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The Impact of European Bank Mergers on Bidder Default Risk

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Abstract

We analyze the risk implications of European bank consolidation on the probability of default of acquiring banks. Using the Merton distance to default model, we show that the average bank merger is risk neutral. We examine the extent to which merger motives linked to risk diversification and regulatory incentives explain the observed risk effects of M&A. However, we find only limited evidence consistent with either of these explanations. Mergers that expand the geographic or product scope of banks do not generate a reduction in default risk. Also, stricter regulation does not facilitate risk reduction via M&A. Instead, we show that the risk profile of bidding banks before M&A determines the risk effects of a deal. This finding is robust to different merger strategies, regulatory incentives and pre-merger characteristics of the acquirer. Also, large banks, with limited scope for risk reduction, experience a merger-related increase in default risk.

JEL Classification: G21, G34, G33, G28
Key words: banks, mergers, default risk

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1 Introduction

In the past two decades, the structure of the European banking industry been transformed by numerous mergers and acquisitions (M&A) that have increased both the size of banking firms and concentration levels in national banking markets. Lately, this consolidation process has been given further impetus by the ongoing financial crisis which emphasized the role of acquisitions as a means to prevent bank failures and costly bank bailouts by policy makers (Group of Thirty, 2009). However, whether mergers are suitable to reduce the default risk of banks and, thus, to enhance the stability of the banking industry remains an open question. The purpose of this paper is to analyze the merger-related risk effects of M&A for a sample of European bidding banks.

Risk considerations may motivate the acquirer's choice of target bank and can be linked to disparate merger strategies (e.g. Benston et al., 1995; Craig and dos Santos, 1997). On the one hand, acquirers may seek risk diversification through mergers. Simulation studies report that M&A achieves greater portfolio diversification and lowers the probability of default of US banks as a result of scale effects (Emmons et al., 2004), geographic diversification (Hughes et al., 1999) and activity diversification (e.g. through mergers between banking and insurance firms (Boyd et al., 1993; Estrella, 2001)).

However, simulation results that indicate risk benefits related to bank mergers must be interpreted with care, because these studies fail to consider the increased organizational complexity and the resulting operational inefficiencies resulting from acquisitions (Hughes et al. , 1999; Knapp et al., 2005). In this context, Akhaven et al. (1997) show that geographic diversification may leave the overall level of risk unaffected when banks—against the background of a more diversified loan portfolio—sharply increase lending in the post-merger period.

Consistent with this, the few studies that focus on the realized risk effects of US bank mergers produce empirical findings that are more mixed than the hypothetical risk reduction benefits estimated by simulation studies. Benston et al. (1995) report for US mergers in the first half of the 1980s that the purchase premiums that bidders pay reflect the earning diversification potential of targets. Mishra et al. (2005) show

that total and idiosyncratic risk decline in a sample of 14 US acquirers because of synergies produced by bank mergers. Other studies question the importance of risk diversification as a major force behind US bank mergers. Amihud et. al. (2002) find no measurable merger-related risk reduction effect of cross-border bank mergers on the market risk of acquiring banks. Similar results are found by Craig and dos Santos (1997) for US bank mergers on the basis of an accounting-based measure of risk. In a related study, Craig and dos Santos (1996) provide further evidence against risk diversification as a motive for mergers by showing that acquired banks tend to be transformed post-M&A to resemble the strategic features of the acquiring institution.[1]

Next to diversification, regulatory incentives may also provide a risk-related bank merger motive. As pointed out by Elyasiani and Jia (2008), banks with higher default risk face increased scrutiny by regulators and are more likely to be subjected to regulatory intervention. Consequently, regulatory pressures may make risk-reducing mergers more prevalent in environments where regulators have increased disciplinary powers. In a recent study, Buch and DeLong (2008) provide evidence consistent with this argument by showing for a sample of cross-border mergers that stricter regulatory regimes are associated with a reduction in acquiring bank risk in the post-merger period.

However, the operation of bank bailout policies and deposit insurance schemes also give rise to well-defined moral hazard problems in the context of M&A. For example, underpriced deposit insurance schemes may encourage banks to enhance their deposit subsidy through mergers that increase the risk and size of an institution with the purpose of becoming too-big-to-fail (Benston et al., 1995). However, the empirical evidence that banks use mergers either to escape strict home country authorities or to extract deposit insurance benefits has hitherto been weak (Buch and DeLong, 2008, Benston et al., 1995).

