Idiosyncratic Volatility, Takeover Premiums and Target Gains

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Abstract

We examine the relation between targets' idiosyncratic volatility (sigma) with takeover premiums received and target's acquisition announcement returns. We argue that sigma is a significant driving force of the premium difference and hence different returns enjoyed by target firm's shareholders. The uncertainty in the market about a target's value makes bidder manager to pay a relatively higher price, when she believes that the acquisition will increase her shareholders' value, in favor of target's shareholders. Our results support this argument as we find that high idiosyncratic volatility targets receive considerably larger premiums and gain significantly more than targets that are easier-to-value. This finding is robust to the method of payment effect and several other target and deal characteristics. Finally, our results have implications about the method of payment effect on target returns by idiosyncratic volatility. High idiosyncratic volatility targets acquired with cash realize the largest returns by great magnitude because the investors interpret this financing decision as the bidder has more favorable information than the market about target's value and hence appreciate price at the benefit of target's shareholders.

1. Introduction

Hietala, Kaplan and Robinson (2003) suggest that acquisition announcements reveal information about the bidder premium, the stand-alone values of the bidder and the target and the potential synergies of the deal. When the acquirer announces a bidding offer, the information prompts a revaluation of the bidder and the target. Bidders and targets' information asymmetry models have been used to examine the effect on bidder returns (Moeller, Schlingemann, and Stulz (2008) and Officer, Poulsen, and Stegemoller (2008)) and explain return differences of bidding firms in cash versus stock acquisitions. While information asymmetry models assume different levels of information among managers and investors, which in turn influence the method of payment decision, there is no evidence on whether uncertainty about target firm's value drives the premium paid by the bidder and, subsequently, target returns. Even though value-creation to target shareholders is a well-documented phenomenon, there is a considerable variation in the target shareholders' gains.[1] As Bargeron, Schlingemann, Stulz and Zutter (2008) posit, "*there should be some unobservable target characteristics that are responsible for the premium difference*" and hence different returns enjoyed by target firm's shareholders. In this paper, we examine the relationship between target's idiosyncratic volatility (sigma) with takeover premium received and target's announcement returns.

We argue that target firms with greater pre-event sigma receive considerably larger premiums and, subsequently, experience significantly larger announcement returns relative to low sigma firms. Given that targets with high sigma, which have greater uncertainty and

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[1] For example, Huang and Walkling (1987) suggest that method of payment (cash versus stock deals), type of acquisitions (mergers versus tender offers) and managerial resistance play a significant role in shaping target returns. Very recently, Bargeron, Schlingemann, Stulz and Zutter (2008) and Bauguess, Moeller, Schlingemann and Zutter (2008) provided evidence that bidder's ownership status (public versus private) and ownership structure, respectively, drive target returns.

are more difficult-to-value, are higher risk investment projects, it is expected that their acquisition will lead to larger returns for the bidding company. Otherwise the bidder would not undertake these projects, assuming that there are no behavioral or agency motivations behind the deals. Hence, once the bidder decides that it is worth proceed to a bid offer for a target with relatively greater uncertainty, this reflects that she believes that the conduction of the deal will create relatively larger value to the company. Therefore she is disposed to offer relatively higher premium in order to make the deal successful, in favor of targets' shareholders.

The empirical evidence supports our hypothesis. We find that high idiosyncratic volatility targets receive considerably larger premiums (58.37% for high sigma targets versus 31.81% for low sigma targets) and outperform their low sigma counterparts by a positive and significant return margin (9.34%). The pattern holds for all methods of payment (as opposed to information asymmetry models)[2] and other firm and deal characteristics. The same result is obtained when we examine target's returns by the interaction of bidders' and targets' idiosyncratic volatility. When targets are hard-to-value, target firms' shareholders enjoy significantly larger profits relative to low idiosyncratic volatility targets irrespective of bidder's uncertainty.

The results have further implications for the relation between target's idiosyncratic volatility with the method of payment and firm's performance. While cash deals drive target firm's performance, high sigma cash deals outperform significantly their low sigma counterparts (on average 20.18% over the 5-day event period surrounding the acquisition announcement). The same pattern emerges for bidder returns in cash deals, as acquisitions

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[2] Under information asymmetry models bidders with high information asymmetry generate lower returns when an acquisition is financed with stock (Travlos, 1987), while the same does not hold in cash deals. When there is high target information asymmetry stock deals lead to lower bidder announcement returns while cash deals lead, on average, to larger CARs (Officer, Poulsen and Stegemoller, 2008).

of high sigma targets lead to a 5-day CAR of 3.11% relative to 0.01% for low sigma targets.

Hansen (1987) predicts that bidders have greater incentives to finance a bid with stock when the uncertainty about target assets is high. In cash-financed deals the bidder bears the entire cost of overpayment, since the payment is independent of the true value of the target *ex post*, while in stock-swap exchanges the bidder shares some of the target mispricing with target firms' shareholders. Hence, when uncertainty rises and cash is used to finance acquisitions, the investors interpret this as the bidder has more favorable information than the market about target's value and thus appreciate price of both targets and bidders. On the other hand, if the bidders insist in offering stock to high uncertainty targets to share the risk with targets' shareholders, this will add an extra negative effect to the signaling effect of overvaluation (Travlos, 1987) to the market reaction, as investors will interpret this as the bidders attempt to share the high risk of the project by offering their overvalued equity. Thus, while high sigma targets will still enjoy larger returns due to higher premium received, acquirers' return will be further harmed by their financing decision to use stock for such a high risky project.

Our study has several contributions to the M&As literature. It is the first study that tests empirically the relationship between idiosyncratic volatility with takeover premiums and target's shareholders returns. Second, it provides evidence that targets receive larger premiums and, hence, gain more when there is high uncertainty/risk about their value. Third, it provides insights of target characteristics (i.e. pre-event idiosyncratic volatility), as claimed in previous studies, responsible for the premium difference and therefore return differential among target firms' shareholders. Fourth, it provides empirical evidence about the financing decision of the bidder as a matter of target firm's uncertainty and its effect on acquisition returns.

The remainder of the paper is organized as follows. Section 2 describes the data and the empirical methodology. Section 3 presents and interprets the empirical results. Section 4 concludes the paper.

2. Sample Construction and Preliminary Analysis

To analyze the relation between target firm's idiosyncratic volatility with premium received and target's acquisition announcement abnormal return, we collect a sample of all successful acquisition deals announced during the period 1996-2005 from the Thomson ONE Banker Mergers and Acquisitions Database. We require that both the acquirer and the target are US firms listed on CRSP. We analyze majority acquisitions in which the acquirer owns less than 10% six months before the announcement date and owns 100% of the target's shares after the deal. Following Moeller, Schlingemann and Stulz (2004), we also restrict our sample to deals whose transaction value is at least $1 million and at least 1% of the acquirer market value four weeks before the announcement date. We also exclude any deal without method of payment information. We define as cash deals those that are fully paid with cash and stock deals those that are fully paid with stock. All others are defined as mixed deals. Our sample that meets the above criteria includes 2,110 deals.[3]

Table 1 provides descriptive statistics by year on deal size, target announcement cumulative abnormal returns (CARs), dollar gains around acquisition announcements, idiosyncratic volatility and premiums for our sample of public acquisitions. The majority of the transactions took place over the period 1996-2001 (67%) while almost 40% of the deals cluster in the late 1990s (1998-2000) consistent with Fuller, Netter and Stegemoller (2002).

