The risk effects of acquiring distressed firms☆

Evy Bruyland[a,*], Wouter De Maeseneire[b]

[a] *Corporate Finance Department, Ghent University, Kuiperskaai 55E, 9000 Ghent, Belgium & Vlerick Leuven Gent Management School*

[b] *Finance Department, Vlerick Leuven Gent Management School, Reep 1, 9000 Ghent, Belgium & Erasmus University Rotterdam*

Abstract

We examine the impact of distressed acquisitions on acquirer volatility and default risk for a worldwide sample. We find that, on average, risk increases for both shareholders and debtholders. Interestingly, high-risk acquirers may experience a significant reduction in risk. Therefore, risk changes cannot exclusively be explained by transferring risk from target to acquirer. In particular, high market-to-book acquirers, frequent acquirers, low-risk acquirers, higher takeover premiums and deals during bull markets are associated with elevated post-acquisition risk. Our results suggest that bidder pre-acquisition performance and risk as well as market conditions affect the type of acquisitions and hence the risk implications.

JEL classification: G32, G33, G34

Keywords: distressed acquisitions; M&A; default risk; volatility; risk factors

1. Introduction

In 2008, the world entered a global financial crisis, resulting in a massive number of bankruptcies, fire sales and forced acquisitions. Organisations that came under severe financial pressure struggled with restructurings and workouts, sometimes ending up in bankruptcy. Acquisitions of these troubled firms might in many cases offer a more preferable exit path

☆We are grateful for helpful comments and suggestions of Eric De Bodt, Bram Decroix, Olivier De Jonghe, Marc Deloof, Marie Dutordoir, Mathieu Luypaert, Sophie Manigart, Ronald Masulis, Tom Vanacker, Bart Van Hoe, Cynthia Van Hulle, Elisabeth Van Laere and seminar participants at the Corporate Finance day 2011, Lille. Financial support from the Agency for Innovation by Science and Technology (IWT), the Policy Research Centre Entrepreneurship and International Entrepreneurship (STOIO) and Vlerick Academic Research Fund is also gratefully acknowledged.

*Corresponding author: Address: Ghent University, Kuiperskaai 55E, 9000 Ghent, Belgium; E-mail address: evy.bruyland@ugent.be; Tel: +32 9210 9887; Fax: +32 9210 9751.

to many of the stakeholders involved (Jensen, 1991; Hambrick and D'Aveni, 1988; Balcaen et al., 2009). This paper studies the risk effects of acquiring such distressed firms.

To date, research on distressed acquisitions is scant and has mainly focused on performance. Previous research tends to agree that distressed acquisitions lead to positive abnormal stock returns for acquirers, yet results for operating performance are mixed (Clark and Ofek, 1994; Hotchkiss and Mooradian, 1998; Carapeto et al., 2009). However, to evaluate the success of an acquisition, the impact on risk should equally be considered as well. Even though the credit crisis has triggered increasing risk awareness, existing research on risk effects in corporate M&A transactions remains overall scarce. Moreover, research on the risk impact of distressed acquisitions is non-existent.

Most of the earlier studies on non-distressed M&A indicate that, on average, acquirer risk increases following acquisitions. However, rather few investigated the determinants that explain why acquirer risk changes. In prior research, risk reduction is among the reasons commonly cited for mergers. Amihud and Lev (1981) show that conglomerate mergers have a risk-reducing diversification effect on the combined entity. However, more recent studies find that acquirer default risk rises due to changes in financial leverage (Ghosh and Jain, 2000; Morellec and Zhdanov, 2008). Furfine and Rosen (2011) add to this discussion that M&A increases default risk driven by aggressive managerial actions impacting risk enough to outweigh the diversification effect.

Consequently, it is important to deepen our understanding of why an acquisition may change acquirer risk. Particularly, distressed M&A represents a unique environment to study this question as acquirers are exposed to a number of additional risks. Distressed acquisitions may create attractive opportunities to expand geographically or activity-wise, to increase market share and to generate new revenues at discounted prices. Simultaneously, these transactions may contain more risk as they often take place in shorter timeframes and involve more complex valuations increasing the risk of overpayment. Moreover, managers may underestimate the efforts required to turn around and integrate the distressed firm. Consequently, the ability to assess and manage these risks will determine the risk exposure and eventually the return to shareholders.

Our study contributes to the existing M&A literature in several important ways. First,

this paper is the first to study the risk impact and drivers of distressed acquisitions. Second, we use various proxies for risk to identify potential risk effects as prior studies in the risk literature have reached little consensus in terms of the most appropriate risk measure. By comparing several alternatives, we try to capture different dimensions of risk and avoid biased results due to methodological issues. Third, we analyse a worldwide data set of distressed acquisitions over a long time period - acquisitions occurring between 1990 and 2009 - while related literature typically uses relatively small samples and is predominantly US oriented.

The results point to a significant risk increase for both shareholders and debtholders. In particular, we show that distressed acquisitions have, on average, no impact on absolute levels of bidder historical and implied volatility. However, relative total, systematic and idiosyncratic volatility and default risk rise significantly. Interestingly, high-risk acquirers may reduce their riskiness following a distressed acquisition. This suggests that risk changes cannot solely be explained by a risk transfer from distressed target to acquirer. Especially for high-risk acquirers the asset diversification effect is large enough to outweigh the risk increase generated by the acquisition itself.

Our evidence suggests that bidder pre-acquisition levels of performance and risk as well as market conditions impact the type of distressed acquisitions and the resulting risk effects of such transactions. Particularly, we find that high market-to-book acquirers, frequent acquirers, low-risk acquirers, deals involving higher acquisition premiums and deals closed during bull markets are associated with higher post-acquisition risk. Moreover, the risk increase for low-risk acquirers is mainly driven by closing larger distressed deals and taking up higher levels of leverage. These results may point to management hubris in distressed acquisitions, yet we find some evidence inconsistent with this hypothesis. Overpayment is lower for transactions involving high market-to-book acquirers even though they have more financial flexibility. In addition, high-risk acquirers appear to be reluctant towards additional leverage by preferring stock-financed deals involving less leveraged targets.

This paper proceeds as follows. In the next section, we review related literature and develop our hypotheses. Section 3 describes our sample and explains the methodology. Section 4 presents the results, while the last section summarizes and concludes.

2. Literature review and hypotheses development

Earlier research on distressed M&A mainly concentrates on performance effects. Clark and Ofek (1994) analyse a sample of 38 US distressed takeovers using several performance measures and find that acquirers have negative post-merger performance. Hotchkiss and Mooradian (1998) analyse a sample of 55 US acquisitions and show that acquirers significantly gain in operating performance and earn positive abnormal returns following the acquisition of a target in Chapter 11. In a recent paper, Carapeto et al. (2009) report that acquirers have positive abnormal announcement returns when taking over a distressed or bankrupt target. Moreover, the combined long-term performance improves compared to the combined pre-bid performance but deteriorates compared to the acquirer pre-acquisition performance. In sum, prior studies show that distressed acquisitions generate positive abnormal stock returns for acquirers while results on operating performance are mixed. Our study extends previous distressed M&A research by investigating the dynamics that may affect acquirer risk. Due to the lack of research in this area, we proceed by reviewing risk in non-distressed M&A literature.

While some studies have examined the risk impact of acquisitions, only few have investigated the determinants of risk changes. In addition, prior research opts for different methodological choices. One of the first and most commonly used methods to study risk around corporate acquisitions is by calculating volatility of stock returns. Correspondingly, Langetieg et al. (1980) collect a sample of 82 US mergers and report that total, systematic and idiosyncratic risk increase due to mergers. Lubatkin and O'Neill (1987) show that mergers are associated with increases in idiosyncratic risk for a sample of 297 US large mergers. Further, they find a significant decline in systematic and total risk for related mergers. More recently, Amihud et al. (2002) and Mishra et al. (2005) use this method to evaluate the impact of bank mergers on risk. Amihud et al. (2002) find overall no significant effect on acquirer risk in the post-merger period for a sample of 214 cross-border bank mergers. Mishra et al. (2005) show that for non-conglomerate bank mergers, total and idiosyncratic risk significantly decline in a sample of 14 US acquiring banks, whereas no significant change was reported in systematic risk.

Bharath and Wu (2005) and Geppert and Kamerschen (2008) investigate effects of corpo-

rate US mergers on acquirer risk by calculating implied volatilities of options. Bharath and Wu (2005) find that there is a strong run-up in total, systematic, and idiosyncratic implied volatility in four years before the merger and one year after the merger announcement. This pre-merger run-up is explained by the hypothesis that M&As are a response to industry shocks. In addition, Geppert and Kamerschen (2008) use a sample of 25 corporate mergers and find that at least for the first 18 months after the merger completion date, mergers do not reduce risk in the same way that a portfolio of the two individual firms would, suggesting that mergers increase expected risk for shareholders.

More recent work estimates risk changes via default risk measures. As the optimal risk measure is still under discussion, there is a growing number of studies that develop new enhanced measures based on Merton's model (Merton, 1974), such as implied probability of default in CDS spreads or bond yields (Bharath and Shumway, 2008), option implied probability of default (Capuano, 2008), Expected Default Frequency (EDF) using Moody's KMV, etc. The only study in this area that uses EDF in corporate M&A research is Furfine and Rosen (2011) who show that acquirer default risk increases following mergers, mainly due to managerial actions outweighing the risk-reducing effect of asset diversification. In particular, mergers increase risk when CEOs have large option-based compensation, recent stock performance is poor, and idiosyncratic equity volatility is high. Moreover, Vallascas and Hagendorff (2011) are the first to study risk implications of bank M&A by using Merton's distance-to-default model. They show that M&A has on average no impact on acquirer risk. However, low-risk banks experience a significant increase in default risk, particularly for cross-border and conglomerate deals and M&A completed under weak regulation, indicating that acquirer pre-acquisition risk is an important determinant of acquisition-related risk effects. In sum, most of the earlier studies find that, on average, acquirer risk increases following acquisitions. Yet, a comprehensive understanding of what is driving these risk changes is still lacking.

Based on the literature review, we identify the following factors that may affect risk in distressed acquisitions: activity and geographic diversification, management quality and expertise, bidder pre-acquisition risk, overpayment and market conditions.

2.1. Activity and geographic diversification

In general, risk diversification is amongst one of the most frequently suggested motives for bank and corporate M&As. Craig and dos Santos (1997) claim that acquirers select bank targets that allow for a substantial decline in acquirer risk.

Amihud and Lev (1981) show that conglomerate mergers have a risk-reducing diversification effect on the combined entity. Due to non-perfectly correlated cash flows, Lewellen (1971) points to a coinsurance effect. Mergers reduce risk, which results in a lower cost of external financing, more debt capacity and a larger tax shield. The motive of risk reduction through diversification appears not to be beneficial to shareholders since they can achieve the risk reduction on their own by diversifying their portfolio (Amihud and Lev, 1981). Further, they argue that managers look for conglomerate mergers to decrease their personal risk. Managers with more personal wealth tied up in a firm, try to diversify by engaging in unrelated M&As (May, 1995).

Apart from a risk-reducing effect, conglomerate mergers may be risk-increasing due to limited knowledge of the industry environment as opposed to related acquisitions. Hence, Clark and Ofek (1994) report that acquirers of distressed targets are often in the same industry. Hotchkiss and Mooradian (1998) find that bidders for bankrupt firms frequently have some prior relationship with the target and are, as a result, well aware of the value and best use of the target's assets. Moreover, related mergers are more synergistic, leading to reduced costs given the economies of scale and scope (Chatterjee and Lubatkin, 1990). Therefore, we expect conglomerate distressed transactions to increase acquirer risk.

Risk diversification could also be achieved via foreign expansion and is often a dominant reason for cross-border M&A. As two geographically different markets are imperfectly correlated, earnings volatility may be reduced (Seth, 1990). Fatemi (1984) studies the effect of corporate international diversification and finds that shareholders' total risk and systematic risk declines. In addition, internationalisation may increase the likelihood of realizing synergies. We expect that foreign expansion via distressed acquisitions reduces risk given the fast access to new markets, new resources and technology. We include in our multivariate analysis a conglomerate and a cross-border dummy.

2.2. Management quality and expertise

Apart from synergetic effects, M&A may be motivated by agency problems and hubris destroying shareholder value. Management hubris could lead to poor acquisition decisions in case management overestimates its own abilities when determining potential synergies (Roll, 1986; Rau and Vermaelen, 1998). Consequently, hubris might cause managers to underestimate the cost and effort of the turnaround. Hubris is mainly related to firms that have experienced good performance. In contrast to Roll's hubris hypothesis, Morck et al. (1990) and Shleifer and Vishny (2003) argue that poor prior performance incentivizes managers to perform risk-increasing transactions. Low-performing firms may have lower quality managers that pursue their personal objectives and therefore likely make bad acquisitions (Masulis et al., 2007). However, we expect that well performing acquirers take more risk given their higher level of financial flexibility. We measure acquirer prior performance via market-adjusted buy-and-hold return and market-to-book ratio.

Further, we explore whether prior acquisition experience is related to changes in risk. In M&A and performance literature, the effect of prior experience on the performance of subsequent acquisitions is mixed (Haleblian et al., 2009). Prior experience is found to be positively correlated with acquisition performance. However, Haleblian and Finkelstein (1999) report that the relation between acquisition experience and acquisition performance is not positively linear. Moreover, frequent acquisitions may result in substantial integration risk because frequent acquirers may not have sufficient time to integrate the targets (Kusewitt, 1985; Bharath and Wu, 2005). In addition, distressed acquisitions may involve more complex valuations than non-distressed M&A. Consequently, applying non-distressed M&A experience to distressed transactions is subject to limitations. Moreover, we could expect that prior successful acquisitions strengthens management confidence which makes them vulnerable for management hubris. Hence, we hypothesize that risk rises if acquirers have more experience in non-distressed M&A deals. We measure acquisition experience by the number of non-distressed M&A transactions prior to the current deal.

2.3. Bidder pre-acquisition risk

A firm's risk profile and attitude towards risk might influence its acquisition decisions. Moreover, the strategic needs of an acquirer could be different depending on the initial

risk profile. In banking literature, Brewer III (1989) reports that only high-risk banks gain from diversification, while Vallascas and Hagendorff (2011) show that only low-risk banks increase default risk. In addition, Bruton et al. (1994) argue that high-risk acquirers may take over firms to exit a difficult environment, to improve resources and their competitive position. Hence, distressed targets create attractive opportunities as the upside restructuring potential is high. Moreover, Furfine and Rosen (2011) suggest that 'mergers are used as a mechanism to achieve a desired level of default risk'. Consequently, we expect that low-risk acquirers will take more risk than high-risk acquirers. We test for bidder pre-acquisition risk by including a dummy variable for low-risk and high-risk acquirers in our regression model.

2.4. Acquisition premium

According to Clark and Ofek (1994), the size of the premium is negatively correlated with restructuring success, mainly due to overpayment. Acquirers may pay higher acquisition premiums if more synergistic gains are expected from the transaction. However, overpayment might occur if these synergies cannot be realized. In addition, management hubris could lead to higher acquisition premiums as management may be overoptimistic. Hence, we expect that higher premiums result in higher acquisition risk. The acquisition premium is measured by the ratio of takeover price minus target's stock price to target's stock price.

2.5. Bull and bear markets

Bouwman et al. (2009) suggest that acquisitions in bull markets are of poorer quality. During bear markets, management is expected to be highly risk averse due to market uncertainty. Consequently, management exercises special caution in planning, implementing and controlling the acquisition process which increases the likelihood that a firm closes a successful M&A transaction (Lubatkin and O'Neill, 1987). Opposite behaviour should occur during bull markets. We hypothesize that distressed acquisitions are more risk-increasing during bull markets, measured by the yearly change in MSCI stock return index.

