(1.5212)	(1.5007)	(1.5967)	(1.2588)	(0.5673)
Acquirer ROA	-0.0382	-0.0374	-0.0178	-0.0166	-0.0440	-0.0451	0.2625	0.1893
	(-0.7317)	(-0.7815)	(-0.3719)	(-0.3754)	(-0.4019)	(-0.4366)	(1.1521)	(0.9009)
Log(target market cap)	0.0015	0.0011	0.0035***	0.0030**	-0.0064**	-0.0044*	0.0015	0.0056
	(1.1994)	(0.9842)	(2.6704)	(2.4569)	(-2.3492)	(-1.8728)	(0.3740)	(1.5678)
Target Tobin's q	-0.0069**	-0.0064**	-0.0044	-0.0040	-0.0205***	-0.0209***	-0.0175	-0.0104
	(-2.1273)	(-2.2089)	(-1.3728)	(-1.4395)	(-3.7580)	(-3.6872)	(-1.1958)	(-0.7199)
Target leverage	0.0252	-0.0067	0.0636	0.0270	0.0351	0.0112	0.2708	0.4375**
	(0.4524)	(-0.1400)	(1.4101)	(0.6700)	(0.2980)	(0.1053)	(1.3924)	(2.3539)
Target ROA	-0.0618**	-0.0601**	-0.0873***	-0.0860***	0.0675	0.0476	-0.2307	-0.1974
	(-1.9770)	(-1.9876)	(-2.8419)	(-2.8617)	(0.9960)	(0.7175)	(-1.2620)	(-1.1133)
High-tech combination	-0.0163	-0.0150	0.0050	0.0046	-0.0457	-0.0467	0.0132	0.0224
	(-0.8390)	(-0.8333)	(0.3403)	(0.3307)	(-1.1984)	(-1.3514)	(0.2123)	(0.3937)
Competing offer	-0.0165	-0.0109	-0.0229	-0.0205	0.0208	0.0270	0.1987*	0.1957*
	(-0.4891)	(-0.3304)	(-0.6406)	(-0.5708)	(0.3110)	(0.4244)	(1.6557)	(1.7198)
Relative deal size	0.0370***	0.0375***	-0.0071	-0.0082	-0.0498**	-0.0461**	0.0248	0.0360
	(2.6082)	(2.7819)	(-0.6399)	(-0.7702)	(-1.9764)	(-1.9684)	(0.4656)	(0.6887)
Diversifying	-0.0228	-0.0196	-0.0047	-0.0002	-0.0356	-0.0291	0.0098	0.0067
	(-1.4131)	(-1.3526)	(-0.4104)	(-0.0177)	(-1.1868)	(-1.0583)	(0.2228)	(0.1621)
All-cash deal	0.0325*	0.0285*	0.0440**	0.0416***	0.0540*	0.0616**	0.0758	0.0522
	(1.8758)	(1.8452)	(2.5604)	(2.6417)	(1.7839)	(2.0731)	(1.6442)	(1.1898)
Intercept	-0.1130	-0.0809	-0.0508	-0.0438	-0.2756*	-0.0518	0.0256	-0.0322
	(-1.5607)	(-1.3373)	(-0.7268)	(-0.6934)	(-1.8660)	(-0.3449)	(0.1203)	(-0.1176)
Number of Obs	448	507	448	507	448	507	426	479
R^2	0.3007	0.2860	0.2704	0.2602	0.2682	0.2421	0.2516	0.2312

Table 10: Post-merger Operating Performance Change and Target Information Asymmetry

This table reports results of OLS regressions with one-year, two-year, and three-year post-merger change in performance-adjusted ROA of the merged firms as dependent variables on target information asymmetry factor. The regressions control for year and industry fixed effects where industry is defined by the two-digit SIC codes. The regressions standard errors are adjusted for heteroskedasticity. Information asymmetry factor is the first factor obtained from factor analysis using 10 well-documented information asymmetry proxy variables. All variables are defined in the Appendix. ***, **, and * denote the significance at 1%, 5%, and 10% levels.