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[3] All the 2,110 deals included in the analysis have been completed within 1,000 days of the initial acquisition announcements.

The average (median) deal value is $1.75 billion ($237.96 million). As expected, acquirers are larger than targets. In fact, while the average (median) acquirer market value of equity four weeks before the acquisition announcement is $7.72 billion ($1.43 billion), the average (median) target market value of equity is $587.78 million ($117.38 million). Deal value, target and acquirer size are the largest in 2005, which signifies the recent trend of less in number but larger in size deals.

In the fourth column we report the target CAR. We measure the CAR from day -2 to day +2 around the takeover announcement using a standard market model to compute expected return.[4] The average target 5-day CAR in our sample of acquisitions is 20.67%, consistent with Bauguess et al. (2008) and statistically significant at the 1% level. Our analysis of CARs also shows that targets enjoyed their largest returns during 2001 and 2002 (27.12 and 31.13, respectively), after the end of the dotcom bubble. On average, the target dollar gain, defined as the firm's market value of equity 5 days before the acquisition announcement multiplied by the abnormal return in the event window (-2, +2), is $151.87 million (median $20.13 million).

Target firms' idiosyncratic volatility (*sigma*), which is defined as the standard deviation of market adjusted residuals of the daily stock returns measured during the period (t-205, t-6)[5] where t is the acquisition announcement day,[6] presents an interesting pattern: sigma grows during the 1990s and reaches the peak of 5.40% in 2001. Then, it begins to decrease until 2004. In 2001 and 2003 the idiosyncratic volatility of targets exhibits the largest values. These values coincide with the largest target mean CARs (27.12 and 31.13% respectively),

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[4] The market model is estimated over the period starting 240 days to 41 days before the announcement date. We use the CRSP value weighted market returns as market returns.
[5] We also employ several different estimation periods to calculate target's sigma throughout the empirical analysis and we find qualitatively similar results not reported for brevity.
[6] Dierkens (1991) uses the same event window to capture the degree of pre-event information asymmetry, while Boehme, Danielsen and Sorescu (2006) use sigma as a measure of investors' differences of opinion.

which highlights the relationship between pre-announcement target's information uncertainty and target announcement returns. In 2004, the average (median) target firm has a sigma of 2.52% (2.06%). Finally, the average price offered by the acquirers is more than 43% higher than the target stock price four weeks before the acquisition announcement.[7] Looking at the premium data by year we confirm the correlation with sigma as years with high sigma targets move parallel with the magnitude of premiums paid to them (period 1999-2002).

[Insert Table 1 About Here]

Table 2 provides information on target firms, deal characteristics and mean excess returns by method of payment. Target firms are relatively young companies. The median time elapsed from going public to the acquisition announcement is 6 years. The dotcom bubble of the late 1990s, when many hi-tech companies went public and were subsequently acquired by other companies, might explain this figure. Stock prices of target firms remain almost flat in the months immediately before the acquisition announcements. In fact, while the average run-up, defined similarly to Bauguess et al. (2008) as the market adjusted buy abnormal return in the period [-205, -6], is 8.15%, the median run-up is close to zero (-1.19%). Operating performance is also not particularly encouraging, with an average (median) ROA of 4.31% (6.05%) and an average (median) cash-flow to equity ratio of 8.77% (6.55%). Target firms have low leverage ratio. More specifically, the median leverage ratio is about 14.73%. The target book-to-market ratio is less than one, signaling that either target firms have growth opportunities or that target companies are overvalued (Dong, Hirshleifer, Richardson and Teoh, 2006 and Ang and Cheng, 2006).

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[7] We also use 1-day and 1-week premiums throughout the empirical analysis of the study and the results obtained are similar, which are not reported for space purposes.

Panel B of Table 2 presents statistics about the deal characteristics. As expected, relative size, defined as the ratio between the target's market capitalization and the acquirer's market capitalization four weeks before the announcement, is less than one. However, targets are not very small compared to acquirers. In particular, the median ratio is 14.67% and the average relative size is above 30%. Thus, these are acquisitions that can be expected to have a significant impact on the acquirer's future performance. Interestingly, stock is by far the most preferred method of payment in the deals examined with almost half of the acquisitions financed entirely with stock (45.82%, i.e. 967 deals out of 2,110).[8] The average deal has a 60.8% stock component and a 29.59% cash component. As argued by Fuller, Netter and Stegemoller (2002), if the bidder is uncertain about the target's value, the bidder may not want to offer cash, since the target will only accept a cash offer greater than its true value and the bidder will have overpaid. Thus, stock is expected to be correlated with target uncertainty.

By sample construction, toehold cannot exceed 10% of the target shares. However, the average toehold is well below this threshold, being just 3.22%. Consistent with Betton, Eckbo, and Thornburn (2008), more than half of the sample acquirers do not own any share in the target company before the acquisition. Hostile offers represent only 1% of the sample, consistent with the fact that late 1990s and 2000s were dominated by friendly deals in the global takeover markets (Rossi and Volpin, 2004). Three out of ten deals involve firms belonging to different industries.[9] Deals are on average completed within four to five months of the initial announcement, thus uncertainty related to the deal completion is resolved relatively quickly. A quick resolution may also depend on the fact that acquirers are

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[8] This is consistent with Andrade, Mitchell, and Stafford (2001) who report that 70% of U.S. deals are stock financed with 58% being fully stock financed for the period 1973-1998.

[9] Industries are defined at the 2-digit SIC level.

often uncontested in their pursuit of the target firms. In fact, the median number of bidder in a deal is one.

Finally, Panel C of Table 2 presents preliminary evidence about abnormal returns according to the method of payment. As already documented in the literature, abnormal returns for target firms are higher in cash deals than stock deals (29.72% vs. 17.37%), and the difference is statistically significant at 1% level. Panel C also reports CARs in the three day event window (-1, 1). CARs in the two event windows considered are remarkably similar and all the results shown in the analysis hold for both event windows.[10]

[Insert Table 2 About Here]

3. Empirical Analysis

3.1. Univariate Results

3.1.1. Target's Idiosyncratic Volatility (Sigma) and Premium

Table 3, Panel A presents the 4-week mean and median takeover premiums for sub-groups of our sample by target's idiosyncratic volatility. The sample is divided into 3 equal portfolios (high, median and low) according to target's sigma. High sigma targets receive a mean (median) premium of 58.37% (49.02%). On the other hand, low sigma targets are acquired at a relative discount as the mean (median) premium is 31.81% (26.86%). The mean premium differential between high and low sigma targets is 26.56% and statistically significant at the 1% level. We further partition our sample by method of payment in cash deals, stock deals, and mixed deals. We still find that high sigma targets obtain by great magnitude larger premiums compared to low sigma targets irrespective of the payment

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[10] For space purposes, only results for the event window (-2, +2) will be reported and discussed throughout the paper.

method. The mean premium differentials between high and low sigma targets in the three groups are 41.89%, 21.03% and 22.94%, respectively. Overall, the findings indicate the significantly positive relationship between target's idiosyncratic volatility and premium. As the risk involved in high sigma targets is higher than low sigma targets, bidders who undertake the decision to proceed in acquisitions of such firms are disposed to offer larger premiums, because they believe that they will be compensated by larger returns to their shareholders.