2.6. Control variables

First, we control for the changes in leverage surrounding the transaction measured by the change in acquirer total liabilities on total assets. We expect that increased leverage results

in more financial risk. According to Ghosh and Jain (2000) firms increase financial leverage following mergers caused by more debt capacity. In addition, transactions financed with debt increase a firm's leverage ratio. Moreover, acquiring a distressed target without a prior debt restructuring, may lead to an upturn in bidder's post-acquisition leverage. Further, we control for the degree of target risk in several ways by including respectively the target interest coverage ratio and target distance-to-default. We test whether our results are not driven by high-tech targets by including a high-tech dummy variable.

Next, we introduce the method of payment via a stock dummy variable. Hansen (1987) argues that an acquirer should pay in stock if an acquirer has less information on the target's value. Given the potential information asymmetry between acquirer and distressed target, we expect that stock-financed deals are less risk increasing than cash-financed acquisitions. Besides, we evaluate the expected return of the deal, measured by the cumulative abnormal return around the event window. If shareholders expect the deal to be risk increasing without positive returns, the effect on acquirer stock price should be negative. Following Furfine and Rosen (2011), we predict a negative correlation between abnormal cumulative returns and changes in risk.

Moreover, we test for the target status via a public dummy variable. We expect that the acquisition of a public distressed target is less likely to increase risk given the higher disclosure requirements for public firms which reduce information asymmetry. We also control for the relative size of the target to the acquirer. Larger targets are likely to be more risk diversifying than small targets (Vallascas and Hagendorff, 2011). Opposed to diversification benefits, acquisitions of large targets will make integration more complex than relatively small targets. In addition, larger targets may be more difficult to restructure than smaller targets (Clark and Ofek, 1994). We expect that acquisitions of large targets result in a risk increase. Furthermore, we control for acquirer size itself measured by the log of market value of assets. We expect that larger acquirers are less affected by distressed acquisitions as large acquirers have less business risk.

To control for market liquidity, we add the corporate spread measured by the spread on BAA versus AAA corporate bonds. We expect that acquirers that close deals during periods when credit is easily available take more risk than when credit is scarce. Additionally, we

include regional dummies to control for acquirer and target country bias. We test as well for differences in institutional factors between countries, which might have an impact on acquirer risk-taking. Therefore, we add the degree of shareholder and creditor protection in a country respectively measured by the anti-director rights index and the creditor rights index (La Porta et al., 1998). Finally, to control for acquirer industry-specific risk factors, we include industry dummies.

Table 1 provides an overview of the various hypotheses and describes the measurement of these explanatory variables.

3. Sample selection and methodology

3.1. Sample selection

This study covers worldwide distressed M&A deals that occurred between 1990 and 2009. We download M&A deals from Thomson ONE Banker and Zephyr.[1] Our initial data set meets the following criteria: (1) the acquiring firm is a publicly quoted company, (2) the acquirer has a pre-acquisition stake of less than 50% and a final stake of more than 50% in the target company, (3) the sample excludes targets and acquirers from the financial industry[2] and (4) deals with all sizes of transaction value are included.

Next, we determine whether a target is healthy or distressed. A vast number of 'corporate distress' definitions exists in business failure and bankruptcy prediction literature. In earlier studies (Beaver, 1967; Altman, 1968; Ohlson, 1980), corporate distress is defined in terms of default, insolvency or bankruptcy. In reality, a failure process evolves from early stages of distress towards insolvency: a company can be distressed without going into default. A company entering distress may be characterized by negative cumulative earnings, a debt overhang and/or a cash shortage, resulting in insufficient cash flow to cover current financial obligations. Therefore, more recent studies use distress measures such as recurring profit after taxes (Balcaen et al., 2009), interest coverage ratio (Asquith et al., 1994; Rajan and Zingales, 1995; Pindado and Rodrigues, 2005; Carapeto et al., 2009), negative cumulative

[1]The Zephyr and Amadeus databases are both commercialized by Bureau van Dijk.

[2]We excluded all finance, insurance, real estate, holding and other investment companies (US SIC code 6).

earnings (Gilbert et al., 1990), leverage ratios (Andrade and Kaplan, 2002), operating margin (Theodossiou et al., 1996), etc. The classification measure we use, is the Interest Coverage Ratio (ICR) calculated as the Earnings Before Interest, Tax, Depreciation and Amortization (EBITDA) divided by the Net Interest Expense. A target is classified as distressed if the firm has an ICR less than one in the year prior to the transaction. Accounting information is collected from Worldscope and Amadeus. This yields a sample of 1,082 distressed M&A deals. The final distressed sample consists of 53% (573) Thomson One Banker deals and 47% (509) Zephyr deals. Table 2 summarizes the construction of our sample.

Since most of the transactions covered by Thomson ONE Banker include public M&A transactions, we complement this data set with M&A deals from Zephyr (Brav, 2009). Consequently, we add a substantial number of European acquisitions with private European targets to our sample. The final distressed sample covers 45% private targets compared to 55% public targets. However, the Zephyr database only includes pan-European transactions dating back to 1997 and US deals from 2001 onwards. Descriptive statistics of the distressed sample are presented in Table 3-5.

Table 3 shows an overrepresentation of US firms, consistent with the geographical distribution of overall M&A activity. Our sample includes 47.60% transactions with a US acquirer, while 44.09% involve a US target. Table 4 presents the industry breakdown for both acquirer and target. Around 40% of the deals are in the manufacturing and services industries. Table 5 summarizes various profitability, liquidity and solvency ratios for acquirer and target in the distressed sample. Not surprisingly, the mean and median of the target profitability ratios are negative, indicating that most of the targets are in economic distress. Some distressed targets are highly leveraged, while others have low leverage. Some acquirers are distressed themselves which explains why the profitability ratios are on average negative. Considering median values, acquirers of distressed targets are profitable, solvent and liquid.

3.2. Methodology

To ensure that our results are not driven by the selected risk measure, we use several volatility measures and Merton's default risk measure.

3.2.1. Historical volatility: measuring risk via volatility of stock returns

We follow the standard market model methodology (Chatterjee and Lubatkin, 1990; Lubatkin and O'Neill, 1987; Langetieg et al., 1980) to estimate risk changes of the bidding firm. Via this model we can split up total risk into systematic and idiosyncratic components:

$$R_{it} = \alpha_i + \beta_i R_{mt} + \epsilon_{it}, \tag{1}$$

where

t = 1,..., T

i = 1,..., N

R_{it} = daily rate of return on stock return index of the security

R_{mt} = average daily rate of return of MSCI All Countries return index

α_i, βi = firm-specific coefficients

ϵ_{it} = a stochastic error term

Stock return data are collected from Thomson Datastream. The MSCI All Countries stock return index and country stock market indexes are downloaded from Bloomberg and Thomson Datastream. We estimate total risk by calculating the standard deviation of the firm's daily rate of return (based on daily closing stock prices adjusted for stock splits, stock issues, and dividends) over a 250 days estimation period. The change in bidder's total risk (total risk absolute difference score) is the difference between the standard deviation after the deal announcement (for +2 days to +252 days following the announcement date) and the standard deviation before the deal announcement (for -30 days to -280 days relative to the announcement date). Systematic and idiosyncratic risk are measured by regressing the daily rate of return of the acquirer on the daily rate of return of the MSCI All Countries market return over a 250 days estimation window.[3] Systematic risk is estimated by the beta-coefficient of the regression model. Idiosyncratic risk is computed by the standard deviation of the stochastic error term over the 250 days estimation period. The systematic risk absolute difference score and idiosyncratic risk absolute difference score are calculated

[3]To check the robustness of our results, we use the Fama-French three-factor regression approach for the US subsample. The daily Fama-French factors are downloaded from http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html.

by subtracting the pre-acquisition estimate from its respective post-acquisition estimate. A positive difference score means that risk has increased. In addition, we examine the percentage change in risk by calculating relative difference scores defined as the absolute difference score divided by the pre-acquisition estimate.

An alternative way to look at risk, is by considering only the downside risk. According to Markowitz (1959) the semi-variance is a more acceptable measure of risk. We compute three downside risk measures: the semi-standard deviation below the mean, the semi-standard deviation below zero and the downside beta. Downside beta is the sensitivity of the return on a firm's stock with respect to the MSCI All Countries market return if both returns simultaneously go down (Estrada, 2007). We use the same estimation windows as described above. Subsequently, we compute absolute and relative difference scores.

3.2.2. Implied volatility: measuring risk via implied volatility in options

While historical volatility is computed from realized returns, implied option volatility is a forward-looking risk measure reflecting the expected future volatility of returns over the remaining life of the option. We collect standardized implied option volatilities of 30-day call options from the IVY Database of Optionmetrics. As Optionmetrics contains only implied volatilities for the US listed index and equity options market beginning from 1996, our sample will be limited both in time and in geographical scope. We proceed in a similar way as measuring risk via volatility of stock returns (as noted in Section 3.2.1). The total implied volatility (σ_i) can be broken down in systematic and idiosyncratic risk via the market model. The capital asset pricing model implies that:

$$\sigma_i^2 = \beta_i^2 \sigma_m^2 + \sigma_\epsilon^2, \tag{2}$$

The absolute total risk difference score is equal to the mean implied option volatility of the acquirer after the announcement date minus the mean implied option volatility of the acquirer before the announcement date (with respective estimation windows: +2 +252 and -280 -30). Systematic risk is estimated by multiplying beta with the implied market volatility (S&P 500 index options) over a 250 days estimation window. The idiosyncratic risk component is calculated as the square root of the squared total implied volatility minus the squared

systematic component. Both absolute and relative difference scores are computed.

3.2.3. Default risk: measuring risk via Merton's distance-to-default model

In Merton's model (1974) default occurs when the market value of assets is lower than the book value of total liabilities at maturity. The distance-to-default (DD) measures the number of standard deviations that the market value of assets is away from default. The advantage of Merton's distance-to-default model is that accounting and market information is combined. DD on day t is expressed as follows (Hillegeist et al., 2004; Vasselou and Xing, 2004; Akhigbe et al., 2007):

$$DD_t = \frac{ln(V_{A,t}/L_t) + (r_f - \sigma_{A,t}^2/2)T}{\sigma_{A,t}T^{0.5}}, \tag{3}$$

where

$V_{A,t}$ = market value of assets

L_t = book value of total liabilities

r_f = risk-free rate

$\sigma_{A,t}$ = annualized standard deviation of asset returns

T = time to maturity

The following input parameters are aggregated. The market value of equity and book value of total liabilities are collected from Thomson Datastream. Further, we download the yield on the two-year German government bond and the two-year US treasury notes as a proxy for the risk-free interest rate. Time to maturity is set to one year. The values of $V_{A,t}$ and $\sigma_{A,t}$ can be inferred through an iterative process based on the Black-Scholes-Merton pricing model. We employ as starting values for the asset volatility the historical volatility of equity computed daily on the basis of a 250-day rolling window. The following non-linear equations need to be solved:

$$V_{E,t} = V_{A,t}N(d_{1,t}) - X_t e^{-r_{ft}T}N(d_{2,t}), \tag{4}$$

$$\sigma_{E,t} = \frac{V_{A,t}N(d_{1,t})\sigma_{A,t}}{V_{E,t}}, \tag{5}$$

The absolute change in acquirer distance-to-default equals mean distance-to-default after the announcement date minus mean distance-to-default before the announcement date for the respective estimation windows +2 days +252 days and -280 days -30 days.

4. Empirical results

In this section, we first examine whether distressed M&A, on average, significantly impacts acquirer risk. Subsequently, we shed light on deal-specific and firm-specific factors that influence acquirer risk via a multivariate regression analysis.

4.1. The impact of distressed acquisitions on acquirer risk

Table 6 presents the results for the various risk measures broken down in systematic and idiosyncratic risk if applicable. We analyse whether the total risk difference score, systematic difference score and idiosyncratic risk difference score differ from zero. All results are winsorized at 1%. The absolute difference scores for the volatility measures suggest that, on average, total and idiosyncratic risk do change in the post-acquisition period. However systematic risk is significantly decreasing for the downside risk measure (downside beta) and the measure based on the Fama-French model. Our results further show that, on average, acquirer default risk increases after an acquisition. The percentage of positive changes indicates that the number of increases and decreases of volatility are more or less equal. Summarized, distressed M&A, on average, does not significantly impact acquirer volatility, but significantly increases acquirer default risk.

Further, we examine risk changes by looking at the percentage change in risk. Relative risk measures have the advantage of considering acquirer pre-acquisition risk. A given absolute change in risk can be more important for a low-risk acquirer (Furfine and Rosen, 2011). The relative difference score is measured by the absolute difference score divided by pre-acquisition risk. Table 6 reports different results with respect to absolute and relative risk measures. We find strong support for an increase in acquirer relative total, idiosyncratic and systematic volatility.[4] Acquirer total volatility rises on average with 5.52% to 9.53% following

[4]Except for beta difference score of the Fama-French regression model. The beta-coefficient of the Fama-French model cannot be compared to the beta-coefficient of the market model (CAPM) since it considers

an acquisition event, depending on the chosen methodology.

The strong but confounding results for the absolute and relative risk measures underline the importance for further investigation of the risk drivers in distressed M&A transactions. Table 7 ranks the acquirers into quartiles based on their degree of pre-acquisition risk.[5] We notice that volatility and default risk decline from low-risk to high-risk acquirers. Hence, we find strong evidence of risk increases for low-risk acquirers and risk reduction for high-risk acquirers independent of the risk measure.[6] Consistent with prior research (Vallascas and Hagendorff, 2011; Furfine and Rosen, 2011), these results confirm our expectations that acquirer pre-acquisition risk is an important driver. To test the robustness of our risk measures, we re-run the regression models with different market (country) indexes. We also collect and analyse the data both in dollar and local currency if applicable. In addition, we use total financial debt as an input parameter instead of total liabilities for the distance-to-default calculation. We confirm our main findings. However, further tests in a multivariate context are necessary to evaluate the impact of various deal-specific and firm-specific factors on these risk changes.

4.2. Determinants of changes in acquirer risk

We examine the impact of various factors on distressed acquisition-related risk changes. The dependent variables in the regression models are historical and implied volatility, and default risk. The choice of the explanatory and control variables is based on the literature review and hypothesis development summarized in Table 1. We check the variance inflation factors and the correlations among the various explanatory and control variables. Apart from the institutional factors and regional dummies being highly correlated, no multicollinearity is found. Subsequently, we drop the regional dummies from our regressions. However, we find no regional effects if we include regional dummies instead of institutional factors. Further, our regressions are run using robust standard errors.

Table 8 reports the summary statistics of the independent variables. Due to missing data,

two additional factors SMB (small minus big market cap) and HML (high minus low book-to-market ratio). None of the three beta-coefficients is statistically significant for the US subsample.

[5]We use the idiosyncratic component as a classification measure for low-high risk acquirers.

[6]We find consistent results for the volatility measures based on the Fama-French model and downside risk with respect to zero, as well as for idiosyncratic risk volatility measures (not reported).

the number of observations is smaller than the initial sample of 1,082 distressed deals. However, note that the summary statistics of both the historical volatility sample and distance-to-default sample are in line with summary statistics of the overall distressed sample. The implied option volatility sample is slightly different but this can be explained by the geographical scope being restricted to US due to data availability issues and the fact that firms issuing options are mostly larger firms.

In the full distressed sample, 51.58% involve deals within related industries, measured via three-digit SIC code and 31.23% are cross-border transactions. In addition, the acquirer market-adjusted buy-and-hold return is on average 16.26% over 250 days, while the average acquirer market-to-book ratio is 2.54. Most of the acquirers (67.51%) have prior acquisition experience with an average of 3.5 non-distressed deals prior to the current transaction. The yearly change in the MSCI world index is 5.4%. The premium paid for the target is on average 77.18%. Moreover, the leverage ratio increases post-acquisition with about 0.0123. Not surprisingly, the mean interest coverage ratio is negative. Further, 23.36% of the distressed targets belong to a high-tech industry. Furthermore, 31.80% of the deals are fully stock financed, while 44.78% of the deals are fully cash financed. The mean cumulative abnormal return over 5 days is 0.31% with a high standard deviation of 10.51%. In the sample, 55.17% of the deals involve a public target. The transaction value averages around 30% of the acquirer market value. Finally, the corporate spread is on average 1.09%.