In this paper, we analyze the default risk implications of M&A on acquiring banks in Europe. We start

[1] A related strand of the literature examines the effects of bank consolidation on the stability of the banking industry rather than the bank-level effects. These studies come to mixed conclusions as well. Uhde and Heimeshoff (2009) and De Nicolo et al. (2004) show that more concentrated banking systems are more risky. By contrast, Schaeck et al. (2009) and Beck et al. (2006) offer findings consistent with a positive influence of market concentration on the stability of the industry.

by showing that the average European bank merger does not affect the default risk of the acquirer. Next, we show this result also holds for merger types which offer the relatively largest scope for risk-related diversification benefits (i.e. cross-border and product diversifying M&A). However, we identify pre-merger risk as a key determinant of the risk implications of M&A. The riskiest sample banks experience a decrease in default risk, while the least risky bidders increase their default risk in the post-merger period.

Furthermore, we rule out that strong supervisory oversight motivates opposite risk-taking choices by low-risk and high-risk banks when engaging in M&A. By contrast, we observe a statistically significant change in bidder risk when bank supervision is weak. Furthermore, we are not able to fully explain this result as a consequence of the risk diversification potential being especially pronounced for the riskiest banks (see Brewer, 1989). Instead, we argue that our results point to market forces inducing high-risk and low-risk banks to converge towards the prevalent risk profile within their industry. Finally, our multivariate analysis shows that bidder characteristics play an important role in driving merger-related changes in distance to default. For example, both larger deals and deals initiated by larger banks are associated with lower risk reductions for bidders which raises some concerns about the financial stability implications of mega-mergers in banking.

Our analysis adds to the existing literature on mergers and banking risk in several ways. First, this paper is the first to study the realized risk implications of bank M&A by adopting a Merton distance to default (DD) model. This forecasting model boasts a wide range of empirical (see e.g., Akhigbe et al., 2007; Gropp et al., 2006; Vassalou and Xing, 2004) and commercial applications (including as a risk management tool in the banking industry (Basle Committee on Banking Supervision, 1999)). As a result of it combining market with accounting information, this measure holds several advantages over other default risk indicators. Estrella (2001) points out that pure accounting-based default measures (e.g. Craig and dos Santos 1997), by understating the variability of returns, underestimate the probability of bank failure. At the same time, market measures of banking risk (which decompose risk into total and systemic risk; see Amihud et. al., 2002; Mishra, 2005) do not provide a direct assessment of the default risk of a bank.

Second, to the best of our knowledge, this paper offers the first assessment of the risk effects of mergers

for European bidders. The extant literature on the risk effect of M&A has focused on either US mergers or on international samples of cross-border mergers. However, institutional differences between the US and Europe as well as recent policy initiatives aimed at stimulating the (cross-border) consolidation of banking assets to create a single European market for banking services (see Hernando et al., 2009) mean the European banking industry offers a suitable background against which to examine the risk effects of M&A.

Third, we contribute to the literature on bank M&A. The lack of empirical work that reports either positive wealth effects for bidding bank shareholders or performance improvements surrounding M&A (see Campa and Hernando, 2006) continues to raise the question as to who benefits from bank consolidation. Given the downside risk of shares is limited to zero, shareholders may benefit from risk-inducing mergers, because an increase in the riskiness of the financial institution exposes them to potentially large gains.

The rest of the paper proceeds as follows. Section 2 focuses on the methodology that we employ to measure the change in acquirer default risk that is due to mergers. Section 3 describes the sample of European bank M&A, while Section 4 discusses the empirical results. The final section concludes.

2 Methodology: Measuring Default Risk

To estimate merger-related changes in the default risk of bidding banks, we employ an application of the Merton distance to default (DD) model as in Akhigbe et al. (2007) and Gropp et al. (2006). Default risk is measured as the number of standard deviations that the market value of bank assets are above default point (the point where the market value of assets is less than the book value of total liabilities). Formally, DD on day *t* is expressed as:

$$DD_t = \frac{\ln\left(V_{A,t}/L_t\right) + \left(r_{f_t} - 0.5\sigma_{A,t}^2\right)T}{\sigma_{A,t}T}, \tag{1}$$

where $V_{A,t}$ is the market value of assets, L_t is the book value of total liabilities, r_{f_t} is the risk-free rate (proxied by the yield on two-year German government bonds), $\sigma_{A,t}$ is the annualized standard deviation of asset returns at *t*, and T is the time to maturity (conventionally set to 1 year).

The computation of DD_t requires estimates of $V_{A,t}$ and $\sigma_{A,t}$ neither of which are directly observable.