3.1.2. Target's Idiosyncratic Volatility (sigma) and Firm's Announcement Returns

Table 3, Panel B contains mean and median target 5-day CARs for sub-samples of our data by target's idiosyncratic volatility. Similarly to Panel A, our sample is divided into 3 equal portfolios (high, median and low) according to target's sigma. High sigma targets earn an average (median) CAR of 25.01% (21.12%). The CAR is significant at the 1% level. On the other hand, low sigma targets experience a mean (median) return of 15.67% (13.03%). The mean return differential between high and low sigma targets is 9.34% and statistically significant. The median test is also statistically significant. When we further partition our sample by method of payment, we still find that high sigma targets outperform significantly low sigma targets for all forms of financing. In numbers, high sigma targets earn on average 37.11%, 19.97% and 25.37% in cash, stock and mixed acquisitions respectively, relative to 16.93%, 14.44% and 16.41% of low sigma targets respectively. The mean and median return differences between high and low uncertainty targets are all positive and statistically significant irrespective of the method of payment. Two very interesting points here: first, if information asymmetry was the driving force of target returns we would expect that high sigma targets would earn less than low sigma targets when stock is used as a method of

payment. Based on Hansen's (1987) model bidders have an incentive to pay with stock when there is high uncertainty about the target. In this way they share any risk involved in the transaction with the target. Given that, we would expect that on average the target's benefit would be lower in high uncertainty deals as the bidder offers his stock without being necessarily overvalued. On the other hand, if the bidder uses his stock and the target's uncertainty is low, this indicates that targets would take this as a signal of overvaluation and therefore the premium paid would be significantly larger. Hence we notice that the effect of uncertainty about target value is over and above information asymmetry. The second point refers to the very large CAR of high sigma targets in cash acquisitions (37.11%). When information uncertainty rises and cash is used to finance acquisitions, the investors interpret this as the bidder has more favorable information than the market about target's value and hence appreciate price at the benefit of target firm's shareholders.

3.1.2. Target's Idiosyncratic Volatility (sigma) and Bidder's Announcement Returns

In Panel C of Table 3, we examine the relationship between bidders' mean and median 5-day CARs for sub-samples of our data by target's idiosyncratic volatility. Overall we find that there is an insignificant difference in the returns enjoyed by bidders acquiring high or low sigma targets. For deals with high sigma targets, bidders lose a 5-day mean CAR of -1.91% compared to -1.77% for low sigma targets. However, when we partition the sample by method of payment, target's idiosyncratic volatility drives bidder returns. More specifically, acquisitions of high sigma targets with cash lead to a positive abnormal return of 3.11%, while acquisitions of low sigma targets do not have any material effect on bidder returns (0.01%). Their mean difference is equal to 3.12% over the 5-day period surrounding the event and statistically significant at the 5% level. On the other hand, an opposite result

occurs when a stock offer is made. Bidders that conduct a stock-swap acquisition deal with a high sigma target, suffer a significant negative abnormal return of -4.69% relative to -2.19% losses for low sigma targets. Their mean difference, which equals to -2.5%, is also significant at the 5% level. In general, according to the signaling hypothesis (Travlos, 1987), the decision of the bidder to use stock (cash) in order to finance an M&A transaction is interpreted by the market as the bidder equity is overvalued (undervalued). Therefore, while high sigma targets enjoy relatively larger gains irrespective of the method of payment due to higher premiums received, stock (cash) offers for hard-to-value targets, for which there is relatively less information, higher uncertainty and are hence more risky, are viewed by investors as additional bad (good) news, which is reflected by bidders' larger announcement losses (gains).

[Insert Table 3 About Here]

3.1.3. Interaction of Bidders' Idiosyncratic Volatility with Targets' Idiosyncratic Volatility and Takeover Premiums

In Table 4 we interact bidders' and targets' sigma and partition our sample into four groups: i) deals where acquirers have sigma below the median and targets have sigma below the median; ii) deals where acquirers have sigma below the median and targets have sigma above the median; iii) deals where acquirers have sigma above the median and targets have sigma below the median; and iv) deals where acquirers have sigma above the median and targets have sigma above the median.

Panel A of Table 4 reports mean and median takeover premiums for these four groups. The empirical evidence indicates that target's idiosyncratic volatility plays a very important role: deals in groups 4 and 2, i.e. the two groups with above-median sigma

targets, have exceptionally large average mean (median) takeover premiums, 54.27% (43.99%) and 50.40% (44.30%), respectively. Statistical tests (Panel B) show that takeover premiums for groups 2 and 4 are statistically significantly different from those of groups 1 and 3, which indicates that high sigma targets receive larger premiums irrespective of bidder's idiosyncratic volatility. We also present the breakdown of these groups by method of payment. The findings are similar to those for the full sample: target firms in groups 4 and 2 receive larger takeover premiums regardless the mode of payment. Similarly to Table 3, firms offered a 100%-cash payment enjoy considerably larger premium than target firms in stock deals for all groups of interaction between bidders and targets' idiosyncratic volatility.

3.1.4. Interaction of Bidders' Idiosyncratic Volatility with Targets' Idiosyncratic Volatility and Target's Announcement Returns

Table 4, Panel C examines target's announcement returns for the four groups created to interact bidders' and targets' idiosyncratic volatility. The results are similar with Table 3 and mirror the findings of Table, 4 Panel A. We find that when a target has above median sigma, high uncertainty targets outperform significantly low sigma targets irrespective of the uncertainty of the bidder (high or low sigma acquirers). In the portfolios with high uncertainty targets and high (low) uncertainty bidders the mean announcement returns are respectively 23.45% (25.84%) relative to 19.11% (16.71%) when target's uncertainty is low and bidder's uncertainty is high (low). The difference between the means is statistically significant irrespective of the method of payment. Median tests are also significant, indicating that the medians of the groups are not the same. Looking particularly at the stock method of payment, we observe that target returns are higher (21.92%) when uncertainty for target value is high and for bidder is low compared to cases where sigma is high in both

parties (18.95%). This suggests that there is incremental value to the target from a stock acquisition when uncertainty about the bidder's value is low.