	OLS		
	1-year Δ in Performance-adjusted ROA	2-year Δ in Performance-adjusted ROA	3-year Δ in Performance-adjusted ROA
Target information asymmetry factor	-0.0140	0.0030	-0.0317
	(-0.6109)	(0.1156)	(-1.2493)
Log (acquirer market cap)	0.0093	0.0105	0.0115
	(1.2219)	(0.7969)	(0.8654)
Acquirer Tobin's q	-0.0018	-0.0056	0.0141*
	(-0.3838)	(-0.6610)	(1.7320)
Acquirer leverage	0.0309	0.1144	0.2124
	(0.3225)	(0.9240)	(1.4788)
Acquirer ROA	-0.0504	-0.1218	-0.2583*
	(-0.4851)	(-0.8665)	(-1.9562)
Log(target market cap)	-0.0040	-0.0020	0.0023
	(-1.6207)	(-0.8002)	(0.7595)
Target Tobin's q	0.0002	0.0031	-0.0077
	(0.0199)	(0.2329)	(-0.5584)
Target leverage	-0.0441	-0.0489	-0.0331
	(-0.4723)	(-0.6393)	(-0.3122)
Target ROA	-0.0272	0.0312	-0.0928
	(-0.4104)	(0.3467)	(-1.1750)
High-tech combination	-0.0012	-0.0190	-0.0867**
	(-0.0368)	(-0.4713)	(-2.2527)
Competing offer	-0.0248	0.0276	-0.0184
	(-0.8658)	(0.3832)	(-0.1846)
Relative deal size	0.0506*	0.0507	0.0258
	(1.7924)	(1.6160)	(0.9334)
Diversifying	0.0350	0.0837**	-0.0147
	(1.4161)	(2.5857)	(-0.3809)
All-cash deal	0.0392	-0.0099	0.0397
	(1.1921)	(-0.3705)	(1.2978)
Intercept	-0.2867	-0.1284	0.0048
	(-1.1943)	(-0.9284)	(0.0342)
Number of Obs	277	206	161
R^2	0.3783	0.4273	0.5986

Table 11: Target Firm Selection and Target Information Asymmetry Factor

This table reports results of conditional logit models. The dependent variable target selection equals one for the target firms and zero for the control firms. The random control sample is formed by five randomly drawn control firms for each target. The industry and size control sample is formed by five control firms matched by industry and size with each target where industry is defined by the two-digit SIC codes. The industry, size, and book-to-market (B/M) control sample is formed by five control firms matched by industry, size, and book-to-market (B/M) with each target where industry is defined by the two-digit SIC codes. The information asymmetry factor is the first factor obtained from factor analysis using 10 well-documented information asymmetry proxy variables. All variables are defined in the Appendix. ***, **, and * denote the significance at 1%, 5%, and 10% levels.

	Conditional Logit					
	Random Sample		Industry and Size Sample		Industry, Size, and B/M Sample	
	Target Selection		Target Selection		Target Selection	
Target information asymmetry factor	**0.4706*** **	**0.4613*** **	**0.2811*** **	**0.4040*** **	**0.2836*** **	**0.3296** **
	(6.6159)	**(3.6113)**	**(3.7427)**	**(2.8969)**	**(3.6830)**	**(2.3429)**
Log (sales)		0.0654		0.0801		0.0730
		(1.1838)		(1.3063)		(1.1473)
R&D		0.9755**		1.1985**		1.4717***
		(2.3121)		(2.4921)		(2.9697)
Sales growth		-0.0100		-0.0219		-0.0247
		(-0.3114)		(-0.7749)		(-0.7537)
ROA		0.5127*		0.4206*		0.0516
		(1.7908)		(1.8403)		(0.1793)
Leverage		-0.5710		0.3157		0.5296
		(-1.5332)		(0.7795)		(1.2818)
Cash		0.8354***		0.4927*		0.6569**
		(3.2730)		(1.8753)		(2.4198)
Book-to-market		-0.0526		-0.0669		
		(-1.2072)		(-0.9464)		
Stock return		-0.1830**		-0.1940***		-0.1499**
		(-2.5147)		(-2.7539)		(-2.1604)
Number of Obs	3,154	2,987	3,137	2,979	3,123	2,984
Pseudo R^2	0.02	0.05	0.01	0.02	0.01	0.02