The regression results are presented in Table 9. We find some support for diversification effects in distressed acquisitions amongst the historical and implied volatility measures. Our results point to a decrease in volatility for conglomerate acquisitions, which is inconsistent with our hypothesis. However, these transactions do not reduce acquirer default risk. A possible explanation could be that the risk-reducing diversification effect does not outweigh the increase in leverage given that the distance-to-default measure explicitly takes leverage into account. There are no diversification effects from cross-border distressed acquisitions. Moreover, we find no significant interaction effect between conglomerate and cross-border transactions.

Further, acquirers with recent poor stock performance (low buy-and-hold return) significantly increase default risk. In contrast, the results for the downside volatility measure

indicate that high-performing acquirers increase downside risk more than low-performing acquirers. In addition, we test management quality by acquirer market-to-book ratio. We report that a high market-to-book ratio leads to an increase in volatility and default risk. This confirms our hypothesis that acquirers with more potential resources are able to take on more risk. In addition, high market-to-book companies are associated with growth companies suggesting that these companies have more to gain in distressed acquisitions. However, these companies may also be more exposed to management hubris so that management overestimates its capabilities to successfully restructure the distressed target. Similarly, acquirers with more non-distressed acquisition expertise generate significant increases in volatility and default risk. Subsequently, we check whether an interaction effect exists between acquisition experience and market-to-book. However, no interaction effect is found.

As the results of the market-to-book ratio and acquisition experience tend to refer to managerial agency problems, we test Jensen's free cash flow hypothesis (1986). Following this hypothesis, managers with large free cash flows should take more risk in distressed acquisitions as the upward potential is higher which may encompass more private benefits such as higher remuneration and personal prestige. Hence, we control for acquirer EBITDA on total assets and cash on total assets but we find no significant results. We also evaluate the impact of accounting performance on risk by including acquirer return on assets, but find no significant results. In addition, we test for acquirer distressed acquisition experience, sector-related experience and non-linear relationships between risk and experience but find no significant results.

Further, we confirm our univariate tests that high-risk acquirers may reduce volatility and default risk, while low-risk acquirers generate a significant increase in downside and default risk. Moreover, we report that transactions in bull markets are more risk-increasing than deals closed in bear markets. This confirms our hypothesis that bidders take more risk during (over-)optimistic markets.

Furthermore, we control for leverage changes and disclose that higher levels of leverage significantly increase volatility and default risk. The effect is not surprising for the distance-to-default measure as we use leverage to calculate this measure. However, also historical and implied volatility increase if leverage increases. We find consistent results if we control for

total financial debt on total assets instead of total leverage on total assets.

To assess the effect of the target's risk profile on acquirer volatility and default risk, we test for the target's degree of risk via its interest coverage ratio and distance-to-default (not reported), but find no significant results. In addition, no significant results are reported for the target high-tech dummy, the method of payment and the cumulative abnormal return.[7] We find some support that transactions involving large acquirers and public targets are less risk-increasing, whereas large deals increase risk. We also consider the impact of market liquidity and reveal that deals closed in markets with credit scarcity are more risk-increasing. Finally, we control for industry effects and institutional factors but find no significant results.

4.2.1. Management quality

The regression results in Table 9 confirm a number of hypotheses. However, the conflicting evidence of acquirer pre-acquisition performance measured by buy-and-hold return and market-to-book ratio is somewhat surprising. Acquirers with low buy-and-hold returns are associated with risk-increasing transactions, consistent with Morck et al. (1990). High market-to-book acquirers tend to take more risk, consistent with the hubris hypothesis of Roll (1986). Therefore, we further investigate the interaction effect between pre-acquisition risk and pre-acquisition performance. We find that high-risk acquirers are associated with significantly higher buy-and-hold returns than low-risk acquirers. Not surprisingly, these companies involve more risk and therefore shareholders should be compensated by receiving a higher return. Consequently, we test for an interaction effect between high-risk acquirers and buy-and-hold return.

Most of the regression models in Table 10 report a significant interaction effect between both. Moreover, the coefficients of the buy-and-hold return variable are no longer significant, except for downside volatility indicating a positive relation consistent with previous findings. This result confirms that our initial findings were driven by high buy-and-hold returns of high-risk acquirers. We conclude that high market-to-book acquirers increase risk probably driven by a higher availability of resources compared to low market-to-book firms. However,

[7]We also control for the cumulative abnormal return over the period [-30 +2] but find no significant results.

given that these companies have more funds, they might be vulnerable to management hubris. In addition, acquirers with high buy-and-hold returns increase downside risk indicating that following distressed acquisitions their sensitivity to downside market movements rises. In contrast, high-risk acquirers with high buy-and-hold returns decrease volatility and default risk, suggesting that the market perceives these transactions as less risky.

4.2.2. Overpayment

We test whether the premium paid for the distressed target has an impact on bidders' volatility and default risk. As the premium is calculated based on the target stock price, this subsample only includes public distressed targets. Table 11 reveals some support for increased implied volatility and default risk due to higher acquisition premiums. Higher premiums could lead to overpayment. Definitely in distressed acquisitions, overpaying may be higher as deals are closed in shorter timeframes and involve a more complex analysis. Moreover, management confidence may lead to the payment of higher premiums. Given that high market-to-book acquirers have more financial flexibility, we could expect that overpayment is higher in such transactions. Hence, we test the interaction effect between acquirer market-to-book and premium paid. Table 12 shows that overpayment is lower for high market-to-book acquirers, which is inconsistent with the hubris hypothesis. In addition, we find similar results if we use the target's cumulative abnormal return around the announcement event as a proxy for acquisition premium.

4.2.3. Bidder pre-acquisition risk

In general, a distressed target has more default risk than the typical acquirer. So, we would expect that, given risk transfer, risk would increase both for acquirers with low and high pre-acquisition risk. Nevertheless, risk still decreases for high-risk acquirers even if we remove all distressed acquirers (acquirers with an ICR less than one). In addition, we remove all acquirers with a higher degree of default risk than the target's degree of default risk and show that high-risk acquirers still reduce their default risk. This result suggests that the changes in risk cannot exclusively be explained by a risk transfer from target to acquirer.

To provide further evidence on the risk transfer, we calculate default risk of a hypothetical portfolio of acquirer and target 250 days before acquisition, weighted according to market

value of assets of acquirer and target. This limits the distressed sample to 232 observations as we only include public targets for which we can measure Merton's distance-to-default. The average distance-to-default prior to acquisition of this subsample is 4.3694 in line with the full sample average. If we compare default risk of this portfolio to acquirer default risk prior to acquisition announcement, then the average distance-to-default of the portfolio is significantly above the acquirer pre-acquisition value (a difference of 0.7676). This indicates that there is asset diversification. In addition, the post-acquisition distance-to-default is significantly below the portfolio's distance-to-default (a difference of -1.4093), again confirming that risk is not solely transferred but may be created by the M&A process itself e.g. uncertainties about expected synergies, integration risk, extra debt capacity, etc.

To control whether the additional evidence is comparable for low-risk and high-risk acquirers, we perform the analysis for both subsamples. For low-risk acquirers we find that although asset diversification is substantial (14%), it is not large enough to outweigh the risk increase generated by the acquisition itself (37%) in contrast to high-risk acquirers. For high-risk acquirers, asset diversification causes a reduction in default risk of 54%, whereas the acquisition itself creates a risk increase of 16%.

Following the above findings, the impact of distressed acquisitions appears to be different for low-risk and high-risk acquirers. Therefore, we examine whether these different risk-effects are linked to diverse acquisition strategies involving different deal and firm characteristics.

First, to get a better understanding of the risk profile of high-risk and low-risk acquirers, we compare several accounting ratios of the acquirer one year prior to the deal.[8] Table 13 reports that high-risk acquirers are on average smaller than low-risk acquirers, both measured by book size and market value. High-risk acquirers score lower on profitability and are more liquid and leveraged than low-risk acquirers. However, their mean interest coverage ratio is negative. In sum, both subsamples have a significantly different risk profile.

Subsequently, we test whether they acquire targets with different risk profiles as their initial risk profile could play an important role in the selection of the target. Table 13 reports

[8]The subsamples of low-risk and high-risk acquirers are based on the degree of default risk. However, our findings hold for the subsamples of low-risk and high-risk acquirers based on the degree of historical volatility (including downside risk) apart from high risk acquirers being less leveraged than low risk acquirers.

target's profitability, liquidity and solvency for high-risk and low-risk acquirers. High-risk acquirers take over distressed targets that are on average smaller and less leveraged.[9]

In addition, we examine several deal-characteristics for both types of acquirers. Table 14 reports summary statistics of these characteristics. High-risk acquirers execute less cross-border deals (27.65%) than low-risk acquirers (40.12%). High-risk acquirers have, on average, higher buy-and-hold returns, lower market-to-book ratios and less acquisition experience. Most of the deals by low-risk acquirers take place in bull markets (84.20%) whereas deals by high-risk acquirers are more or less equally spread between bear and bull markets. High-risk acquirers prefer to pay in stock (42.67%) instead of cash (30.67%) in contrast to low-risk acquirers who prefer to pay in cash (71.65%) rather than stock (15.75%).[10]

The above results indicate that the different risk effects of low-risk and high-risk acquirers are motivated by different acquisition policies. Therefore, we run separate regressions on both subsamples (not reported). We find that the risk effects of high-risk acquirers are determined by the same factors as the regression results on the overall sample. This suggests that high-risk acquirers have the potential to decrease risk by taking over distressed targets according to specific acquisition criteria. For example, high-risk acquirers are more reluctant to take additional leverage on their balance sheet by preferring stock-financed deals involving less leveraged targets. By contrast, risk effects of low-risk acquirers are mainly driven by relative size of the deal and leverage changes. We test these results further via interaction effects and confirm our main findings. Table 15 shows a strong interaction effect between low-risk acquirers and relative size of the deal. This points to a considerable risk increase for low-risk acquirers involved in large and complex deals. Moreover, we find a strong interaction effect between low-risk acquirers and leverage changes indicating that the default risk of low-risk acquirers mainly increases due to increases in leverage surrounding the transaction. We further explore the source of this leverage effect by comparing post-acquisition leverage to combined pre-acquisition leverage and find a significant increase. This implies that increased

[9]The same findings hold for the subsamples of low-risk and high-risk acquirers based on the degree of historical volatility (including downside risk).

[10]The same findings hold for the subsamples of low-risk and high-risk acquirers based on the degree of historical volatility (including downside risk). However, the difference of buy-and-hold returns between both subsamples is significant at 1%.

leverage surrounding the acquisition is not solely caused by target's leverage.

4.3. Robustness checks

To verify the robustness of our results, we perform several additional tests. First, we restrict our sample to deals with a minimum relative size of 5% and add time dummies to our multivariate regression. We find that our main results are invariant.

Second, we drop all deals that fall within 250 trading days between separate acquisition announcements to avoid confounding events, which reduces the sample size by half. We did not impose this restriction initially as it would bias our results towards less frequent acquirers. We find that the acquirer market-to-book ratio is no longer significant for the volatility measures, however default risk still significantly increases for acquirers with high market-to-book ratios. In addition, we do not find overpayment in such acquisitions. However, these results may be biased by the small sample size.[11]

Third, we impose that distressed targets have an interest coverage ratio smaller than one in the first, second and third year prior to the acquisition. In addition, we exclude transactions involving bankrupt targets (2%). We confirm our main results. Moreover, we calculate the Altman Z-score of the targets in our distressed sample. We find that 74.68% of the targets have a Z-score smaller than 1.81 indicating that these companies are in the 'distress zone'.

Fourth, to evaluate whether our results are not driven by distressed acquirers, we remove all acquirers with an interest coverage ratio less than one, one year prior to the deal, which reduces the sample size with about 100 observations. The results confirm our main findings. However, the decrease in acquirer post-acquisition volatility is no longer significant for conglomerate distressed acquisitions. This suggests that especially distressed acquirers benefit from the risk-reducing effect of conglomerate transactions. We investigate the subsample of distressed acquirers and confirm that volatility decreases post-acquisition for conglomerate transactions. However, future research may examine the specific drivers of M&A by distressed acquirers.

Finally, we evaluate the impact of distressed acquisitions on bondholder risk by analysing

[11] We only have about 90 observations for the regressions including the variable premium.

changes in bond spreads surrounding the acquisition announcement, defined as the difference between bond yield and government bond yield. We are able to compose a sample of 88 bond spreads and find that bond spreads significantly increase post-acquisition both absolutely (12 bps) and relatively (10.9%), which is consistent with our previous findings.[12]

5. Summary and conclusions

This paper studies the risk effects of distressed M&A transactions. We collect a worldwide sample of 1,082 distressed acquisitions occurring between 1990 and 2009 and compare various risk measures. We show that, on average, absolute levels of historical and implied volatility do not change following a distressed acquisition. However, we report a significant increase in relative total, systematic and idiosyncratic volatility. Moreover, distressed acquisitions generate a significant increase in bidder default risk. This indicates that shareholders and debtholders involved in a distressed acquisition are exposed to additional risk. Interestingly, this risk increase cannot solely be explained by a risk transfer from distressed target to acquirer. In particular, high-risk acquirers may reduce volatility and default risk by taking over a distressed target.

To explain these risk effects further, we examine the influence of diversification, acquirer management quality and expertise, market conditions, bidder overpayment and acquirer pre-acquisition risk. We show that high market-to-book acquirers, frequent acquirers, low-risk acquirers, higher acquisition premiums and deals closed during bull markets are associated with higher levels of post-acquisition risk. The risk increase for high market-to-book acquirers is probably driven by a higher availability of resources. Yet, these firms might be vulnerable to management hubris. However, overpayment is lower for transactions involving high market-to-book acquirers. In addition, downside risk increases for acquirers with good recent stock performance indicating that their sensitivity to downside market movements rises. Not surprisingly, the turnaround and integration process of a distressed target brings more uncertainty in bear markets. Correspondingly, bidders take more risk during (over-)optimistic markets. Further, we find that the risk increase for low-risk acquirers is mainly

[12]Bond data is downloaded from Thomson Datastream.

driven by pursuing larger deals and taking up more leverage.

Although some of these results may point to management hubris, it is surprising that default risk for high-risk acquirers even decreases when acquiring a target with a higher degree of default risk. Asset diversification reduces default risk by 54%, whereas the acquisition itself creates a risk increase of only 16%. This could be explained by high-risk acquirers acquiring distressed targets according to specific acquisition criteria. For example, they are more reluctant towards additional leverage by preferring stock-financed deals involving less leveraged targets. However, such acquisition decisions are inconsistent with the theory of management hubris. Hence, risk effects in distressed acquisitions cannot exclusively be explained by a risk transfer but may be influenced by bidder pre-acquisition levels of performance and risk as well as market conditions.

From a social point of view, partial risk increases following distressed acquisitions may be justified if the target's alternative is bankruptcy, which often destroys value and lowers economic welfare. Therefore, governments should encourage these transactions and consider them rightfully as alternative to bankruptcy or Chapter 11 type of exits.

While our study documents a number of deal- and firm-specific characteristics, managerial biases could further affect risk in distressed acquisitions. Given the separation between ownership and control, future research may well take into account the relation between corporate risk-taking and management entrenchment (Bebchuk et al., 2009; Gompers et al., 2003). Managers that have more freedom in making decisions could influence acquisition strategies in significant ways. Moreover, managerial risk-preferences may be associated with incentive systems. Furfine and Rosen (2011) find that managers with large option-based compensation are incentivized to risk-increasing actions in corporate acquisitions. Future investigation of the topic might also extend our analysis by having a detailed look at institutional differences such as the impact of differences in bankruptcy procedures. Clearly, in this unprecedented and challenging environment a better understanding of distressed acquisitions is needed.