[Insert Table 4 About Here]

3.2. Multivariate Results

3.2.1. OLS Regressions

The results from the univariate tests indicate that high sigma targets receive considerably larger premiums and hence realize significantly larger announcement returns than low sigma targets. In addition, targets, overall, appear to produce positive announcement returns consistent with the literature. To better examine the impact of idiosyncratic volatility on premiums paid and targets' performance around acquisition announcements, we adopt a multiple regression framework, where we employ sigma and various target's and deal's characteristic controls as independent variables. The dependent variables are the premium (Table 5) and target's five-day cumulative abnormal return (Table 6).

Specifically, we conduct cross-sectional regression analysis of 4-week premiums offered to targets and targets' abnormal returns (5-day CARs) to examine whether differences in target and deal characteristics explain the abnormal return differences found in high- and low target's sigma acquisitions. The multivariate results for regressions of premiums are reported in Table 5. Consistent with the results from the univariate tests, regression (1) shows that high sigma targets have a positive and strongly significant association with premium offered. The sigma variable carries a large positive coefficient and is statistically significant at the 1% level, suggesting that the bidder manager increases the

premium if the target is difficult to value. A very interesting observation is that sigma variable itself explains a relatively large variation of the model (3.66%).

In regression (2) we include, in addition to sigma, the following independent variables, which have been suggested by theory as key determinants of the premium paid to targets: the *log of target's market value (MV)*, which is target's market capitalization four weeks prior the acquisition announcement. Schwert (2000) shows that there is a negative relationship between premiums and target firm size; *price run up*, measured as the market-adjusted buy and-hold return over the period starting 205 days to 6 days prior to the announcement of the deal as in Bauguess et al. (2008); *target's relative size*, defined as the ratio of the deal value to acquirer's market value one month before the acquisition announcement date. There is evidence that target firms experience lower returns when their firm is relatively larger (Officer 2003). To control for the liquidity of the target's shares the Amihud (2002) *illiquidity variable* is inserted, defined as the average over the interval [-205, -6] preceding the acquisition announcement of the ratio between the absolute return and the value of stock traded using daily data.[11] A higher value of that measure means that a stock's market is less liquid. *Toehold* is the percentage of the target firm's equity owned by the acquirer six month before the acquisition announcement. Officer (2003) and Gaspar Massa and Matos (2005) document that bidder pays less to the target if it owns larger stake of the target prior the deal. We also include: the percentage of cash used in the financing of the acquisition. Berkovitch and Narayanan (1990) show that target abnormal return should be higher if the takeover is completed with cash offer. *Hostile variable* is a dummy that takes the value of one when the acquisition is reported as hostile in Thomson One Banker and 0 otherwise. As reported by Schwert (2000), Thomson One Banker (previously SDC)

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[11] The ratio obtained is multiplied by 1,000,000 as in Hasbrouck (2006).

describe a deal as hostile if it is unsolicited and resisted by the incumbent managers. Schwert (2000) finds that acquisition identified as hostile by SDC have higher premiums. *Tender offer* is a binary variable that takes value one when the acquisition is carried out through a tender offer and 0 otherwise (as defined from Thomson One Banker). Huang and Walkling (1987) find that tender offers have a positive relationship with premium offered and, in turn, target returns. A dummy for *diversification deals* is an indicator variable that takes the value of one when the acquirer and target are not from the same industry and zero otherwise at the two-digit SIC code level. Morck, Shleifer and Vishny (1990) find that investors respond negatively to diversifying acquisitions, indicating that managers might overpay for the target in favour of its shareholders. Finally, in regression (3), since acquisitions tend to take place in concentrated time periods (waves) and macroeconomic conditions, we include controls for merger activity, *Percentage of Deals*, defined as the percentage of deals that takes place in the quarter in which the deal occur and a dummy for acquisitions that took place from *1998 to 2000* to control for the dot.com effect. The results show that sigma remains strongly positively correlated with premium. Consistent to the prior literature size exhibits a significantly negative relationship with premium while run-up, illiquidity, hostile deals. In regression 3, we find that the dummy for deals undertaken between 1998 and 2000 carries a positive and significant coefficient.

Finally in regressions (4) and (5) we also incorporate several accounting variables: *leverage,* defined as total financial debt over total assets for the fiscal year prior to the acquisition announcement; *book-to-market ratio*, which is calculated as the target's market value divided by its net book value one month prior to the acquisition announcement. When the target's book-to-market is higher due to managerial entrenchment and agency costs, it is more likely that acquiring firms will offer larger premium to exploit opportunities for value

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creation in favour of target firm's shareholders (Lang, Stulz and Walkling, 1989). In addition,

Dong et al. (2006) find that higher target valuation is associated with lower bid premium

and in turn target return. To control for the ability of the target firm to generate cash flows

we insert the *Cash flow to equity ratio*, computed as in Lehn and Poulsen (1989) and the

Return on Assets (ROA) as measure of operating performance. Both variables are measured

at the end of the year before the acquisition. The pattern is the same as the coefficient of

sigma remains largely positive and significant at the 1% level, which highlights the

importance of target's idiosyncratic volatility on the bidder's decision concerning the

magnitude of the premium paid. Looking at the impact of accounting variables on the

takeover premium, we find a positive relationship with cash flow/equity and a weak

negative relationship with leverage at the 10% level.

[Insert Table 5 About Here]

The multivariate results for regressions of target's abnormal returns are reported in

Table 6. Also consistent with the results from the univariate tests, regression (1) shows that

sigma has a positive and significant association with abnormal announcement returns. The

sigma variable carries a coefficient of 1.6155 and is statistically significant at the 1% level,

suggesting that the market offers a higher premium to high uncertainty targets. A change of

one standard deviation in sigma increases target shareholders' returns by approximately

3.75% over the five-day window.[12]

In regressions (2) and (3) we include, in addition to sigma, the same explanatory

variables as in Table 5, which have been suggested by the theory as key determinants of the

market's perception of an acquisition. Overall the results confirm prior results of the strong

positive relationship of sigma with target CARs. Consistent to the literature, illiquidity,

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[12] The standard deviation of sigma is 0.023225.

percentage of cash, tender offer and dummy 98-00 are found to have a positive and significant relationship with target CARs, while run up, relative size and percentage of deals exhibit negative relationship with target returns. Further, the results obtained in regressions (4) and (5) suggest that accounting characteristics have no distinct bearing on abnormal returns five days surrounding the acquisition announcement. However, we still find a significant positive relationship between pre-event idiosyncratic volatility and target returns. Overall, the results from the multivariate analysis confirm the findings from univariate tests that target's idiosyncratic volatility plays a crucial role in driving firm's returns.

[Insert Table 6 About Here]

4. Conclusion

In this paper we investigate the relationship between target's idiosyncratic volatility with premium offered and target's announcement returns. We use a sample of US acquisition deals undertaken between 1996 and 2005 and provide evidence that the uncertainty in the market about targets' value makes bidder managers to pay a relatively higher price, under the belief that the acquisition will increase their shareholders' value, in favor of targets' shareholders.