Table 12: Relative M&A Announcements Dollar Gains and Target Information Asymmetry

This table reports results of OLS regressions with relative dollar gains as dependent variable on target information asymmetry factor. The relative dollars gains is the difference in target 5-day announcement-period dollar gains minus acquirer 5-day announcement-period dollar gains scaled by the sum of the acquirer market cap and the target market cap 50 days prior to the announcement date. The sample consists of 543 completed U.S. M&A transactions between 1990 and 2014. The regressions control for year and industry fixed effects where industry is defined by the two-digit SIC codes. The regressions standard errors are adjusted for heteroskedasticity. Information asymmetry factor is the first factor obtained from factor analysis using 10 well-documented information asymmetry proxy variables. All variables are defined in the Appendix. ***, **, and * denote the significance at 1%, 5%, and 10% levels.

	OLS		
	Relative Dollar Gains		
Target information asymmetry factor	**-0.0302*** **	**-0.0232*** **	**-0.0326*** **
	(-4.3304)	**(-2.8721)**	**(-3.6910)**
Acquirer information asymmetry factor			0.0178**
			(2.2328)
Log (acquirer market cap)		-0.0001*	-0.0000
		(-1.8904)	(-0.0251)
Acquirer Tobin's q		-0.0046**	-0.0048***
		(-2.5600)	(-2.6649)
Acquirer leverage		-0.0234	0.0003
		(-0.3760)	(0.0055)
Acquirer ROA		0.0110	0.0285
		(0.3225)	(0.8527)
Log(target market cap)		-0.0030***	-0.0030***
		(-3.5613)	(-3.5602)
Target Tobin's q		0.0022	0.0030
		(0.9667)	(1.2954)
Target leverage		-0.0717*	-0.0730*
		(-1.8374)	(-1.8945)
Target ROA		0.0737***	0.0683**
		(2.8355)	(2.5276)
High-tech combination		-0.0217	-0.0160
		(-1.4147)	(-1.0672)
Competing offer		0.0050	0.0037
		(0.2245)	(0.1672)
Relative deal size		0.0294***	0.0230**
		(2.9696)	(2.3481)
Diversifying		-0.0155	-0.0128
		(-1.2644)	(-1.0622)
All-cash deal		-0.0239**	-0.0184*
		(-2.5234)	(-1.8508)
Intercept	0.0765	0.0409	0.0564
	(1.1084)	(0.6561)	(0.9398)
Number of Obs	543	543	543
R^2	0.2200	0.3386	0.3482

Table 13: Certain Deal Characteristics and Target Information Asymmetry

This table reports results the effects of target information asymmetry factor on certain deal characteristics including relative deal size, all-cash deals, and diversifying deals. The sample consists of 543 completed U.S. M&A transactions between 1990 and 2014. The regressions control for year and industry fixed effects where industry is defined by the two-digit SIC codes. The regressions standard errors are adjusted for heteroskedasticity. Information asymmetry factor is the first factor obtained from factor analysis using 10 well-documented information asymmetry proxy variables. All variables are defined in the Appendix. ***, **, and * denote the significance at 1%, 5%, and 10% levels.