References

Akhigbe, A., Madura, J., Martin, A., 2007. Effect of FED policy actions on the default likelihood of commercial banks. Journal of Financial Research 30, 147–162.

Altman, E., 1968. Financial ratios, discriminant analysis and the prediction of corporate bankruptcy. Journal of Finance 23, 589–609.

Amihud, Y., DeLong, G., Saunders, A., 2002. The effects of cross-border bank mergers on bank risk and value. Journal of International Money and Finance 21, 857–877.

Amihud, Y., Lev, B., 1981. Risk reduction as managerial motive for conglomerate mergers. Bell Journal of Economics 12, 823–837.

Andrade, G., Kaplan, S., 2002. How costly is financial (not economic) distress? Evidence from highly leveraged transactions that became distressed. Journal of Finance 53, 1443–1493.

Asquith, P., Gertner, R., Scharfstein, D., 1994. Anatomy of financial distress: an examination of junk bond issues. Quarterly Journal of Economics 109, 625–658.

Balcaen, S., Manigart, S., Ooghe, H., 2009. Explaining business failure: the analysis of exit paths of distress-related firm exits. Journal of Evolutionary Economics, forthcoming .

Beaver, W., 1967. Financial ratios predictors of failure, empirical research in accounting: selected studies 1966. Journal of Accounting Research 4, 71–111.

Bebchuk, L., Cohen, A., Ferrell, A., 2009. What matters in corporate governance? Review of Financial Studies 22, 783–827.

Bharath, S., Shumway, T., 2008. Forecasting default with the Merton distance to default model. Review of Financial Studies 21, 1339–1369.

Bharath, S., Wu, G., 2005. Long-run volatility and risk around mergers and acquisitions. Unpublished working paper. University of Michigan, Michigan.

Bouwman, C., Fuller, K., Nain, A., 2009. Market valuation and acquisition quality: empirical evidence. Review of Financial Studies 22, 633–679.

Brav, O., 2009. Access to capital, capital structure, and the funding of the firm. Journal of Finance 64, 263–308.

Brewer III, E., 1989. Relationship between bank holding company risk and nonbank activity. Journal of Economics and Business 41, 337–353.

Bruton, G., Oviatt, B., White, M., 1994. Performance of acquisitions of distressed firms. Academy of Management Journal 37, 972–989.

Capuano, C., 2008. The Option-iPoD: the probability of default implied by option prices based on entropy. International Monetary Fund (IMF) working paper 08/194.

Carapeto, M., Moeller, S., Faelten, A., 2009. The good, the bad, and the ugly: a survival guide to M&A in distressed times. Unpublished working paper. Cass Business School, London.

Chatterjee, S., Lubatkin, M., 1990. Corporate mergers, stockholder diversification, and changes in systematic risk. Strategic Management Journal 11, 255–268.

Clark, K., Ofek, E., 1994. Mergers as a means of restructuring distressed firms: an empirical investigation. Journal of Financial and Quantitative Analysis 29, 541–565.

Craig, B., dos Santos, J., 1997. The risk effects of bank acquisitions. Economic Review Q2, 25–35.

Estrada, J., 2007. Mean-semivariance behaviour: downside risk and capital asset pricing. International Review of Economics and Finance 16, 169–185.

Fatemi, A., 1984. Shareholder benefits from corporate international diversification. Journal of Finance 39, 1325–1344.

Furfine, C., Rosen, R., 2011. Mergers increase default risk. Journal of Corporate Finance 17, 832–849.

Geppert, G., Kamerschen, D., 2008. The effect of mergers on implied volatility of equity options. International Review of Financial Analysis 17, 330–344.

Ghosh, A., Jain, P., 2000. Financial leverage changes associated with corporate mergers. Journal of Corporate Finance 6, 377–402.

Gilbert, L., Krishnagopal, M., Schwartz, K., 1990. Predicting bankruptcy for firms in financial distress. Journal of Business Finance & Accounting 17, 161–171.

Gompers, P., Ishii, J., Metrick, A., 2003. Corporate governance and equity prices. Quarterly Journal of Economics 118, 107–155.

Haleblian, J., Devers, C., McNamara, G., Carpenter, M., Davison, R., 2009. Taking stock of what we know about mergers and acquisitions: a review and research agenda. Journal of Management 35, 469–502.

Haleblian, J., Finkelstein, S., 1999. The influence of organizational acquisition experience on acquisition performance: a behavioural learning perspective. Administrative Science Quarterly 44, 29–56.

Hambrick, D., D'Aveni, R., 1988. Large corporate failures as downward spirals. Administrative Science Quarterly 33, 1–23.

Hansen, R., 1987. A theory for the choice of exchange medium in mergers and acquisitions. Journal of Business 60, 75–95.

Hillegeist, S., Keating, E., Cram, D., Lundstedt, K., 2004. Assessing the probability of bankruptcy. Review of Accounting Studies 9, 5–34.

Hotchkiss, E., Mooradian, R., 1998. Acquisitions as a means of restructuring firms in Chapter 11. Journal of Financial Intermediation 7, 240–262.

Jensen, M., 1991. Corporate control and the policies of finance. Journal of Applied Corporate Finance 4, 13–33.

Kusewitt, J., 1985. An exploratory study of strategic acquisition factors relating to performance. Strategic Management Journal 6, 151–169.

La Porta, R., Lopez-de Silanes, F., Shleifer, A., Vishny, R., 1998. Law and finance. Journal of Political Economy 106, 1113–1155.

Langetieg, T., Haugen, R., Wichern, D., 1980. Merger and stockholder risk. Journal of Financial and Quantitative Analysis 15, 689–717.

Lewellen, W., 1971. A pure financial rationale for the conglomerate merger. Journal of Finance 26, 521–537.

Lubatkin, M., O'Neill, H., 1987. Merger strategies and capital market risk. Academy of Management Journal 30, 665–684.

Markowitz, H., 1959. Portfolio selection: efficient diversification of investments. John Wiley & Sons, Inc., New York.

Masulis, R., Wang, C., Xie, F., 2007. Corporate governance and acquirer returns. Journal of Finance 62, 1851–1889.

May, D., 1995. Do managerial motives influence firm risk reduction strategies? Journal of Finance 50, 1291–1308.

Merton, R., 1974. On the pricing of corporate debt: the risk structure of interest rates. Journal of Finance 29, 449–470.

Mishra, S., Prakash, A., Karels, G., Peterson, M., 2005. Bank mergers and components of risk: an evaluation. Journal of Economics and Finance 29, 85–96.

Morck, R., Shleifer, A., Vishny, R., 1990. Do managerial objectives drive bad acquisitions? Journal of Finance 45, 31–48.

Morellec, E., Zhdanov, A., 2008. Financing and takeovers. Journal of Financial Economics 87, 556–581.

Ohlson, J., 1980. Financial ratios and the probabilistic prediction of bankruptcy. Journal of Accounting Research 18, 109–131.

Pindado, J., Rodrigues, L., 2005. Determinants of financial distress costs. Financial Markets and Portfolio Management 19, 343–359.

Rajan, R., Zingales, L., 1995. What do we know about capital structure? Some evidence from international data. Journal of Finance 50, 1421–1460.

Rau, P., Vermaelen, T., 1998. Glamour, value and the post-acquisition performance of acquiring firms. Journal of Financial Economics 49, 223–253.

Roll, R., 1986. The hubris hypothesis of corporate takeovers. Journal of Business 59, 197–216.

Seth, A., 1990. Value creation in acquisitions: an empirical investigation. Strategic Management Journal 11, 431–446.

Shleifer, A., Vishny, R., 2003. Stock market driven acquisitions. Journal of Financial Economics 70, 295–311.

Theodossiou, P., Kahya, E., Saidi, R., Philippatos, G., 1996. Financial distress and corporate acquisitions: further empirical evidence. Journal of Business Finance & Accounting 23, 699–719.

Vallascas, F., Hagendorff, J., 2011. The impact of European bank mergers on bidder default risk. Journal of Banking and Finance 35, 902–915.

Vasselou, M., Xing, Y., 2004. Default risk in equity returns. Journal of Finance 59, 831–868.

Table 1: Variable definitions and hypothesized effects

The table provides an overview of the various hypotheses and describes the measurement of the independent variables.

		Measurement	Hypothesis
Explanatory variables			
Diversification			
Activity diversification	CONGL	Dummy that equals one if acquirer and target have a different three-digit SIC code	Increase
Geographic diversification	CROSSBORDER	Dummy that equals one if the acquirer and target are in a different nation	Decrease
Management quality and expertise			
Pre-acquisition performance	BHR	Acquirer pre-acquisition market-adjusted buy-and-hold return calculated over the window [-280 -30[trading days	Increase
	MTB	Acquirer pre-acquisition market-to-book calculated as acquiror market value of assets [-280 -30[trading days divided by total assets (Y-1)	Increase
Prior acquisition experience	ACQEXP	Number of non-distressed transactions prior to the current deal	Increase
Acquirer pre-acquisition risk			
Pre-acquisition risk LOW	LOWRISK		
	Historical volatility	Dummy that equals one if pre-idiosyncratic risk falls within the 1st quartile	Increase
	Downside risk	Dummy that equals one if pre-downside risk falls within the 1st quartile	Increase
	Distance-to-default	Dummy that equals one if pre-distance-to-default falls within the 4th quartile	Increase
	Implied volatility	Dummy that equals one if pre-idiosyncratic risk falls within the 1st quartile	Increase
Pre-acquisition risk HIGH	HIGHRISK		
	Historical volatility	Dummy that equals one if pre-idiosyncratic risk falls within the 4th quartile	Decrease
	Downside risk	Dummy that equals one if pre-downside risk falls within the 4th quartile	Decrease
	Distance-to-default	Dummy that equals one if pre-distance to default falls within the 1st quartile	Decrease
	Implied volatility	Dummy that equals one if pre-idiosyncratic risk falls within the 4th quartile	Decrease
Bull and bear markets	BULL_BEAR	Yearly change of MSCI All Countries market return	Increase
Premium paid for target	PREMIUM	Price paid per share minus stock price of the target 4 weeks before acquisition announcement, divided by the stock price of the target 4 weeks before acquisition announcement	Increase
Control variables			
Leverage changes	CHANGESLEV	Difference between post-acquisition (Y+1) and pre-acquistion (Y-1) total liabilities on total assets	Increase
Target interest coverage ratio	T_ICR	Target interest coverage ratio measured by EBITDA divided by interest expense on debt in Y-1	Increase
Target in high-tech industry	T_HIGHTECH	Dummy that equals one if target is in a high-tech industry measured by the OECD classification	Increase
Stock-paid deals	ALLSTOCK	Dummy that equals one if the deal is fully stock financed	Decrease
Cumulative Abnormal Return	CAR	Cumulative abnormal return over the window [-2; +2] trading days	Decrease
Target public status	T_PUBLIC	Dummy that equals one if the target is a quoted company	Decrease
Relative size of the deal	RELSIZE	Deal value divided by acquirer market value of assets	Increase
Acquirer size	SIZE	Log of acquirer market value of assets calculated as market value of equity plus book value total debt; market value of equity = mean of daily market cap over the window [-280; -30[trading days	Decrease
Corporate spread	C_SPREAD	Difference between corporate BAA bonds and AAA bonds	Decrease
Institutional effects	Inst. effects	Acquirer and target anti-director rights index and creditor rights index (La Porta et al., 1998)	
Regional effects	Reg. dummies	Based on acquirer or target nation assigned to the regions: European developed countries, European emerging countries, UK, US, other developed countries or other emerging countries	
Industry effects	Ind. dummies	Acquirer industry dummies; acquirer is assigned to a particular industry via the Industry Classification Benchmark (level2) developed by Dow Jones and FTSE, downloaded from Thomson Datastream	

Table 2: Construction of distressed sample

The table presents the construction of a distressed sample of 1,082 distressed transactions for 1985-2009. We combine Thomson ONE Banker M&A data with M&A deals collected from Zephyr. Zephyr is a database of M&A, IPO and venture capital deals with pan-European transactions dating back to 1997 and US deals from 2001, commercialized by Bureau van Dijk. The first columns show the number of transactions involving a quoted acquirer. Subsequently, we complete the initial data set with the target interest coverage ratio. Next, we only include transactions involving distressed targets (interest coverage ratio one year prior to acquisition announcement is smaller than one) and exclude transactions in the financial industry (US SIC code 6). Finally, we combine distressed transactions from Thomson ONE Banker with Zephyr. This yields a final distressed sample of 1,082 transactions over the period 1990-2009.

Year	Deals with quoted acquirer				Deals with target accounting data				Deals with target $ICR_{Y-1} < 1$ Excluding financial industry				Final distressed sample	
	Thomson ONE Banker		Zephyr		Thomson ONE Banker		Zephyr		Thomson ONE Banker		Zephyr		Thomson ONE Banker	
1985	875	0.5%			14	0.3%			0	0.0%			0	0.0%
1986	1,575	1.0%			50	0.9%			0	0.0%			0	0.0%
1987	1,866	1.2%			49	0.9%			0	0.0%			0	0.0%
1988	2,613	1.6%			73	1.4%			0	0.0%			0	0.0%
1989	3,368	2.1%			87	1.7%			0	0.0%			0	0.0%
1990	3,413	2.1%			63	1.2%			3	0.5%			3	0.3%
1991	3,730	2.3%			86	1.6%			3	0.5%			3	0.3%
1992	3,962	2.5%			94	1.8%			3	0.5%			3	0.3%
1993	4,604	2.9%			86	1.6%			2	0.3%			2	0.2%
1994	5,710	3.6%			121	2.3%			4	0.7%			4	0.4%
1995	6,516	4.1%			173	3.3%			4	0.7%			4	0.4%
1996	7,703	4.8%			165	3.1%			6	1.0%			6	0.6%
1997	9,769	6.1%	485	0.9%	312	5.9%	5	0.1%	5	0.9%	0	0.0%	5	0.5%
1998	11,039	6.9%	368	0.7%	495	9.4%	8	0.2%	36	6.3%	1	0.2%	36	3.3%
1999	10,438	6.5%	268	0.5%	657	12.5%	8	0.2%	77	13.4%	0	0.0%	77	7.1%
2000	10,368	6.5%	2,837	5.2%	493	9.4%	30	0.6%	64	11.2%	3	0.5%	65	6.0%
2001	7,476	4.7%	1,674	3.0%	360	6.8%	35	0.7%	71	12.4%	3	0.5%	71	6.6%
2002	6,608	4.1%	1,985	3.6%	233	4.4%	203	4.0%	45	7.9%	46	7.3%	81	7.5%
2003	6,589	4.1%	4,973	9.0%	251	4.8%	370	7.3%	49	8.6%	80	12.8%	112	10.4%
2004	7,925	4.9%	6,300	11.5%	227	4.3%	492	9.7%	29	5.1%	56	8.9%	79	7.3%
2005	9,224	5.7%	7,458	13.6%	267	5.1%	729	14.4%	38	6.6%	83	13.2%	107	9.9%
2006	9,858	6.1%	7,979	14.5%	262	5.0%	824	16.3%	33	5.8%	96	15.3%	111	10.3%
2007	10,262	6.4%	8,499	15.5%	292	5.5%	1,086	21.5%	33	5.8%	98	15.6%	107	9.9%
2008	8,417	5.2%	7,078	12.9%	191	3.6%	798	15.8%	38	6.6%	96	15.3%	121	11.2%
2009	6,660	4.1%	5,102	9.3%	169	3.2%	473	9.3%	30	5.2%	65	10.4%	85	7.9%
Total	160,568	100%	55,006	100%	5,270	100%	5,061	100%	573	100%	627	100%	1,082	100%

Table 3: Transactions by acquirer and target nation

The table presents the geographical distribution of 1,082 distressed M&A deals for 1990-2009.