Our results indicate that high idiosyncratic volatility targets, which have greater uncertainty and are hard-to-value, realize substantially larger announcement returns relative to targets that are easier-to-value. The pattern is robust to the method of payment effect and several other target and deal characteristics. In addition, our results have further implications to the payment mode effect on target returns by idiosyncratic volatility. High sigma targets acquired with cash realize by great magnitude the largest returns because the

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investors interpret this financing decision as the bidder has more favorable information than the market about target's value and hence appreciate price at the benefit of target's shareholders. Overall, our findings provide insights of further target characteristics (i.e. idiosyncratic volatility), as claimed in previous studies, responsible for the premium difference and, thus, return differential among target firms' shareholders.

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Table 1. Summary Statistics of Acquisitions by Year

The table presents summary statistics of acquisitions by year for the sample period between 1996 and 2005. All targets and acquirers are publicly traded firms listed on CRSP. Column (1) represents the transaction value, which is the value of the transaction as reported by Thomson One Banker in US$ mil. In columns (2) and (3) target's and acquirer's Market Value (MV) are presented. Target (acquirer) MV is the market value of the target firm (acquirer) in US$ mil. four weeks before the acquisition announcement. Target CAR is the average cumulative abnormal return in the event window (-2, +2) around the acquisition announcement. CARs are computed using daily data with a market model (value weighted). The market model is estimated over the period starting 240 days to 41 days before the announcement date. Dollar gain (Column (5)) is the dollar value (US$ mil.) of the abnormal gain around the acquisition announcement and is the outcome of the target CAR multiplied by the target's market value of equity 5 days before the acquisition announcement. Target sigma (Column (6)) is the target firm's idiosyncratic volatility, which is calculated as the standard deviation of market adjusted residuals of the daily stock returns measured during the period (t-205,t-6) where t is the acquisition announcement day. Column (7) shows the premium,* which is the difference between the price offered and the target's price 4 weeks before the acquisition divided by the latter (from Thomson One Banker) in percentage. Column (8) presents the number of observations per year. All data used are from CRSP with the exception of Transaction Value. Means are the first numbers presented and medians are in brackets. *Premium is available for 2010 observations out of 2110.

Year	Transaction Value (1)	Target MV (2)	Acquirer MV (3)	Target CAR (4)	Dollar Gain (5)	Target sigma (6)	4-Week Premium (7)	# N. Obs. (8)
1996	883.05	587.77	3504.17	18.38%	94.13	3.18%	46.30%	257
	[175.08]	[118.38]	[1016.14]	[15.36%]	[17.72]	[2.82%]	[31.36%]	
1997	925.94	583.79	4138.53	15.00%	83.50	3.08%	34.31%	343
	[250.32]	[171.06]	[1106.89]	[12.89%]	[17.25]	[2.57%]	[30.83%]	
1998	2484.68	1769.25	7631.12	17.58%	147.91	3.48%	42.25%	257
	[243.72]	[179.00]	[1684.34]	[13.60%]	[15.47]	[2.95%]	[31.98%]	
1999	2066.46	1346.46	10661.60	22.34%	156.62	4.32%	50.21%	311
	[308.44]	[180.33]	[1799.09]	[19.66%]	[23.47]	[3.63%]	[46.06%]	
2000	2982.53	1589.51	11093.52	23.41%	309.95	4.66%	50.20%	242
	[361.96]	[208.04]	[1978.21]	[19.74%]	[32.27]	[3.82%]	[43.14%]	
2001	1165.24	839.82	6082.66	27.12%	93.74	5.40%	45.56%	190
	[160.97]	[93.87]	[1158.87]	[21.69%]	[18.65]	[4.39%]	[41.33%]	
2002	989.52	753.84	8231.84	31.13%	170.49	4.83%	62.97%	111
	[127.58]	[78.65]	[883.65]	[23.08%]	[18.22]	[4.21%]	[35.54%]	
2003	1205.21	789.33	6702.57	21.86%	109.67	3.68%	41.32%	141
	[147.99]	[122.62]	[949.47]	[15.04%]	[16.40]	[2.92%]	[28.06%]	
2004	1903.28	1389.49	6472.22	19.28%	162.70	2.52%	29.57%	139
	[317.07]	[214.52]	[1950.62]	[14.32%]	[30.39]	[2.06%]	[27.12%]	
2005	3202.23	2391.73	17579.24	18.93%	260.89	2.56%	32.27%	119
	[588.88]	[354.42]	[4186.38]	[17.31%]	[43.99]	[2.11%]	[26.26%]	
Total	1750.87	1157.20	7719.31	20.67%	151.87	3.78%	43.37%	2110
	237.96	154.40	1434.57	16.81%	20.13	3.14%	[34.25%]	

Table 2. Descriptive Statistics

The table presents descriptive statistics for the target firms (Panel A), the deals (Panel B), and abnormal returns (Panel C) for the sample period between 1996 and 2005. All targets and acquirers are publicly traded firms listed on CRSP. Cash flow to equity is the ratio between cash flows computed as in Lehn and Poulsen (1989) and the market value of equity. Leverage is defined as total financial debt over total assets. ROA is defined as EBITDA at time t divided by total assets at the beginning of the year for the fiscal year prior to the acquisition announcement. Book-to-market ratio is calculated as the target's market value divided by its net book value one month prior to the acquisition announcement. Runup is measured as the market-adjusted buy and-hold return over the period starting 205 days to 6 days prior to the announcement of the deal as in Bauguess et al. (2008). Illiquidity is the Amihud (2002) illiquidity measure, defined as the average of the ratio between the absolute return and the value of stock traded using daily data over the interval [-205, -6] preceding the acquisition announcement. Age is the age of the target company, defined as the time elapsed between the company's first listing on CRSP and the year in which the acquisition takes place. Transaction value is the value of the transaction as reported by Thomson One Banker in US$ mil. Time to completion is the time elapsed between the announcement and the completion of the acquisition. Target's relative size is the ratio of the deal value to acquirer's market value four weeks before the acquisition announcement date. Number of bidders is the number of firms that make offers for acquiring the target firms as reported in Thomson One Banker. % Cash (stock, other) in consideration is the percentage of cash (stock, other) used to pay for the acquisition. Toehold is the percentage of the target firm's equity owned by the acquirer six month before the acquisition announcement. Owned after transaction is the percentage of the target firm's equity owned by the acquirer after the conclusion of the acquisition. Diversification is a binary variable that takes value one if target and acquirer operate in different industries based on the 2-digit SIC code. Hostile variable is a dummy that takes the value of one when the acquisition is reported as hostile in Thomson One Banker and 0 otherwise. Tender offers % is the percentage of deals in the sample that takes the form of tender offers. Target CAR is the average cumulative abnormal return in the event window (-2, +2) around the acquisition announcement. CARs are computed using daily data with a market model (value weighted). The market model is estimated over the period starting 240 days to 41 days before the announcement date. Cash (stock) is a dummy that takes value 1 if the deal is paid for with 100% cash (stock). Mixed deal is a dummy that takes value 1 if both cash and stock dummies are equal to zero. N denotes the number of observations.

Table 2. Descriptive Statistics (Cont.)