	Probit	Probit	OLS	OLS
	All-cash	Diversifying	Relative Deal Size	Log(Deal Closure Time+1)
Target information asymmetry factor	**-0.5341*** **	**-0.5048** **	**-0.2329*** **	**-0.1589*** **
	(-3.5221)	**(-2.1511)**	**(-4.7259)**	**(-2.6112)**
Log (acquirer market cap)	0.0021	0.3946***	-0.0010*	-0.0001
	(1.4591)	(4.9477)	(-1.8837)	(-0.1498)
Acquirer Tobin's q	-0.0933	-0.1258**	-0.0110	0.0130*
	(-1.5782)	(-2.4852)	(-1.4806)	(1.9332)
Acquirer leverage	-0.8759	-2.7626**	0.2794	-0.2458
	(-0.9872)	(-2.5141)	(1.1908)	(-0.5487)
Acquirer ROA	0.5432	-1.6697**	-1.1203*	-0.3163*
	(0.8419)	(-2.5620)	(-1.9358)	(-1.8744)
Log(target market cap)	-0.1147**	-0.4368***	-0.0056	0.0035
	(-2.5187)	(-3.3786)	(-1.0134)	(0.4240)
Target Tobin's q	-0.1075**	0.1228**	0.0141*	-0.0201
	(-2.2196)	(2.4073)	(1.6675)	(-1.6252)
Target leverage	-1.9451***	-0.2783	0.3448	0.4510
	(-2.7241)	(-0.3215)	(1.3433)	(1.6308)
Target ROA	-0.1961	0.1013	0.1290	-0.1060
	(-0.5343)	(0.2083)	(0.9646)	(-0.7133)
High-tech combination	0.2476	-0.7895***	0.0371	-0.0181
	(1.2254)	(-3.4179)	(0.6574)	(-0.2481)
Competing offer	0.6359*	-0.4450	0.1751*	0.2236
	(1.8339)	(-1.0223)	(1.6755)	(1.2254)
Relative deal size	-0.9147***	0.2062		0.0470
	(-2.6254)	(0.8583)		(0.8179)
Diversifying	0.0800		-0.0849	-0.3947***
	(0.4296)		(-1.4561)	(-6.1496)
All-cash deal		-0.0158	-0.1351**	0.0135
		(-0.0826)	(-2.4157)	(0.1783)
Intercept	0.5417	3.9176***	1.2453***	4.1712***
	(0.9873)	(2.8566)	(3.6760)	(7.0561)
Number of Obs	543	543	543	543
R^2 (Pseudo R^2)	0.2025	0.3605	0.3870	0.2607

Table 14: Robustness Check: 11-day Abnormal Returns and Target Information Asymmetry

This table reports results of OLS regressions with 11-day target-acquirer portfolio, acquirer, and target 11-day abnormal returns as dependent variables on target information asymmetry factor. The sample consists of 543 completed U.S. M&A transactions between 1990 and 2014. The regressions control for year and industry fixed effects where industry is defined by the two-digit SIC codes. The regressions standard errors are adjusted for heteroskedasticity. Information asymmetry factor is the first factor obtained from factor analysis using 10 well-documented information asymmetry proxy variables. All variables are defined in the Appendix. ***, **, and * denote the significance at 1%, 5%, and 10% levels.

	OLS				
	Portfolio CAR (-5, 5)		Acquirer CAR (-5, 5)		Target CAR (-5
Target information asymmetry factor	**0.0287*** **	**0.0266** **	**0.0355*** **	**0.0243* **	**0.0902*** **
	(3.0820)	**(2.2381)**	**(4.0612)**	**(1.9642)**	**(4.8669)**
Log (acquirer market cap)		-0.0001		-0.0072	
		(-0.7024)		(-1.1455)	
Acquirer Tobin's q		-0.0010		-0.0008	
		(-0.4086)		(-0.2920)	
Acquirer leverage		0.0007		0.0414	
		(0.0094)		(0.6425)	
Acquirer ROA		-0.0735		-0.0534	
		(-1.1622)		(-0.8636)	
Log(target market cap)		0.0003		0.0020*	
		(0.2678)		(1.7727)	
Target Tobin's q		-0.0032		-0.0009	
		(-0.8228)		(-0.2338)	
Target leverage		0.0172		0.0514	
		(0.2875)		(0.9528)	
Target ROA		-0.0308		-0.0536	
		(-0.7683)		(-1.2639)	
High-tech combination		-0.0118		0.0055	
		(-0.5918)		(0.3297)	
Competing offer		-0.0005		-0.0049	
		(-0.0189)		(-0.2449)	
Relative deal size		0.0376**		-0.0037	
		(2.0485)		(-0.3253)	
Diversifying		-0.0235		-0.0084	
		(-1.2071)		(-0.6223)	
All-cash deal		0.0307		0.0360*	
		(1.6359)		(1.9004)	
Intercept	0.1176	0.1185	-0.0626	0.0122	0.4644***
	(1.5178)	(1.6086)	(-0.9439)	(0.1532)	(2.8105)
Number of Obs	543	543	543	543	543
R^2	0.1740	0.2354	0.1329	0.1700	0.1846