Country	Transactions by acquirer nation		Transactions by target nation	
US	515	47.60%	477	44.09%
Europe	477	44.09%	569	52.59%
UK	140	12.94%	168	15.53%
Europe excl UK	337	31.15%	401	37.06%
Austria	6	0.55%	3	0.28%
Belgium	8	0.74%	12	1.11%
Bulgaria	1	0.09%	0	0.00%
Czech Republic	1	0.09%	5	0.46%
Denmark	3	0.28%	0	0.00%
Finland	13	1.20%	13	1.20%
France	83	7.67%	127	11.74%
Germany	37	3.42%	41	3.79%
Greece	15	1.39%	13	1.20%
Hungary	0	0.00%	3	0.28%
Ireland	6	0.55%	3	0.28%
Italy	20	1.85%	34	3.14%
Luxembourg	1	0.09%	1	0.09%
Netherlands	15	1.39%	4	0.37%
Norway	28	2.59%	34	3.14%
Poland	10	0.92%	14	1.29%
Portugal	2	0.18%	3	0.28%
Romania	0	0.00%	3	0.28%
Serbia	1	0.09%	3	0.28%
Slovakia	0	0.00%	2	0.18%
Slovenia	0	0.00%	1	0.09%
Spain	22	2.03%	30	2.77%
Sweden	48	4.44%	50	4.62%
Switzerland	16	1.48%	1	0.09%
Ukraine	1	0.09%	1	0.09%
Other countries	90	8.32%	36	3.33%
Total	1,082	100%	1,082	100.00%

Table 4: Transactions by acquirer and target industry

The table presents the industry distribution of 1,082 distressed M&A deals for 1990-2009. The Manufacturing (Div. D), Transportation & Communication (Div. E), and Services industry (Div. H) are broken down to two-digit US SIC code.

US SIC code	Transactions by acquirer industry		Transactions by target industry	
Division A: Agriculture, fishing and hunting	3	0.14%	7	0.32%
Division B: Mining	48	2.23%	42	1.95%
Division C: Construction	14	0.65%	12	0.56%
Division D: Manufacturing	470	21.83%	410	19.01%
20 Food and kindred products	25	1.16%	26	1.21%
21 Tobacco products	1	0.05%	0	0.00%
22 Textile mill products	5	0.23%	3	0.14%
23 Apparel and other fishing products	8	0.37%	4	0.19%
24 Lumber and wood products	3	0.14%	3	0.14%
25 Furniture and fixtures	2	0.09%	0	0.00%
26 Paper and allied products	8	0.37%	6	0.28%
27 Printing and publishing	20	0.93%	16	0.74%
28 Chemicals and allied products	142	6.60%	129	5.98%
29 Petroleum and coal products	8	0.37%	2	0.09%
30 Rubber and misc. plastic products	4	0.19%	3	0.14%
31 Leather and leather products	1	0.05%	0	0.00%
32 Stone, clay and glass products	5	0.23%	3	0.14%
33 Primary metal industries	11	0.51%	10	0.46%
34 Fabricated metal products	12	0.56%	11	0.51%
35 Industrial machinery and equipment	53	2.46%	40	1.85%
36 Electronic and other electronic equipment	92	4.27%	81	3.76%
37 Transportation equipment	14	0.65%	14	0.65%
38 Measuring, analysing, and controlling Instruments; photographic, medical and optical Goods; watches and clocks	50	2.32%	54	2.50%
39 Miscellaneous manufacturing industries	6	0.28%	5	0.23%
Division E: Transportation, Communications, Electric, Gas, And Sanitary Services	129	5.99%	119	5.52%
40 Railroad transportation	1	0.05%	1	0.05%
42 Trucking and warehousing	1	0.05%	3	0.14%
44 Water transportation	6	0.28%	9	0.42%
45 Transportation by air	4	0.19%	4	0.19%
46 Pipelines, expect natural gas	0	0.00%	1	0.05%
47 Transportation services	4	0.19%	4	0.19%
48 Communication	85	3.95%	73	3.38%
49 Electric, gas and sanitary services	28	1.30%	24	1.11%
Division F: Wholesale trade	28	1.30%	27	1.25%
Division G: Retail trade	39	1.81%	40	1.85%
Division H: Services	347	16.12%	422	19.56%
70 Hotels, rooming Houses, camps, and other lodging places	2	0.09%	2	0.09%
72 Personal services	3	0.14%	5	0.23%
73 Business services	257	11.94%	305	14.14%
75 Automotive repair, services and parking	1	0.05%	0	0.00%
76 Miscellaneous repair services	0	0.00%	3	0.14%
78 Motion pictures	6	0.28%	5	0.23%
79 Amusement and recreation services	9	0.42%	11	0.51%
80 Health services	10	0.46%	13	0.60%
81 Legal services	1	0.05%	0	0.00%
82 Educational services	2	0.09%	3	0.14%
83 Social services	5	0.23%	6	0.28%
87 Engineering and management services	51	2.37%	69	3.20%
Division J: Public administration	0	0.00%	3	0.14%
Total	1,079	100.00%	1,082	100.00%

Table 5: Summary statistics on acquirer and target profitability, liquidity and solvency before acquisition

The table reports median, mean, standard deviation, minimum and maximum of bidder and target size, profitability, liquidity and solvency ratios one year prior to acquisition. As some data is missing in the sample of 1,082 distressed transactions, we report the number of observations as well.

$Target_{Y-1}$	Obs	Median	Mean	Sd	Min	Max
TOTAL ASSETS ($ Th)	964	22,658	155,871	509,706	1	7,946,086
MARKET VALUE OF ASSETS ($ Mio)	418	84.02	371.32	962.34	1.23	12,644.21
Profitability						
EBITDA/SALES	847	-0.34	-5.81	78.84	-2,245.33	0.65
NET INCOME/TOTAL EQUITY	718	-49.94	-136.31	606.87	-14,403.23	265.24
EBITDA/TOTAL ASSETS	1,067	-0.19	-2.26	32.40	-695.00	0.54
EBIT/TOTAL ASSETS	1,005	-0.25	-1.18	16.75	-522.00	0.54
SALES/TOTAL ASSETS	871	0.57	2.46	13.76	0.00	249.10
Liquidity						
CASH & EQ/TOTAL ASSETS	916	0.17	0.28	0.28	0.00	0.93
CURRENT ASSETS/CURRENT LIABILITIES	1,056	1.33	3.04	5.42	0.00	70.55
Solvency						
EBITDA/INTEREST EXPENSE	1,082	-12.10	-235.38	1,914.79	-51,924.33	0.99
TOTAL LIABILITIES/TOTAL ASSETS	1,067	0.68	1.84	10.16	0.02	195.33
TOTAL LIABILITIES/MV OF ASSETS	415	0.25	0.54	1.72	0.01	30.89
TOTAL FINANCIAL DEBT/TOTAL ASSETS	897	0.15	0.53	2.15	0.00	46.38
TOTAL EQUITY/TOTAL LIABILITIES	1,004	0.44	1.98	5.22	-10.58	64.71
$Acquirer_{Y-1}$	Obs	Median	Mean	Sd	Min	Max
TOTAL ASSETS ($ Th)	952	539,736	8,043,094	23,300,000	3	243,000,000
MARKET VALUE OF ASSETS ($ Mio)	905	907.22	14,847.46	41,114.14	0.93	407,513.20
Profitability						
EBITDA/SALES	649	0.11	-0.21	2.06	-33.07	7.15
NET INCOME/TOTAL EQUITY	865	9.07	-36.60	579.84	-14,346.33	997.71
EBITDA/TOTAL ASSETS	785	0.09	-0.03	1.18	-28.26	0.92
SALES/TOTAL ASSETS	701	0.72	0.84	0.63	0.00	4.83
Liquidity						
CASH & EQ/TOTAL ASSETS	938	0.16	0.25	0.24	0.00	0.98
CURRENT ASSETS/CURRENT LIABILITIES	934	1.76	3.15	6.66	0.01	117.60
Solvency						
EBITDA/INTEREST EXPENSE	824	7.32	39.88	1,453.24	-24,270.00	31,643.00
TOTAL LIABILITIES/TOTAL ASSETS	935	0.48	0.94	9.03	0.01	195.33
TOTAL LIABILITIES/MV OF ASSETS	904	0.30	0.40	0.39	0.00	2.94
TOTAL FINANCIAL DEBT/TOTAL ASSETS	934	0.15	0.35	3.09	0.00	66.67
TOTAL EQUITY/TOTAL LIABILITIES	938	1.09	2.84	10.02	-44.75	190.58

Table 6: Do distressed acquisitions impact acquirer risk?

The table reports summary statistics of absolute and relative difference scores for total risk, systematic risk and idiosyncratic risk. Absolute difference scores are calculated by computing acquirer average daily volatility or default risk over the post-announcement period]+2 +252] minus average daily volatility or default risk over the pre-announcement period [-280 -30[. Relative differences scores are defined as the absolute difference score divided by average daily volatility or default risk over the pre-announcement period [-280 -30[. The t-test evaluates whether the difference scores are equal to zero. In addition, we report the percentage of positive difference scores by risk measure. The results are winsorized at 1%. As some data is missing in the sample of 1,082 distressed transactions, we report the number of observations by subsample. The historical volatility measure based on the Fama-French model and the implied option volatility measure only include US transactions. ***, **, and * indicate significance at 1%, 5%, and 10%. The sample period is 1990-2009.

		Absolute			Relative			
		Total risk difference			Total risk difference			
Risk measure	Obs	Mean	Sd	P-value	Mean	Sd	P-value	% positive changes
Historical volatility								
Stock return volatility (Market Model)	790	-0.0589	1.4423	0.2508	0.0699***	0.4209	0.0000	49.87%
Stock return volatility (Fama-French Model)	395	-0.0285	2.2608	0.8022	0.0552**	0.4379	0.0128	47.09%
Downside risk (Semideviation) with respect to average	877	-0.0496	1.6362	0.3692	0.0953***	0.4908	0.0000	49.72%
Downside risk (Semideviation) with respect to zero	879	-0.0521	1.3317	0.2462	0.0829***	0.4540	0.0000	50.06%
Implied option volatility	221	0.0088	0.1451	0.3684	0.0699***	0.2912	0.0004	50.68%
Distance-to-default	687	-0.3493***	1.7906	0.0000	0.01856	0.3706	0.1891	45.85%

		Absolute			Relative			
		Systematic risk difference			Systematic risk difference			
Risk measure	Obs	Mean	Sd	P-value	Mean	Sd	P-value	% positive changes
Historical volatility								
Stock return volatility (Market Model)	790	0.0049	0.5239	0.7939	0.4115***	1.6573	0.0000	49.62%
Stock return volatility (Fama-French Model)	395	-0.0601*	0.7136	0.0949	-0.0973	1.1749	0.1006	46.33%
Downside beta	875	-0.1606***	1.2280	0.0001	0.0727***	0.6520	0.0010	44.13%
Implied option volatility	210	0.0100	0.1371	0.2895	0.2150***	0.6544	0.0000	53.33%

		Absolute			Relative			
		Idiosyncratic risk difference			Idiosyncratic risk difference			
Risk measure	Obs	Mean	Sd	P-value	Mean	Sd	P-value	% positive changes
Historical volatility								
Stock return volatility (Market Model)	790	-0.0763	1.3461	0.1117	0.0555***	0.4015	0.0001	48.68%
Stock return volatility (Fama-French Model)	395	-0.0467	2.1280	0.6628	0.0351*	0.4074	0.0876	45.82%
Implied option volatility	210	-0.0036	0.1274	0.6863	0.0623**	0.3489	0.0105	51.20%

Table 7: Acquisition-related risk changes by risk quartiles

The table reports summary statistics of absolute and relative total risk difference scores by risk quartiles. The risk quartiles are computed using the idiosyncratic risk component if applicable. Absolute difference scores are calculated by computing acquirer average daily volatility or default risk over the post-announcement period]+2 +252] minus average daily volatility or default risk over the pre-announcement period [-280 -30[. Relative differences scores are defined as the absolute difference score divided by average daily volatility or default risk over the pre-announcement period [-280 -30[. The t-test evaluates whether the difference scores are equal to zero. The results are winsorized at 1%. The implied option volatility subsample only include US transactions. ***, **, and * indicate significance at 1%, 5%, and 10%. The sample period is 1990-2009.

Absolute Total risk difference

	Historical volatility								Implied option volatility				Distance-to-default			
	Stock return volatility (Market Model)				Downside risk											
	Obs	Mean	Sd	P-value	Obs	Mean	Sd	P-value	Obs	Mean	Sd	P-value	Obs	Mean	Sd	P-value
Quartile 1	197	0.3858***	0.7010	0.0000	219	0.4719***	0.8488	0.0000	53	0.0464***	0.0923	0.0006	172	0.5183***	0.9897	0.0000
Quartile 2	198	0.2467***	0.9905	0.0006	219	0.3751***	1.0280	0.0000	52	0.0449***	0.1112	0.0053	173	0.2433***	1.2963	0.0146
Quartile 3	197	0.0115	1.3350	0.9036	221	0.0479	1.5059	0.6368	53	0.0183	0.1262	0.2958	172	-0.4312***	1.4174	0.0000
Quartile 4	198	-0.8774***	2.0292	0.0000	218	-1.0992***	2.2693	0.0000	52	-0.0851***	0.1941	0.0026	173	-1.6093***	2.3811	0.0000

Relative Total risk difference

	Historical volatility								Implied option volatility				Distance-to-default			
	Stock return volatility (Market Model)				Downside risk											
	Obs	Mean	Sd	P-value	Obs	Mean	Sd	P-value	Obs	Mean	Sd	P-value	Obs	Mean	Sd	P-value
Quartile 1	197	0.2624***	0.4274	0.0000	218	0.3376***	0.5055	0.0000	53	0.1842***	0.3121	0.0001	172	0.3176***	0.5488	0.0000
Quartile 2	198	0.1168***	0.4197	0.0001	219	0.1764***	0.4734	0.0000	52	0.1208***	0.2849	0.0035	173	0.0740***	0.3506	0.0061
Quartile 3	197	0.0133	0.3980	0.6390	221	0.0157	0.4576	0.6109	53	0.0469	0.2447	0.1690	172	-0.0727***	0.2540	0.0002
Quartile 4	198	-0.1122***	0.3438	0.0000	218	-0.1475***	0.3839	0.0000	52	-0.0852**	0.2463	0.0158	173	-0.1613***	0.2403	0.0000

Table 8: Summary statistics of independent variables

The table reports summary statistics for the explanatory and control variables in the full distressed sample (1,082 observations), the historical volatility sample (equal to downside risk sample-536 observations), the default risk sample (504 observations) and option implied volatility sample (only includes US subsample-182 observations). As some data on independent variables in the full distressed sample is missing, we report the number of observations. We include a dummy equal to 1 if acquirer and target do not share the same three-digit SIC-code (CONGL), a dummy equal to 1 for a crossborder transaction (CROSSBORDER), acquirer market-adjusted daily buy-and-hold return over the window [-280 -30[(BHR), acquirer market-to-book ratio over the window [-280 -30[(MTB), acquirer prior non-distressed acquisition experience (ACQEXP), a dummy that equals 1 if acquirer pre-acquisition volatility falls within the 1st quartile (the 4th quartile for default risk)(LOWRISK), a dummy that equals 1 if acquirer pre-acquisition volatility falls within the 4th quartile (the 1st quartile for default risk)(HIGHRISK), yearly change in MSCI market return index (BULL_BEAR), acquisition premium (PREMIUM), change in acquirer total leverage to total assets (CHANGESLEV), target interest coverage ratio one year prior to announcement (T_ICR), a dummy that equals 1 if target is in a high-tech industry (T_HIGHTECH), a dummy indicating that the acquisition is fully paid in stock (ALLSTOCK), cumulative abnormal return from -2 to +2 days relative to announcement (CAR), a dummy that equals 1 if target is listed (T_PUBLIC), ratio of deal value to acquirer market value of assets (RELSIZE), log of acquirer market value of assets prior to announcement (ACQSIZE) and corporate bond spread (C_SPREAD). The variables are winsorized at 1%. The sample period is 1990-2009.