	Mean	Median	N
Panel A: Target Statistics			
Cash Flow to Equity	0.0655	0.0877	1832
Leverage	0.2102	0.1473	1969
ROA	0.0431	0.0604	1834
Book-to-Market	0.6620	0.5306	1921
Run-up (-205, -6)	0.0815	-0.0119	2110
Illiquidity	2.0516	0.0964	2110
Age	10.8066	6	2110
Panel B: Deal Statistics			
Transaction Value	1750.868	237.963	2110
Time to Completion (days)	137.7133	121	2110
Relative Size 4wk	0.3070	0.1467	2110
Number of Bidders	1.0498	1	2110
% Cash in Consideration	29.5929	0	2110
% Stock in Consideration	60.7934	79.3255	2110
% Other in Consideration	6.4706	0	2110
Toehold	0.0322	0	2110
Owned After Transaction	98.9821	100	2110
Diversification %	30.95	0	2110
Hostile %	1.00	0	2110
Tender Offers %	14.12	0	2110
Panel C: Abnormal Returns around Acquisition Announcement by Method of Payment			
	CAR(-2,2)		
Cash	29.72%	22.71%	411
Stock	17.37%	14.06%	967
Mixed	19.97%	16.21%	732
Total	20.67%	16.81%	2110
	CAR(-1,1)		
Cash	28.95%	22.55%	411
Stock	16.45%	13.47%	967
Mixed	18.92%	14.55%	732
Total	19.74%	15.50%	2110

Table 3. Takeover Premium, Target's and Bidder's Announcement Returns (5-day CARs) by Target Idiosyncratic Volatility (sigma)

The table presents premiums (Panel A), target's (Panel B) and bidder's (Panel C) mean and median 5-day CARs for the sample period 1996-2005 by target's idiosyncratic volatility. CARs are computed using daily data with a market model (value weighted). The market model is estimated over the period starting 240 days to 41 days before the announcement date. All targets and acquirers are publicly traded firms listed on CRSP. In each Panel, we divide our sample on 3 equal portfolios (high, median and low) according to target's idiosyncratic volatility. Target sigma is the target firm's idiosyncratic volatility, which is calculated as the standard deviation of market adjusted residuals of the daily stock returns measured during the period (t-205, t-6) where t is the acquisition announcement day. Premium is the difference between the price offered and the target's price 4 weeks before the acquisition divided by the latter (from Thomson One Banker) in percentage. We also partition our sample by method of payment: cash, stock and mixed deals. Cash (Stock) acquisitions are those financed with 100% cash (stock). All others are mixed deals. Statistical tests for differences in mean and equality of medians for premiums and target's CARs for the five days [-2, +2] around the announcement day (day 0) are also presented. N denotes the number of observations.

Panel A: Takeover Premium by Target Idiosyncratic Volatility (sigma)			

FULL SAMPLE

	mean	median	N
Low (1)	31.81%	26.86%	681
Median (2)	40.49%	35.14%	675
High (3)	58.37%	49.02%	654
Total	43.37%	34.25%	2010

Statistical Tests for Differences High vs. Low

t-statistics	6.7246	90.2204	
p-value	0.0000	0.0000	

	CASH			STOCK			MIXED		
	mean	median	N	mean	median	N	mean	median	N
Low (1)	28.70%	23.86%	100	35.20%	27.49%	282	29.66%	26.99%	299
Median (2)	47.01%	39.89%	156	36.77%	31.98%	303	40.99%	36.45%	216
High (3)	70.59%	53.71%	140	56.23%	48.68%	346	52.60%	43.71%	168
Total	50.73%	39.54%	396	43.53%	33.85%	931	38.88%	32.01%	683

Statistical Tests for Differences High vs. Low

t-statistics	4.3887	44.5886		2.9819	30.6431		5.0073	13.4813	
p-value	0.0000	0.0000		0.003	0.0000		0.0000	0.0000	

Table 3 – (Cont.)

Panel B: Target Announcement Returns by Target Idiosyncratic Volatility (sigma)

	FULL SAMPLE		
	mean	median	N
Low (1)	15.67%	13.03%	703
Median (2)	21.34%	17.49%	704
High (3)	25.01%	21.12%	703
Total	20.67%	16.81%	2110

Statistical Tests for Differences High vs.
t-statistics	-6.797	39.613
p-value	0.000	0.000

	CASH			STOCK			MIXED		
	mean	median	N	mean	median	N	mean	median	N
Low (1)	16.93%	14.78%	102	14.44%	12.33%	289	16.41%	13.43%	312
Median (2)	31.06%	26.57%	162	17.01%	13.87%	311	20.35%	17.09%	231
High (3)	37.11%	32.09%	147	19.97%	18.36%	367	25.37%	20.14%	189
Total	29.72%	22.71%	411	17.37%	14.06%	967	19.97%	16.21%	732

Statistical Tests for Differences High vs. Low
t-statistics	-5.687	19.870		-3.148	8.931		-3.544	11.243
p-value	0.000	0.000		0.002	0.000		0.001	0.000

Panel C: Bidder Announcement Returns by Target Idiosyncratic Volatility (sigma)

	FULL SAMPLE		
	mean	median	N
Low (1)	-1.77%	-1.40%	703
Median (2)	-1.37%	-1.10%	704
High (3)	-1.91%	-1.73%	703
Total	-1.68%	-1.33%	2110

Statistical Tests for Differences High vs. Low
t-statistics	-0.2284	0.7283
p-value	0.8194	0.393

	CASH			STOCK			MIXED		
	mean	median	N	mean	median	N	mean	median	N
Low (1)	-0.01%	0.16%	102	-2.19%	-1.86%	289	-1.94%	-1.34%	312
Median (2)	2.06%	0.84%	162	-2.55%	-1.92%	311	-2.18%	-1.46%	231
High (3)	3.11%	0.83%	147	-4.69%	-3.78%	367	-0.42%	-0.38%	189
Total	1.93%	0.60%	411	-3.26%	-2.38%	967	-1.63%	-1.27%	732

Statistical Tests for Differences High vs. Low
t-statistics	2.5156	0.3499		-2.468	8.0158		1.6217	1.3016
p-value	0.0127	0.554		0.0139	0.005		0.1061	0.254

Table 4. Takeover Premium and Target's Announcement Returns (5-day CARs) by Interaction of Target's Idiosyncratic Volatility with Bidder's Idiosyncratic Volatility (sigma)

This table presents premiums (Panel A) and target's mean and median 5-day CARs (Panel C) for the sample period 1996-2005 by whether acquirer (target) sigma is above or below the median sigma of all targets and acquirers in the sample. CARs are computed using daily data with a market model (value weighted). The market model is estimated over the period starting 240 days to 41 days before the announcement date. All targets and acquirers are publicly traded firms listed on CRSP. Target (Acquirer) sigma is the target (acquiring) firm's idiosyncratic volatility, which is calculated as the standard deviation of market adjusted residuals of the daily stock returns measured during the period (t-205, t-6) where t is the acquisition announcement day. Premium is the difference between the price offered and the target's price 4 weeks before the acquisition divided by the latter (from Thomson One Banker) in percentage. We also partition our sample by method of payment: cash, stock and mixed deals. Cash (Stock) acquisitions are those financed with 100% cash (stock). All others are mixed deals. Panels B and D present the p-values of statistical tests for differences in mean and equality of medians for takeover premiums and targets' CARs for the five days [-2, +2] around the announcement day (day 0) respectively, for the different combinations of interaction between high and low uncertainty targets and bidders. N denotes the number of observations.