Independent variables	Full distressed sample			Historical volatility sample		Distance-to-default sample		Option implied volatility	
	1,082 observations			536 observations		504 observations		182 observations	
	Obs	Mean	Sd	Mean	Sd	Mean	Sd	Mean	Sd
Explanatory variables									
CONGL	1,078	0.4842	0.5000	0.4493	0.4978	0.4507	0.4980	0.3388	0.4746
CROSSBORDER	1,082	0.3123	0.4636	0.2989	0.4582	0.3133	0.4643	0.1530	0.3609
BHR	872	0.1626	0.6070	0.1639	0.5873	0.1439	0.5515	0.1673	0.5620
MTB	904	2.5412	3.2160	2.5922	3.0756	2.6559	3.4247	3.3863	3.9231
ACQEXP	1,065	3.4884	7.3810	4.5093	7.9296	4.3790	7.9480	8.5989	11.1022
LOWRISK									
Historical volatility				0.2210	0.4153				
Downside risk				0.2373	0.4258				
Distance-to-default						0.2302	0.4214		
Implied volatility								0.2186	0.4144
HIGHRISK									
Historical volatility				0.2717	0.4453				
Downside risk				0.2246	0.4177				
Distance-to-default						0.2746	0.4468		
Implied volatility								0.2623	0.4411
BULL_BEAR	1,082	0.0538	0.2141	0.0638	0.1986	0.0673	0.1983	0.0725	0.1865
PREMIUM	428	0.7718	1.2093	0.7212	1.0140	0.7437	1.0423	0.6028	0.4947
Control variables									
CHANGESLEV	859	0.0135	0.2025	0.0222	0.1864	0.0232	0.1806	0.0372	0.1703
T_ICR	1,082	-152.9772	571.6636	-153.9608	497.8440	-142.1773	426.5685	-125.8417	290.9676
T_HIGHTECH	1,082	0.2336	0.4233	0.2948	0.4564	0.2857	0.4522	0.4396	0.4977
ALLSTOCK	871	0.3180	0.4659	0.2627	0.4405	0.2708	0.4448	0.2404	0.4285
CAR	872	0.3189	10.5100	-0.2556	10.1343	-0.4125	9.3353	-1.0664	9.8358
T_PUBLIC	1,082	0.5517	0.4975	0.6467	0.4784	0.6306	0.4831	0.8743	0.3324
RELSIZE	732	0.2939	0.8621	0.2500	0.7359	0.2743	0.8222	0.1298	0.2293
ACQSIZE	905	6.6864	2.5984	7.3031	2.5132	7.1490	2.5307	8.6706	1.9934
C_SPREAD	1,082	1.0881	0.5510	1.0469	0.4454	1.0442	0.4351	1.0256	0.4150

Table 9: Effect of diversification, management quality and expertise, pre-acquisition risk, and market conditions on acquirer risk in distressed acquisitions

Regressions on the determinants of acquisition-related risk changes. Dependent variables are absolute and relative difference scores in volatility and default risk. Absolute difference scores (ABS) are calculated by computing acquirer average daily volatility or default risk over the post-announcement period]+2 +252] minus daily volatility or default risk over the pre-announcement period [-280 -30[. Relative differences scores (REL) are defined as the absolute difference score divided by average daily volatility or default risk over the pre-announcement period [-280 -30[. The implied option volatility subsample only includes US deals. The model is estimated via OLS with robust standard errors; p-values are in parentheses. We include a dummy equal to 1 if acquirer and target do not share the same three-digit SIC-code (CONGL), a dummy equal to 1 for a crossborder transaction (CROSSBORDER), acquirer market-adjusted daily buy-and-hold return over the window [-280 -30[(BHR), acquirer market-to-book ratio over the window [-280 -30[(MTB), acquirer prior non-distressed acquisition experience (ACQEXP), a dummy that equals 1 if acquirer pre-acquisition volatility falls within the 1st quartile (the 4th quartile for default risk)(LOWRISK), a dummy that equals 1 if acquirer pre-acquisition volatility falls within the 4th quartile (the 1st quartile for default risk)(HIGHRISK), yearly change in MSCI market return index (BULL_BEAR), change in acquirer total leverage to total assets (CHANGESLEV), target interest coverage ratio one year prior to announcement (T_ICR), a dummy that equals 1 if target is in a high-tech industry (T_HIGHTECH), a dummy of 1 if fully paid in stock (ALLSTOCK), cumulative abnormal return from -2 to +2 days relative to announcement (CAR), a dummy that equals 1 if target is listed (T_PUBLIC), ratio of deal value to acquirer market value of assets (RELSIZE), log of acquirer market value of assets prior to announcement (ACQSIZE), corporate bond spread (C_SPREAD), acquirer and target anti-director and creditor rights index and acquirer industry dummies (not reported). The variables are winsorized at 1%. ***, **, and * indicate significance at 1%, 5%, and 10%. The sample period is 1990-2009.

	Distance-to-default		Historical volatility		Historical volatility Downside_avg		Historical volalitlity Downside_zero		Implied volatility	
	ABS	REL	ABS	REL	ABS	REL	ABS	REL	ABS	REL
CONGL	-0.0319	-0.0127	-0.306***	-0.0677**	-0.193*	-0.0500	-0.227**	-0.0597*	-0.0301	-0.0375
	(0.809)	(0.724)	(0.006)	(0.036)	(0.078)	(0.163)	(0.018)	(0.080)	(0.149)	(0.418)
CROSSBORDER	0.181	0.0295	0.0653	0.0064	0.0698	0.0174	0.0442	0.0158	-0.0505	-0.110
	(0.304)	(0.521)	(0.557)	(0.866)	(0.600)	(0.707)	(0.650)	(0.696)	(0.273)	(0.248)
BHR	0.289***	0.140***	-0.162	-0.0389	0.317***	0.0536**	0.268***	0.0559**	0.0251	0.0102
	(0.004)	(0.003)	(0.155)	(0.109)	(0.006)	(0.047)	(0.006)	(0.027)	(0.208)	(0.760)
MTB	-0.0821***	-0.0153	0.0501*	0.0108*	0.0572**	0.0145**	0.0443*	0.0120*	0.00520	0.0060
	(0.002)	(0.179)	(0.084)	(0.059)	(0.048)	(0.037)	(0.062)	(0.063)	(0.109)	(0.350)
ACQEXP	-0.0207*	-0.0037*	0.0127*	0.0063**	0.0128*	0.0070**	0.0136**	0.0065**	0.0018**	0.0048**
	(0.071)	(0.094)	(0.074)	(0.023)	(0.087)	(0.017)	(0.035)	(0.020)	(0.042)	(0.032)
LOWRISK	-1.160***	-0.0981***	0.135	0.144***	0.261**	0.231***	0.151	0.219***	-0.0037	0.0490
	(0.000)	(0.004)	(0.211)	(0.003)	(0.025)	(0.000)	(0.134)	(0.000)	(0.873)	(0.429)
HIGHRISK	0.481***	0.316***	-0.864***	-0.164***	-1.096***	-0.207***	-0.841***	-0.210***	-0.0821***	-0.0849*
	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.003)	(0.064)
BULL_BEAR	-1.980***	-0.469***	2.856***	0.797***	2.350***	0.704***	2.554***	0.759***	0.460***	0.883***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
CHANGESLEV	-2.512***	-0.746***	0.865**	0.248***	0.905**	0.285***	0.823***	0.297***	0.0636	0.162
	(0.000)	(0.000)	(0.027)	(0.003)	(0.022)	(0.003)	(0.009)	(0.000)	(0.228)	(0.101)
T_ICR	-0.00006	-0.00001	-0.00005	-0.00001	-0.00006	-0.000009	-0.00003	-0.000004	0.000007	0.00005
	(0.663)	(0.775)	(0.705)	(0.588)	(0.518)	(0.756)	(0.743)	(0.896)	(0.695)	(0.179)
T_HIGHTECH	0.109	0.0619	0.0442	0.0263	0.126	0.0790	0.0444	0.0390	0.0051	-0.0054
	(0.570)	(0.179)	(0.767)	(0.542)	(0.434)	(0.125)	(0.717)	(0.380)	(0.847)	(0.926)
ALLSTOCK	-0.0573	0.0071	0.220	0.0510	0.0380	0.0362	0.0714	0.0405	-0.0082	-0.0027
	(0.736)	(0.884)	(0.123)	(0.183)	(0.787)	(0.405)	(0.549)	(0.313)	(0.740)	(0.956)
CAR	0.0032	0.0035	0.0015	0.00012	-0.00826	-0.00125	-0.00402	-0.00045	-0.00118	-0.00117
	(0.561)	(0.118)	(0.837)	(0.933)	(0.214)	(0.460)	(0.500)	(0.776)	(0.357)	(0.551)
T_PUBLIC	-0.0563	-0.0643	-0.279*	-0.0632	-0.314**	-0.0742	-0.256*	-0.0488	-0.0145	0.00352
	(0.770)	(0.307)	(0.065)	(0.161)	(0.046)	(0.131)	(0.050)	(0.302)	(0.790)	(0.969)
RELSIZE	-0.133	0.0500	0.0659	0.0263	0.112	0.0862*	0.113*	0.0588*	-0.0694	-0.123
	(0.292)	(0.293)	(0.431)	(0.427)	(0.500)	(0.074)	(0.096)	(0.052)	(0.291)	(0.225)
ACQSIZE	0.0618	0.0170*	-0.0313	-0.0158*	-0.0442	-0.0197**	-0.0392	-0.0181**	-0.00733	-0.0217
	(0.186)	(0.099)	(0.314)	(0.084)	(0.165)	(0.041)	(0.133)	(0.045)	(0.331)	(0.216)
C_SPREAD	-1.271***	-0.281***	0.434***	0.145***	0.327**	0.141***	0.312**	0.127**	0.106***	0.196***
	(0.000)	(0.000)	(0.005)	(0.007)	(0.032)	(0.010)	(0.028)	(0.015)	(0.004)	(0.007)
Observations	504	504	536	536	535	535	536	536	182	182
R^2	0.366	0.357	0.303	0.273	0.336	0.298	0.359	0.315	0.479	0.402
R^2 adjusted	0.327	0.318	0.261	0.230	0.297	0.256	0.321	0.274	0.387	0.297

Table 10: Effect of recent stock performance for high-risk acquirers

Regressions on the determinants of acquisition-related risk changes. Dependent variables are absolute and relative difference scores in volatility and default risk. Absolute difference scores (ABS) are calculated by computing acquirer average daily volatility or default risk over the post-announcement period]+2 +252] minus daily volatility or default risk over the pre-announcement period [-280 -30[. Relative differences scores (REL) are defined as the absolute difference score divided by average daily volatility or default risk over the pre-announcement period [-280 -30[. The implied option volatility subsample only includes US deals. The model is estimated via OLS with robust standard errors; p-values are in parentheses. We include a dummy equal to 1 if acquirer and target do not share the same three-digit SIC-code (CONGL), a dummy equal to 1 for a crossborder transaction (CROSSBORDER), acquirer market-adjusted daily buy-and-hold return over the window [-280 -30[(BHR), interaction effect between high-risk acquirers and buy-and-hold return, acquirer market-to-book ratio over the window [-280 -30[(MTB), acquirer prior non-distressed acquisition experience (ACQEXP), a dummy that equals 1 if acquirer pre-acquisition volatility falls within the 1st quartile (the 4th quartile for default risk)(LOWRISK), a dummy that equals 1 if acquirer pre-acquisition volatility falls within the 4th quartile (the 1st quartile for default risk)(HIGHRISK), yearly change in MSCI market return index (BULL_BEAR), change in acquirer total leverage to total assets (CHANGESLEV), target interest coverage ratio one year prior to announcement (T_ICR), a dummy that equals 1 if target is in a high-tech industry (T_HIGHTECH), a dummy of 1 if fully paid in stock (ALLSTOCK), cumulative abnormal return from -2 to +2 days relative to announcement (CAR), a dummy that equals 1 if target is listed (T_PUBLIC), ratio of deal value to acquirer market value of assets (RELSIZE), log of acquirer market value of assets prior to announcement (ACQSIZE), corporate bond spread (C_SPREAD), acquirer and target anti-director and creditor rights index and acquirer industry dummies (not reported). The variables are winsorized at 1%. ***, **, and * indicate significance at 1%, 5%, and 10%. The sample period is 1990-2009.

	Distance-to-default		Historical volatility		Historical volatility Downside_avg		Historical volalitlity Downside_zero		Implied volatility	
	ABS	REL	ABS	REL	ABS	REL	ABS	REL	ABS	REL
CONGL	-0.0309	-0.0107	-0.301***	-0.0668**	-0.189*	-0.0477	-0.223**	-0.0576*	-0.0297	-0.0359
	(0.815)	(0.763)	(0.006)	(0.038)	(0.082)	(0.178)	(0.019)	(0.089)	(0.152)	(0.441)
CROSSBORDER	0.180	0.0272	0.0553	0.00452	0.0654	0.0148	0.0352	0.0110	-0.0511	-0.112
	(0.307)	(0.552)	(0.624)	(0.906)	(0.627)	(0.750)	(0.721)	(0.786)	(0.278)	(0.246)
BHR	0.240	0.0420	0.195	0.0282	0.538***	0.187***	0.487***	0.174***	0.0300	0.0284
	(0.171)	(0.319)	(0.195)	(0.580)	(0.001)	(0.000)	(0.000)	(0.001)	(0.320)	(0.623)
HIGHRISKxBHR	0.0968	0.192**	-0.531**	-0.0999*	-0.323	-0.194***	-0.322*	-0.173***	-0.00822	-0.0305
	(0.611)	(0.021)	(0.013)	(0.075)	(0.108)	(0.001)	(0.068)	(0.002)	(0.835)	(0.643)
MTB	-0.0807***	-0.0125	0.0536*	0.0115**	0.0595**	0.0158**	0.0463**	0.0131**	0.00507	0.00548
	(0.002)	(0.264)	(0.061)	(0.043)	(0.038)	(0.018)	(0.049)	(0.036)	(0.143)	(0.413)
ACQEXP	-0.0207*	-0.00367*	0.0120*	0.00617**	0.0124*	0.00675**	0.0132**	0.0063**	0.0018**	0.0048**
	(0.071)	(0.093)	(0.087)	(0.026)	(0.094)	(0.019)	(0.039)	(0.023)	(0.042)	(0.033)
LOWRISK	-1.164***	-0.106***	0.163	0.149***	0.266**	0.234***	0.153	0.220***	-0.00382	0.0486
	(0.000)	(0.001)	(0.128)	(0.002)	(0.021)	(0.000)	(0.128)	(0.000)	(0.868)	(0.433)
HIGHRISK	0.463***	0.280***	-0.746***	-0.141***	-1.041***	-0.173***	-0.780***	-0.177***	-0.0799***	-0.0767
	(0.003)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.008)	(0.121)
BULL_BEAR	-1.999***	-0.506***	2.975***	0.820***	2.419***	0.744***	2.627***	0.798***	0.462***	0.889***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
CHANGESLEV	-2.500***	-0.721***	0.907**	0.256***	0.936**	0.303***	0.852***	0.313***	0.0637	0.162*
	(0.000)	(0.000)	(0.019)	(0.002)	(0.017)	(0.001)	(0.006)	(0.000)	(0.227)	(0.100)
T_ICR	-0.00006	-0.00001	-0.00006	-0.00002	-0.00007	-0.00002	-0.00004	-0.000009	0.000008	0.00005
	(0.658)	(0.731)	(0.594)	(0.497)	(0.444)	(0.574)	(0.644)	(0.724)	(0.684)	(0.178)
T_HIGHTECH	0.103	0.0500	0.0339	0.0244	0.121	0.0761	0.0361	0.0345	0.00569	-0.00334
	(0.594)	(0.280)	(0.818)	(0.572)	(0.453)	(0.140)	(0.766)	(0.434)	(0.831)	(0.954)
ALLSTOCK	-0.0523	0.0170	0.199	0.0470	0.0279	0.0301	0.0603	0.0345	-0.00876	-0.0047
	(0.759)	(0.728)	(0.152)	(0.209)	(0.841)	(0.475)	(0.608)	(0.376)	(0.724)	(0.923)
CAR	0.00327	0.00357	0.00056	-0.00006	-0.00880	-0.00158	-0.00458	-0.00075	-0.00117	-0.00114
	(0.553)	(0.101)	(0.940)	(0.967)	(0.186)	(0.338)	(0.441)	(0.626)	(0.363)	(0.563)
T_PUBLIC	-0.0534	-0.0583	-0.277*	-0.0629	-0.314**	-0.0746	-0.259**	-0.0503	-0.0160	-0.00221
	(0.782)	(0.322)	(0.066)	(0.165)	(0.047)	(0.133)	(0.049)	(0.290)	(0.778)	(0.981)
RELSIZE	-0.132	0.0521	0.0588	0.0250	0.109	0.0843*	0.110	0.0568*	-0.0679	-0.117
	(0.297)	(0.279)	(0.471)	(0.444)	(0.515)	(0.082)	(0.109)	(0.057)	(0.315)	(0.261)
ACQSIZE	0.0615	0.0164	-0.0281	-0.0152*	-0.0438	-0.0194**	-0.0375	-0.0172*	-0.00705	-0.0207
	(0.190)	(0.108)	(0.365)	(0.099)	(0.168)	(0.041)	(0.150)	(0.055)	(0.361)	(0.245)
C_SPREAD	-1.270***	-0.279***	0.440***	0.146***	0.329**	0.143***	0.317**	0.129**	0.106***	0.196***
	(0.000)	(0.000)	(0.005)	(0.007)	(0.032)	(0.010)	(0.027)	(0.015)	(0.004)	(0.007)
Observations	504	504	536	536	535	535	536	536	182	182
R^2	0.366	0.370	0.313	0.277	0.340	0.311	0.364	0.326	0.479	0.403
R^2adjusted	0.326	0.330	0.271	0.233	0.299	0.268	0.325	0.285	0.384	0.293

Table 11: Effect of overpayment on acquirer risk in distressed acquisitions

Regressions on the determinants of acquisition-related risk changes. Dependent variables are absolute and relative difference scores in volatility and default risk. Absolute difference scores (ABS) are calculated by computing acquirer average daily volatility or default risk over the post-announcement period]+2 +252] minus daily volatility or default risk over the pre-announcement period [-280 -30[. Relative differences scores (REL) are defined as the absolute difference score divided by average daily volatility or default risk over the pre-announcement period [-280 -30[. The implied option volatility subsample only includes US deals. The model is estimated via OLS with robust standard errors; p-values are in parentheses. We include a dummy equal to 1 if acquirer and target do not share the same three-digit SIC-code (CONGL), a dummy equal to 1 for a crossborder transaction (CROSSBORDER), acquirer market-adjusted daily buy-and-hold return over the window [-280 -30[(BHR), interaction effect between high-risk acquirers and buy-and-hold return, acquirer market-to-book ratio over the window [-280 -30[(MTB), acquirer prior non-distressed acquisition experience (ACQEXP), a dummy that equals 1 if acquirer pre-acquisition volatility falls within the 1st quartile (the 4th quartile for default risk)(LOWRISK), a dummy that equals 1 if acquirer pre-acquisition volatility falls within the 4th quartile (the 1st quartile for default risk)(HIGHRISK), yearly change in MSCI market return index (BULL_BEAR), acquisition premium (PREMIUM), change in acquirer total leverage to total assets (CHANGESLEV), target interest coverage ratio one year prior to announcement (T_ICR), a dummy that equals 1 if target is in a high-tech industry (T_HIGHTECH), a dummy of 1 if fully paid in stock (ALLSTOCK), cumulative abnormal return from -2 to +2 days relative to announcement (CAR), a dummy that equals 1 if target is listed (T_PUBLIC), ratio of deal value to acquirer market value of assets (RELSIZE), log of acquirer market value of assets prior to announcement (ACQSIZE), corporate bond spread (C_SPREAD), acquirer and target anti-director and creditor rights index and acquirer industry dummies (not reported). The variables are winsorized at 1%. ***, **, and * indicate significance at 1%, 5%, and 10%. The sample period is 1990-2009.

	Distance-to-default		Historical volatility		Historical volatility Downside_avg		Historical volalitlity Downside_zero		Implied volatility	
	ABS	REL	ABS	REL	ABS	REL	ABS	REL	ABS	REL
CONGL	0.0213	0.0008	-0.362**	-0.0452	-0.333**	-0.0629	-0.301**	-0.0528	-0.0232	-0.0263
	(0.913)	(0.986)	(0.033)	(0.333)	(0.037)	(0.211)	(0.037)	(0.279)	(0.347)	(0.634)
CROSSBORDER	0.0394	-0.0119	0.472*	0.0975	0.223	0.0309	0.319	0.0926	-0.0335	-0.0999
	(0.919)	(0.893)	(0.081)	(0.180)	(0.327)	(0.682)	(0.126)	(0.230)	(0.506)	(0.310)
BHR	0.144	0.0778*	0.315	0.0803	0.332	0.138*	0.557**	0.205**	0.0389	0.0309
	(0.502)	(0.067)	(0.163)	(0.252)	(0.141)	(0.059)	(0.016)	(0.022)	(0.339)	(0.702)
HIGHRISKxBHR	0.207	0.189*	-0.650**	-0.148*	-0.0882	-0.124	-0.332	-0.177*	-0.0071	-0.0326
	(0.334)	(0.066)	(0.023)	(0.051)	(0.740)	(0.109)	(0.212)	(0.061)	(0.878)	(0.692)
MTB	-0.0538	-0.0214**	0.0255	0.0045	0.0303	0.0070	0.0258	0.0065	0.0043	0.0057
	(0.141)	(0.013)	(0.417)	(0.501)	(0.224)	(0.323)	(0.292)	(0.379)	(0.268)	(0.463)
ACQEXP	-0.0099	-0.0003	0.0064	0.0046	0.0026	0.0040	0.0067	0.0040	0.0023**	0.0067**
	(0.529)	(0.908)	(0.495)	(0.228)	(0.786)	(0.286)	(0.435)	(0.273)	(0.037)	(0.011)
LOWRISK	-0.922***	-0.0529	0.0193	0.0991	0.228	0.219**	0.151	0.224**	-0.0018	0.0511
	(0.009)	(0.310)	(0.918)	(0.209)	(0.245)	(0.015)	(0.436)	(0.023)	(0.948)	(0.469)
HIGHRISK	0.588***	0.304***	-0.636***	-0.0983*	-0.996***	-0.132**	-0.738***	-0.157***	-0.0507	-0.0391
	(0.005)	(0.000)	(0.004)	(0.055)	(0.000)	(0.013)	(0.000)	(0.007)	(0.112)	(0.489)
BULL_BEAR	-2.638***	-0.671***	4.208***	1.006***	3.470***	0.952***	3.749***	0.995***	0.569***	1.081***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
PREMIUM	-0.113	-0.0206	0.0113	0.0134	-0.0530	-0.00244	-0.0412	-0.00165	0.0464*	0.136***
	(0.101)	(0.231)	(0.884)	(0.510)	(0.336)	(0.889)	(0.456)	(0.923)	(0.058)	(0.005)
CHANGESLEV	-1.877***	-0.484***	0.500	0.128	0.507	0.200**	0.501	0.198**	0.0863	0.201
	(0.000)	(0.001)	(0.310)	(0.241)	(0.214)	(0.048)	(0.204)	(0.047)	(0.152)	(0.108)
T_ICR	-0.0002	-0.00004	-0.00005	-0.000004	-0.00007	0.000001	-0.000006	0.00001	0.000005	0.00007
	(0.417)	(0.548)	(0.809)	(0.915)	(0.658)	(0.981)	(0.961)	(0.756)	(0.820)	(0.124)
T_HIGHTECH	0.125	0.0767	-0.232	-0.0150	-0.169	0.00107	-0.184	-0.0211	-0.0041	-0.0184
	(0.583)	(0.179)	(0.310)	(0.798)	(0.426)	(0.986)	(0.353)	(0.735)	(0.892)	(0.772)
ALLSTOCK	-0.150	-0.0212	0.323*	0.0646	0.150	0.0507	0.146	0.0655	0.0015	0.0381
	(0.487)	(0.691)	(0.069)	(0.150)	(0.366)	(0.322)	(0.347)	(0.187)	(0.953)	(0.467)
CAR	0.0061	0.0033	-0.0009	0.0001	-0.0054	-0.0012	-0.0043	-0.0003	-0.001	-0.0016
	(0.381)	(0.139)	(0.930)	(0.929)	(0.523)	(0.547)	(0.588)	(0.873)	(0.480)	(0.481)
RELSIZE	0.140	0.0474	-0.225	-0.0354	-0.0330	-0.0368	-0.0440	-0.0190	-0.0933	-0.230**
	(0.490)	(0.460)	(0.564)	(0.665)	(0.921)	(0.652)	(0.880)	(0.806)	(0.164)	(0.043)
ACQSIZE	0.0578	0.0114	-0.0163	-0.0113	-0.00836	-0.0132	-0.0271	-0.0162	-0.0108	-0.0377*
	(0.423)	(0.438)	(0.721)	(0.345)	(0.848)	(0.313)	(0.521)	(0.214)	(0.251)	(0.072)
C_SPREAD	-1.354***	-0.268***	0.744***	0.171**	0.647***	0.178**	0.602***	0.167**	0.179***	0.326***
	(0.000)	(0.001)	(0.003)	(0.027)	(0.004)	(0.016)	(0.006)	(0.023)	(0.000)	(0.000)
Observations	266	266	288	288	288	288	288	288	141	141
R^2	0.359	0.430	0.368	0.301	0.418	0.316	0.418	0.344	0.572	0.509
R^2 adjusted	0.277	0.357	0.292	0.216	0.348	0.233	0.348	0.265	0.466	0.387

Table 12: Effect of overpayment for high market-to-book acquirers

Regressions on the determinants of acquisition-related risk changes. Dependent variables are absolute and relative difference scores in volatility and default risk. Absolute difference scores (ABS) are calculated by computing acquirer average daily volatility or default risk over the post-announcement period]+2 +252] minus daily volatility or default risk over the pre-announcement period [-280 -30[. Relative differences scores (REL) are defined as the absolute difference score divided by average daily volatility or default risk over the pre-announcement period [-280 -30[. The implied option volatility subsample only includes US deals. The model is estimated via OLS with robust standard errors; p-values are in parentheses. We include a dummy equal to 1 if acquirer and target do not share the same three-digit SIC-code (CONGL), a dummy equal to 1 for a crossborder transaction (CROSSBORDER), acquirer market-adjusted daily buy-and-hold return over the window [-280 -30[(BHR), interaction effect between high-risk acquirers and buy-and-hold return, acquirer market-to-book ratio over the window [-280 -30[(MTB), acquirer prior non-distressed acquisition experience (ACQEXP), a dummy that equals 1 if acquirer pre-acquisition volatility falls within the 1st quartile (the 4th quartile for default risk)(LOWRISK), a dummy that equals 1 if acquirer pre-acquisition volatility falls within the 4th quartile (the 1st quartile for default risk)(HIGHRISK), yearly change in MSCI market return index (BULL_BEAR), acquisition premium (PREMIUM), interaction effect between acquisition premium and acquirer market-to-book, change in acquirer total leverage to total assets (CHANGESLEV), target interest coverage ratio one year prior to announcement (T_ICR), a dummy that equals 1 if target is in a high-tech industry (T_HIGHTECH), a dummy of 1 if fully paid in stock (ALLSTOCK), cumulative abnormal return from -2 to +2 days relative to announcement (CAR), a dummy that equals 1 if target is listed (T_PUBLIC), ratio of deal value to acquirer market value of assets (RELSIZE), log of acquirer market value of assets prior to announcement (ACQSIZE), corporate bond spread (C_SPREAD), acquirer and target anti-director and creditor rights index and acquirer industry dummies (not reported). The variables are winsorized at 1%. ***, **, and * indicate significance at 1%, 5%, and 10%. The sample period is 1990-2009.

	Distance-to-default		Historical volatility		Historical volatility Downside_avg		Historical volalitlity Downside_zero		Implied volatility	
	ABS	REL	ABS	REL	ABS	REL	ABS	REL	ABS	REL
CONGL	0.0464	0.00579	-0.356**	-0.0448	-0.327**	-0.0620	-0.295**	-0.0521	-0.0247	-0.0304
	(0.813)	(0.903)	(0.035)	(0.340)	(0.038)	(0.218)	(0.038)	(0.286)	(0.328)	(0.589)
CROSSBORDER	0.0357	-0.0126	0.473*	0.0976	0.222	0.0308	0.319	0.0926	-0.0362	-0.107
	(0.926)	(0.886)	(0.081)	(0.180)	(0.328)	(0.683)	(0.127)	(0.231)	(0.454)	(0.256)
BHR	0.103	0.0697*	0.291	0.0784	0.350	0.141*	0.522**	0.201**	0.0535	0.0702
	(0.608)	(0.093)	(0.202)	(0.263)	(0.118)	(0.054)	(0.025)	(0.023)	(0.190)	(0.373)
HIGHRISKxBHR	0.254	0.198*	-0.598**	-0.144*	-0.0828	-0.124	-0.267	-0.169*	-0.0126	-0.0476
	(0.223)	(0.054)	(0.041)	(0.057)	(0.752)	(0.106)	(0.325)	(0.070)	(0.778)	(0.544)
MTB	-0.0996***	-0.0305***	0.0533	0.00664	0.0692**	0.0124	0.0545*	0.00981	0.00811**	0.0159**
	(0.008)	(0.000)	(0.176)	(0.434)	(0.016)	(0.174)	(0.065)	(0.311)	(0.030)	(0.034)
ACQEXP	-0.00686	0.000256	0.00548	0.00450	0.00125	0.00378	0.00577	0.00393	0.00198*	0.00592**
	(0.671)	(0.932)	(0.567)	(0.239)	(0.894)	(0.309)	(0.497)	(0.284)	(0.073)	(0.028)
LOWRISK	-0.940***	-0.0565	0.0327	0.100	0.255	0.223**	0.161	0.225**	-0.00555	0.0409
	(0.008)	(0.283)	(0.862)	(0.208)	(0.191)	(0.014)	(0.404)	(0.023)	(0.839)	(0.558)
HIGHRISK	0.607***	0.307***	-0.658***	-0.100*	-1.019***	-0.135**	-0.762***	-0.160***	-0.0481	-0.0321
	(0.004)	(0.000)	(0.003)	(0.052)	(0.000)	(0.011)	(0.000)	(0.006)	(0.136)	(0.572)
BULL_BEAR	-2.591***	-0.661***	4.121***	1.000***	3.357***	0.937***	3.655***	0.984***	0.580***	1.111***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
PREMIUM	-0.271***	-0.0519**	0.0979	0.0202	0.0666	0.0142	0.0493	0.00876	0.0781**	0.221***
	(0.006)	(0.041)	(0.348)	(0.417)	(0.335)	(0.520)	(0.523)	(0.692)	(0.013)	(0.000)
PREMIUMxMTB	0.0715**	0.0141*	-0.0372	-0.00291	-0.0511**	-0.00710	-0.0386	-0.00444	-0.00867**	-0.0233***
	(0.029)	(0.082)	(0.268)	(0.541)	(0.020)	(0.183)	(0.167)	(0.443)	(0.029)	(0.002)
CHANGESLEV	-1.813***	-0.471***	0.562	0.133	0.601	0.213**	0.568	0.206**	0.0908	0.213*
	(0.000)	(0.002)	(0.241)	(0.234)	(0.130)	(0.040)	(0.137)	(0.044)	(0.128)	(0.084)
T_ICR	-0.00017	-0.00004	-0.00004	-0.000004	-0.00007	0.000001	-0.000002	0.00001	0.000006	0.00007
	(0.461)	(0.584)	(0.822)	(0.920)	(0.670)	(0.974)	(0.988)	(0.746)	(0.801)	(0.112)
T_HIGHTECH	0.154	0.0824	-0.238	-0.0155	-0.183	-0.000885	-0.191	-0.0219	-0.00703	-0.0262
	(0.497)	(0.147)	(0.302)	(0.792)	(0.394)	(0.989)	(0.342)	(0.726)	(0.822)	(0.687)
ALLSTOCK	-0.163	-0.0238	0.333*	0.0654	0.161	0.0522	0.157	0.0667	0.00462	0.0464
	(0.446)	(0.655)	(0.061)	(0.147)	(0.332)	(0.309)	(0.316)	(0.182)	(0.856)	(0.364)
CAR	0.00471	0.00298	0.00051	0.00027	-0.00357	-0.00094	-0.00296	-0.00015	-0.00052	-0.00033
	(0.495)	(0.181)	(0.958)	(0.884)	(0.674)	(0.640)	(0.716)	(0.939)	(0.720)	(0.887)
RELSIZE	0.0337	0.0264	-0.222	-0.0351	-0.0256	-0.0358	-0.0420	-0.0188	-0.0846	-0.206*
	(0.872)	(0.695)	(0.575)	(0.669)	(0.940)	(0.665)	(0.887)	(0.810)	(0.212)	(0.065)
ACQSIZE	0.0474	0.00931	-0.0187	-0.0114	-0.0119	-0.0137	-0.0292	-0.0164	-0.00873	-0.0322
	(0.516)	(0.531)	(0.672)	(0.338)	(0.776)	(0.295)	(0.474)	(0.208)	(0.361)	(0.124)
C_SPREAD	-1.358***	-0.268***	0.724***	0.169**	0.620***	0.175**	0.579***	0.165**	0.187***	0.347***
	(0.000)	(0.001)	(0.003)	(0.029)	(0.005)	(0.019)	(0.007)	(0.026)	(0.000)	(0.000)
Observations	266	266	288	288	288	288	288	288	141	141
R^2	0.366	0.434	0.372	0.301	0.426	0.318	0.423	0.345	0.583	0.528
R^2 adjusted	0.282	0.359	0.294	0.213	0.354	0.232	0.351	0.263	0.473	0.405