	Mean	Median	N	Mean	median	N	Mean	Median	N	Mean	Median	N
Panel A: Premium by Interaction of Target Idiosyncratic Volatility with Bidder Idiosyncratic Volatility (sigma)												
Portfolios		Full Sample			Cash			Stock			Mixed	
Low Bidder/Low Target (1)	33.08%	27.74%	763	34.56%	27.25%	135	35.47%	28.05%	326	29.85%	27.50%	302
Low Bidder/High Target (2)	50.40%	44.30%	250	57.67%	45.17%	78	47.01%	44.99%	102	47.26%	41.72%	70
High Bidder/Low Target (3)	35.42%	32.82%	254	35.94%	32.53%	40	31.06%	28.18%	107	39.59%	39.80%	107
High Bidder/High Target (4)	54.27%	43.99%	743	66.33%	51.11%	143	52.63%	43.39%	396	49.01%	40.80%	204
Total	43.37	34.25	2010	50.73	39.54	396	43.53	33.85	931	38.88	32.01	683
Panel B: P-values of Statistical Tests for Differences in Mean and Equality of Medians for Takeover Premiums												
(2) –(1)	0.000	0.000		0.000	0.000		0.069	0.000		0.005	0.012	
(3) – (1)	0.433	0.163		0.778	0.561		0.459	0.978		0.003	0.067	
(4) – (1)	0.000	0.000		0.001	0.000		0.005	0.000		0.000	0.004	
(2)- (3)	0.000	0.002		0.001	0.173		0.001	0.016		0.246	0.602	
(2)- (4)	0.302	0.927		0.382	0.513		0.254	0.912		0.802	0.890	
(4) – (3)	0.000	0.000		0.002	0.008		0.000	0.001		0.050	0.663	

Panel C: Target Announcement Returns by Interaction of Target Idiosyncratic Volatility with Bidder Idiosyncratic Volatility (sigma)													
	Mean	Median	N	Mean	Median	N	Mean	Median	N	Mean	Median	N
Portfolios		Full Sample			Cash			Stock			Mixed	
Low Bidder/Low Target (1)	16.71%	13.54%	794	21.53%	16.61%	140	14.80%	12.14%	335	16.61%	13.63%	319
Low Bidder/High Target (2)	25.84%	22.67%	261	32.86%	23.58%	79	21.92%	20.73%	103	23.93%	23.46%	79
High Bidder/Low Target (3)	19.11%	16.62%	261	27.34%	22.43%	41	14.89%	12.37%	110	20.25%	16.32%	110
High Bidder/High Target (4)	23.45%	19.07%	794	36.32%	33.31%	151	18.95%	16.33%	419	23.21%	17.58%	224
Total	20.67%	16.81%	2110	29.72%	22.71%	411	17.37%	14.06%	967	19.97%	16.21%	732

Panel D: P-values of Statistical Tests for Differences in Mean and Equality of Medians for Target Announcement Returns													
(2) –(1)	0.000	0.000		0.003	0.043		0.001	0.000		0.007	0.000	
(3) – (1)	0.096	0.309		0.077	0.030		0.961	0.934		0.139	0.213	
(4) – (1)	0.000	0.000		0.000	0.001		0.009	0.013		0.004	0.041	
(2)- (3)	0.001	0.005		0.201	0.700		0.006	0.024		0.279	0.067	
(2)- (4)	0.196	0.044		0.442	0.026		0.197	0.187		0.824	0.017	
(4) – (3)	0.012	0.159		0.030	0.159		0.067	0.072		0.337	0.560	

Table 5. Multivariate Analysis: Regressions of Takeover Premiums on Target's Idiosyncratic Volatility

The table presents the results of multivariate regressions of the 4-week premium offered on target's idiosyncratic volatility (sigma) and other deal's and target's characteristics for the sample period 1996-2005. All targets and acquirers are publicly traded firms listed on CRSP. Premium is the difference between the price offered and the target's price 4 weeks before the acquisition divided by the latter (from Thomson One Banker) in percentage. Target sigma is the target firm's idiosyncratic volatility, which is calculated as the standard deviation of market adjusted residuals of the daily stock returns measured during the period (t-205, t-6) where t is the acquisition announcement day. Ln (MV) is the log of the target firm equity's market value in US\$ mil four weeks before the acquisition announcement. Leverage is defined as total financial debt over total assets. Book-to-market ratio is calculated as the target's market value divided by its net book value one month prior to the acquisition announcement. Cash flow to equity is the ratio between cash flows computed as in Lehn and Poulsen (1989) and the market value of equity. ROA is defined as EBITDA at time t divided by total assets at the beginning of the year for the fiscal year prior to the acquisition announcement. Runup is measured as the market-adjusted buy and-hold return over the period starting 205 days to 6 days prior to the announcement of the deal as in Bauguess et al. (2008). Target's relative size is the ratio of the deal value to acquirer's market value four weeks before the acquisition announcement date. Illiquidity is the Amihud (2002) illiquidity measure, defined as the average of the ratio between the absolute return and the value of stock traded using daily data over the interval [-205, -6] preceding the acquisition announcement. % Cash in consideration is the percentage of cash used to pay for the acquisition. Toehold is the percentage of the target firm's equity owned by the acquirer six month before the acquisition announcement. Owned after transaction is the percentage of the target firm's equity owned by the acquirer after the conclusion of the acquisition. Diversification is a binary variable that takes value one if target and acquirer operate in different industries based on the 2-digit SIC code. Hostile variable is a dummy that takes the value of one when the acquisition is reported as hostile in Thomson One Banker and 0 otherwise. Tender offer is a dummy that takes the value of 1 if the deal has the form of a tender offer and 0 otherwise. Perc. Deals is defined as the percentage of deals that takes place in the quarter in which the deal occur. Dummy 98-00 is a dummy that takes value 1 if the deal is announced in the period 1998-2000 and 0 otherwise. Standard errors are reported in brackets. The symbols *, **, *** denote statistical significance at the 1%, 5%, and 10% levels, respectively. Standard errors are adjusted using White's (1980) correction for heteroskedasticity. N denotes the number of observations.

Table 5 – (Cont.)