Table 13: Acquirer and target risk profile for subsample of high-risk and low-risk acquirers

The table reports summary statistics of acquirer and target size, profitability, liquidity and solvency ratios one year prior to acquisition announcement across the subsample of high-risk and low-risk acquirers. High-risk acquirers are classified according to the 1st quartile of the distribution of pre-acquisition distance-to-default. Low-risk acquirers are classified according to the last quartile of the distribution of pre-acquisition distance-to-default. We mention the number of observations in each subsample. The t-test evaluates whether the differences are equal to zero. The variables are winsorized at 1%. The sample period is 1990-2009.

	High-risk acquirers				Low-risk acquirers				t-statistic	p-value
$ACQUIRER_{Y-1}$	Obs	Mean	Median	Sd	Obs	Mean	Median	Sd		
TOTAL ASSETS ($ Th)	169	746,971	142,630	1,623,873	172	17,100,000	3,529,860	26,000,000	-8.1882	0.0000
MARKET VALUE OF ASSETS ($ Mio)	169	1,315	145	2,656	172	43,787	6,378	64,468	-8.5571	0.0000
Profitability										
EBITDA/TOTAL ASSETS	152	-0.0812	0.0116	0.3193	164	0.1354	0.1464	0.1110	-8.1700	0.0000
EBITDA/SALES	148	-0.5384	0.0182	1.8093	162	0.0707	0.1880	1.0012	-3.7089	0.0002
SALES/TOTAL ASSETS	169	0.7993	0.6195	0.7148	171	0.8574	0.7903	0.4741	-0.8834	0.3776
NET INCOME/TOTAL EQUITY	156	-22.52	-4.605	50.6119	168	18.2839	18.4750	18.8966	-9.4749	0.0000
Liquidity										
CASH & EQ/TOTAL ASSETS	170	0.3167	0.2172	0.2613	172	0.2324	0.1785	0.2118	3.2793	0.0011
CURRENT ASSETS/CURRENT LIABILITIES	169	2.9589	1.971	2.8271	171	2.5407	1.8228	2.4072	1.4692	0.1427
Solvency										
EBITDA/INTEREST EXPENSE	137	-32.386	2.7116	301.456	148	133.8764	20.6224	459.9123	-3.5789	0.0004
TOTAL LIABILITIES/TOTAL ASSETS	170	0.4769	0.4508	0.252	172	0.4177	0.4132	0.2019	2.3996	0.017
TOTAL LIABILITIES/MV OF ASSETS	169	0.4688	0.3572	0.372	172	0.2541	0.1738	0.2275	6.4284	0.0000
TOTAL FINANCIAL DEBT/TOTAL ASSETS	169	0.1696	0.1086	0.1874	172	0.1445	0.1177	0.1424	1.3919	0.1649
$TARGET_{Y-1}$	Obs	Mean	Median	Sd	Obs	Mean	Median	Sd		
TOTAL ASSETS ($ Th)	147	81,704	26,841	170,989	161	122,004	16,825	314,528	-1.3784	0.1691
MARKET VALUE OF ASSETS ($ Mio)	89	229	57	488	68	342	110	526	-1.3891	0.1668
Profitability										
EBITDA/TOTAL ASSETS	170	-0.376	-0.1800	0.5405	169	-0.4524	-0.1946	0.6684	1.1577	0.2478
EBITDA/SALES	143	-2.6824	-0.3126	9.3277	126	-2.5579	-0.4481	9.8767	-0.1063	0.9154
NET INCOME/TOTAL EQUITY	125	-90.314	-58.2100	132.7856	115	-81.6599	-44.6300	124.4600	-0.5197	0.6037
Liquidity										
CASH & EQ/TOTAL ASSETS	146	0.3177	0.2352	0.2848	152	0.3306	0.2301	0.3136	-0.37	0.7116
CURRENT ASSETS/CURRENT LIABILITIES	168	3.5906	1.5318	5.1065	165	3.3187	1.3797	5.048	0.4886	0.6255
Solvency										
EBITDA/INTEREST EXPENSE	170	-190.64	-22.9867	424.6746	169	-105.4125	-14.3600	304.2749	-2.1228	0.0345
TOTAL LIABILITIES/TOTAL ASSETS	170	0.7337	0.5186	0.8053	169	1.1334	0.6699	1.6885	-2.7797	0.0057
TOTAL FINANCIAL DEBT/TOTAL ASSETS	141	0.2589	0.0823	0.5206	151	0.3840	0.1423	0.5732	-1.9476	0.0524

Table 14: Summary statistics on deal-characteristics for high-risk and low-risk acquirers

The table reports summary statistics of various deal characteristics across the subsample of high-risk and low-risk acquirers. High-risk acquirers are classified according to the 1st quartile of the distribution of pre-acquisition distance-to-default. Low-risk acquirers are classified according to the last quartile of the distribution of pre-acquisition distance-to-default. Activity diversification: a dummy that equals 1 if acquirer and target do not share the same three-digit SIC-code, Geographic diversification: a dummy that equals 1 if a crossborder transaction, Buy-and-hold return: acquirer market-adjusted daily buy-and-hold return over the window [-280 -30[, Market-to-book: acquirer market-to-book ratio over the window [-280 -30[, Aquisition experience: acquirer prior non-distressed acquisition experience, Bear market: yearly change in MSCI market return index is negative, Bull market: yearly change in MSCI market return index is positive, Stock only: transaction is fully paid in stock, Cash only: transaction is fully paid in cash. We mention the number of observations in each subsample. The t-test evaluates whether the differences are equal to zero. The variables are winsorized at 1%. The sample period is 1990-2009.

Deal-characteristics	High-risk acquirers		Low-risk acquirers		t-statistic	p-value
	Obs	Mean	Obs	Mean		
Diversification						
Activity diversification	170	0.5118	172	0.5058	0.1097	0.9127
Geographic diversification	170	0.2765	172	0.4012	-2.4495	0.0148
Management quality and expertise						
Buy-and-hold return	168	0.1318	169	0.0631	1.1544	0.2492
Market-to-book	167	1.8626	169	2.7220	-3.1239	0.0019
Acquisition experience	168	1.3988	169	8.1716	-7.9926	0.0000
Economic cycle						
Bear market	170	0.5294	172	0.1570	7.8691	0.0000
Bull market	170	0.4706	172	0.8420	-7.8691	0.0000
Method of payment						
Stock only	150	0.4267	127	0.1575	5.0591	0.0000
Cash only	150	0.3067	127	0.7165	-7.4212	0.0000

Table 15: Effect of leverage and deal size on risk for low-risk acquirers

Regressions on the determinants of acquisition-related risk changes. Dependent variables are absolute and relative difference scores in volatility and default risk. Absolute difference scores (ABS) are calculated by computing acquirer average daily volatility or default risk over the post-announcement period]+2 +252] minus daily volatility or default risk over the pre-announcement period [-280 -30[. Relative differences scores (REL) are defined as the absolute difference score divided by average daily volatility or default risk over the pre-announcement period [-280 -30[. The model is estimated via OLS with robust standard errors; p-values are in parentheses. We include a dummy equal to 1 if acquirer and target do not share the same three-digit SIC-code (CONGL), a dummy equal to 1 for a crossborder transaction (CROSSBORDER), acquirer market-adjusted daily buy-and-hold return over the window [-280 -30[(BHR), acquirer market-to-book ratio over the window [-280 -30[(MTB), acquirer prior non-distressed acquisition experience (ACQEXP), a dummy that equals 1 if acquirer pre-acquisition volatility falls within the 1st quartile (the 4th quartile for default risk)(LOWRISK), interaction effect between low-risk acquirers and changes in leverage and between low-risk acquirers and relative deal size, a dummy that equals 1 if acquirer pre-acquisition volatility falls within the 4th quartile (the 1st quartile for default risk)(HIGHRISK), yearly change in MSCI market return index (BULL_BEAR), change in acquirer total leverage to total assets (CHANGESLEV), target interest coverage ratio one year prior to announcement (T_ICR), a dummy that equals 1 if target is in a high-tech industry (T_HIGHTECH), a dummy of 1 if fully paid in stock (ALLSTOCK), cumulative abnormal return from -2 to +2 days relative to announcement (CAR), a dummy that equals 1 if target is listed (T_PUBLIC), ratio of deal value to acquirer market value of assets (RELSIZE), log of acquirer market value of assets prior to announcement (ACQSIZE), corporate bond spread (C_SPREAD). The variables are winsorized at 1%. ***, **, and * indicate significance at 1%, 5%, and 10%. The sample period is 1990-2009.

	Distance-to-default		Historical volatility		Historical volatility Downside_avg		Historical volalitlity Downside_zero	
	ABS	REL	ABS	REL	ABS	REL	ABS	REL
CONGL	-0.0547	-0.0139	-0.295***	-0.0652**	-0.205*	-0.0497	-0.234**	-0.0594*
	(0.667)	(0.694)	(0.007)	(0.042)	(0.061)	(0.165)	(0.014)	(0.080)
CROSSBORDER	0.316*	0.0318	0.0503	0.00171	0.0628	0.0119	0.0414	0.0116
	(0.070)	(0.481)	(0.656)	(0.965)	(0.636)	(0.800)	(0.672)	(0.775)
BHR	0.227	0.0349	0.173	0.0178	0.300*	0.106**	0.401**	0.152**
	(0.184)	(0.411)	(0.248)	(0.724)	(0.061)	(0.046)	(0.010)	(0.012)
HIGHRISKxBHR	0.125	0.196**	-0.524**	-0.0898	0.0131	-0.0867	-0.202	-0.140**
	(0.509)	(0.017)	(0.014)	(0.108)	(0.951)	(0.139)	(0.304)	(0.032)
MTB	-0.0838***	-0.0135	0.0495*	0.0123**	0.0556*	0.0152**	0.0441*	0.0124**
	(0.001)	(0.221)	(0.084)	(0.030)	(0.054)	(0.026)	(0.060)	(0.046)
ACQEXP	-0.0253**	-0.00397*	0.0120*	0.00656**	0.0134*	0.00699**	0.0140**	0.00646**
	(0.026)	(0.074)	(0.091)	(0.018)	(0.073)	(0.017)	(0.030)	(0.021)
LOWRISK	-0.668**	-0.0745*	0.236**	0.0995*	0.466***	0.245***	0.403***	0.251***
	(0.015)	(0.062)	(0.036)	(0.054)	(0.000)	(0.000)	(0.000)	(0.000)
LOWRISKxCHANGESLEV	-3.941***	0.407*	-0.722	0.0681	-0.154	0.158	-0.169	0.170
	(0.001)	(0.082)	(0.299)	(0.828)	(0.800)	(0.618)	(0.740)	(0.590)
LOWRISKxRELSIZE	-0.605***	-0.116*	0.206**	0.167***	-0.119	0.00599	-0.109	0.0336
	(0.000)	(0.070)	(0.031)	(0.000)	(0.669)	(0.949)	(0.268)	(0.540)
HIGHRISK	0.486***	0.273***	-0.697***	-0.136***	-1.084***	-0.185***	-0.794***	-0.176***
	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
BULL_BEAR	-1.711***	-0.499***	3.237***	0.789***	2.597***	0.737***	2.822***	0.833***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
CHANGESLEV	-1.925***	-0.764***	0.990**	0.248***	0.953**	0.276***	0.880**	0.288***
	(0.000)	(0.000)	(0.020)	(0.003)	(0.027)	(0.006)	(0.010)	(0.001)
T_ICR	-0.00008	-0.00002	-0.00007	-0.00002	-0.00007	-0.00001	-0.00004	-0.00001
	(0.530)	(0.702)	(0.541)	(0.499)	(0.500)	(0.642)	(0.616)	(0.670)
T_HIGHTECH	0.0980	0.0517	0.0261	0.0266	0.124	0.0780	0.0452	0.0386
	(0.593)	(0.269)	(0.859)	(0.539)	(0.436)	(0.131)	(0.711)	(0.386)
ALLSTOCK	-0.0745	0.0214	0.171	0.0405	0.0254	0.0321	0.0578	0.0380
	(0.645)	(0.662)	(0.217)	(0.276)	(0.855)	(0.457)	(0.620)	(0.331)
CAR	0.00490	0.00385*	-0.0000721	-0.000574	-0.00775	-0.00146	-0.00378	-0.000691
	(0.354)	(0.079)	(0.992)	(0.694)	(0.272)	(0.396)	(0.527)	(0.652)
T_PUBLIC	-0.0779	-0.0640	-0.272*	-0.0615	-0.304*	-0.0733	-0.234*	-0.0435
	(0.676)	(0.276)	(0.073)	(0.167)	(0.054)	(0.140)	(0.076)	(0.362)
RELSIZE	0.0970	0.0870	0.00361	-0.00835	0.145	0.0797	0.137	0.0384
	(0.151)	(0.177)	(0.965)	(0.636)	(0.597)	(0.213)	(0.140)	(0.200)
ACQSIZE	0.0814*	0.0191*	-0.0228	-0.0173*	-0.0446	-0.0192**	-0.0381	-0.0174*
	(0.054)	(0.063)	(0.465)	(0.051)	(0.176)	(0.047)	(0.146)	(0.051)
C_SPREAD	-1.196***	-0.295***	0.427***	0.129***	0.352**	0.143***	0.332**	0.127**
	(0.000)	(0.000)	(0.005)	(0.010)	(0.024)	(0.009)	(0.023)	(0.015)
Observations	504	504	536	536	535	535	536	536
R^2	0.410	0.381	0.321	0.293	0.343	0.301	0.369	0.326
R^2 adjusted	0.369	0.338	0.275	0.245	0.298	0.254	0.327	0.280