	(1)	(2)	(3)	(4)	(5)
Constant	0.2360***	0.4721***	0.5367***	0.3040***	0.3667***
	[0.0435]	[0.1319]	[0.1489]	[0.1096]	[0.1215]
Sigma	5.3054***	3.0550***	2.6598**	4.5523***	3.9398***
	[1.2372]	[1.0297]	[1.0326]	[0.8857]	[0.9450]
Ln (MV)		-0.0160*	-0.0195**	-0.007	-0.0111
		[0.0084]	[0.0083]	[0.0075]	[0.0077]
Run-up		0.0149*	0.0151*	0.0085	0.0112
		[0.0080]	[0.0080]	[0.0116]	[0.0113]
Relative Size		-0.0033	-0.0029	0.0049	0.0051
		[0.0150]	[0.0152]	[0.0157]	[0.0160]
Illiquity		0.0122***	0.0124***	0.0117***	0.0120***
		[0.0039]	[0.0038]	[0.0041]	[0.0040]
Toehold		-0.032	-0.0309	-0.0342	-0.0333
		[0.0211]	[0.0209]	[0.0211]	[0.0213]
% of Cash		0.0006	0.0006	0.0008	0.0008*
		[0.0005]	[0.0005]	[0.0005]	[0.0005]
Hostile		0.2311***	0.2398***	0.2303***	0.2405***
		[0.0682]	[0.0676]	[0.0623]	[0.0618]
Tender offer		0.0458	0.0482	0.0501	0.048
		[0.0446]	[0.0432]	[0.0469]	[0.0455]
Diversification		-0.0232	-0.0223	-0.01	-0.0109
		[0.0241]	[0.0241]	[0.0232]	[0.0232]
Perc. Deals			-1.4132		-0.9643
			[1.0336]		[0.9670]
Dummy 98-00			0.0876***		0.0980***
			[0.0232]		[0.0242]
Leverage				-0.0786	-0.0849*
				[0.0495]	[0.0488]
Book-to-Mkt				0.0178	0.0213
				[0.0305]	[0.0309]
CF/Equity				0.1023**	0.0902*
				[0.0472]	[0.0470]
ROA				-0.1648	-0.165
				[0.1284]	[0.1250]
Adj. R^2	0.0366	0.0983	0.1016	0.1819	0.1881
N	2010	2010	2010	1706	1706

Table 6. Multivariate Analysis: Regressions of Target's Announcement Returns (5-day CARs) on Target's Idiosyncratic Volatility

The table presents the results of multivariate regressions of the CAR in the five day interval around the acquisition announcement on target's idiosyncratic volatility (sigma) and other deal's and target's characteristics for the sample period 1996-2005. Target CAR is the average cumulative abnormal return in the event window (-2, +2) around the acquisition announcement. CARs are computed using daily data with a market model (value weighted). The market model is estimated over the period starting 240 days to 41 days before the announcement date. Target sigma is the target firm's idiosyncratic volatility, which is calculated as the standard deviation of market adjusted residuals of the daily stock returns measured during the period (t-205, t-6) where t is the acquisition announcement day. Premium % is the difference between the price offered and the target's price 4 weeks before the acquisition divided by the latter (from Thomson One Banker). Ln (MV) is the log of the target firm equity's market value in US$ mil four weeks before the acquisition announcement. Leverage is defined as total financial debt over total assets. Book-to-market ratio is calculated as the target's market value divided by its net book value one month prior to the acquisition announcement. Cash flow to equity is the ratio between cash flows computed as in Lehn and Poulsen (1989) and the market value of equity. ROA is defined as EBITDA at time t divided by total assets at the beginning of the year for the fiscal year prior to the acquisition announcement. Runup is measured as the market-adjusted buy and-hold return over the period starting 205 days to 6 days prior to the announcement of the deal as in Bauguess et al. (2008). Target's relative size is the ratio of the deal value to acquirer's market value four weeks before the acquisition announcement date. Illiquidity is the Amihud (2002) illiquidity measure, defined as the average of the ratio between the absolute return and the value of stock traded using daily data over the interval [-205, -6] preceding the acquisition announcement. % Cash in consideration is the percentage of cash used to pay for the acquisition. Toehold is the percentage of the target firm's equity owned by the acquirer six month before the acquisition announcement. Owned after transaction is the percentage of the target firm's equity owned by the acquirer after the conclusion of the acquisition. Diversification is a binary variable that takes value one if target and acquirer operate in different industries based on the 2-digit SIC code and 0 otherwise. Hostile variable is a dummy that takes the value of one when the acquisition is reported as hostile in Thomson One Banker and 0 otherwise. Tender offer is a dummy that takes the value of 1 if the deal has the form of a tender offer and 0 otherwise. Perc. Deals is defined as the percentage of deals that takes place in the quarter in which the deal occur. Dummy 98-00 is a dummy that takes value 1 if the deal is announced in the period 1998-2000 and 0 otherwise. The symbols *, **, *** denote statistical significance at the 1%, 5%, and 10% levels, respectively. Standard errors are adjusted using White's (1980) correction for heteroskedasticity. N denotes the number of observations.

Table 6 – (Cont.)

	(1)	(2)	(3)	(4)	(5)
Constant	0.1457***	0.2945***	0.3690***	0.2677***	0.3500***
	[0.0113]	[0.0420]	[0.0457]	[0.0542]	[0.0569]
Sigma	1.6155***	0.7695**	0.6095*	1.0899***	0.9318**
	[0.3418]	[0.3403]	[0.3483]	[0.3956]	[0.4118]
Ln (MV)		-0.0114***	-0.0130***	-0.0104***	-0.0127***
		[0.0030]	[0.0031]	[0.0038]	[0.0038]
Run-up		-0.0188**	-0.0191**	-0.0213	-0.0214
		[0.0083]	[0.0082]	[0.0132]	[0.0132]
Relative Size		-0.0418***	-0.0407***	-0.0396***	-0.0386***
		[0.0090]	[0.0090]	[0.0097]	[0.0096]
Illiquity		0.0021***	0.0022***	0.0018***	0.0018***
		[0.0006]	[0.0006]	[0.0007]	[0.0006]
Toehold		-0.0012	0.0005	-0.0034	-0.0018
		[0.0082]	[0.0081]	[0.0081]	[0.0080]
% of Cash		0.0008***	0.0007***	0.0009***	0.0008***
		[0.0002]	[0.0002]	[0.0002]	[0.0002]
Hostile		0.032	0.0321	0.0298	0.0315
		[0.0428]	[0.0428]	[0.0463]	[0.0460]
Tender offer		0.0826***	0.0899***	0.0944***	0.1022***
		[0.0209]	[0.0213]	[0.0231]	[0.0238]
Diversification		0.0004	0.0008	-0.0007	-0.0017
		[0.0112]	[0.0112]	[0.0121]	[0.0121]
Perc. Deals			-1.9753***		-1.9820***
			[0.4663]		[0.4944]
Dummy 98-00			0.0274**		0.0265**
			[0.0110]		[0.0121]
Leverage				-0.0172	-0.0157
				[0.0273]	[0.0269]
Book-to-Mkt Ratio				0.0117	0.0108
				[0.0121]	[0.0120]
CF/Equity				-0.0069	-0.0089
				[0.0199]	[0.0201]
ROA				0.018	0.0294
				[0.0372]	[0.0367]
Adj. R^2	0.0227	0.1205	0.1271	0.1384	0.1447
N	2110	2110	2110	1786	1786