Following Akhigbe et al. (2007), Vassalou and Xing (2004) and Hillegeist et al. (2004), 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. Specifically, we can express the value of a firm's equity as a function of the asset value and solve the following system of nonlinear equations:

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

$$\sigma_{E,t} = \frac{V_{A,t} e^{-T} N(d_{1,t}) \sigma_E}{V_E} \tag{3}$$

Equation (2) defines the market value of bank equity at day t ($V_{E,t}$) as a call option on the value of the bidder's total assets ($V_{A,t}$), with $d_{1,t} = \frac{\ln\left(V_{A,t}/L_t\right) + \left(r_{f_t} + 0.5\sigma_{A,t}^2\right)T}{\sigma_{A,t}T}$ and $d_{2,t} = d_{1,t} - \sigma_{A,t}\sqrt{T}$. Equation (3) is the optimal hedge equation that relates the annualized standard deviation of a bidder's equity value to the annualized standard deviation of the value of total assets.

To solve this system of equations, we employ as starting values for $\sigma_{A,t}$ the historical volatility of equity (computed daily on the basis of a of 90-day rolling window) multiplied by the ratio between the market value of equity and the sum of the market value of equity and the book value of total liabilities, i.e. $\sigma_{A,t} = \sigma_{E,t} V_{E,t} / \left(V_{E,t} + L_t\right)$. The Newton search algorithm identifies the daily values for $V_{A,t}$ and $\sigma_{A,t}$ in an iterative process which we then employ to compute DD_t as described in Equation (1).

The merger-related change in bidder distance to default is the difference in mean DD_t before the merger (for a-180 days to a-11 days relative to the merger announcement date a) and mean DD_t after completion (for c+11 days to c+180 days following the completion date c). We choose this time window to reduce the level of noise in DD_t and to ensure that our default risk predictions are based on accounting data that relate to the post-merger period for the vast majority of deals.

We eliminate general industry and time trends in risk by computing, at daily frequency, a default risk index for the banking sector as the market weighted average of DD of all banks listed on Datastream in the

bidder's country that are not involved in M&A for a given year.[2] We subtract changes in the market risk index, computed for each merger over the same time window before the announcement date and after the completion date, from changes in the acquirer distance to default. Accordingly, the industry-adjusted change in the distance to default ($\Delta IADD$) for bidding banks that is due to M&A can be expressed as follows:

$$\Delta IADD = \overline{DD}_{(c+11;c+180)} - \overline{DD}_{(a-180;a-11)} - \left(\overline{DD}_{index,(c+11;c+180)} - \overline{DD}_{index,(a-180;a-11)} \right) = \Delta DD_{bidder} - \Delta DD_{index} \quad (4)$$

3 Merger Sample

The sample of bank M&A is obtained from Thomson Financial (SDC Platinum). The selected mergers are announced and completed between 1992 and 2007 and involve bidders located in the European Union, Norway and Switzerland. Bidding firms are commercial banks, bank holding companies and credit institutions, while targets may also be insurance companies (life and accident), mortgage bankers, as well as security brokers. We impose the following sampling criteria: Bidding banks are publicly listed with financial information available on Datastream. In order to avoid confounding events, there must be more than 180 trading days between separate merger announcement by the same bank.

The resulting dataset is described in Table 1. The sample consists of 136 acquisitions with bidders mainly operating in Italy (30), the UK (16) and Spain (14). In addition, the majority of the sampled deals (71) was announced over the period 1997-2001. It is worth emphasizing that the consolidation of bank assets in a number of European economies has chiefly involved non-listed public sector and cooperative institutions (Hernando et al., 2009) which face increasing pressures to consolidate as a result of declines in government ownership or the phasing out of public guarantees of their liabilities.

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[2] Following the application of these index criteria, the number of constituent banks in Finland, Austria, and Luxembourg declined substantially, rising concerns about the ability of our index to accurately capture banking sector risk in these in these countries. As a result, we aggregate some countries following geographic proximity criteria. Specifically, we create a Scandinavian banking sector default index (Finland, Norway & Sweden), a Benelux index (Luxembourg, Belgium & The Netherlands), and we aggregate the German and Austrian default indices.

4 Empirical Results

4.1 The Effect of Mergers on Default Risk

Table 2 reports the pre- and post-merger mean (median) industry-adjusted distance to default (IADD) for our sample of 136 bank mergers. We analyze whether the mean (median) IADD and the mean (median) merger-related change in IADD are equal to zero.

The results of these tests show that the average European bidding bank is riskier than its peers before M&A. Accordingly, the mean (median) industry-adjusted DD in the pre-merger period is -0.103 (-0.276) (statistically significant according to non-parametric tests). Although the majority of deals (56%) generate an increase in industry-adjusted in DD (i.e. they lower default risk), Table 2 suggests that mergers do not produce any statistically significant effect on the acquirers' risk profile. On average, the distance to default neither increases nor decreases in the post-merger period. This result is consistent with the findings reported in Amihud et al. (2002) and Craig and dos Santos (1997) for the US bank mergers.

Table 3 analyzes the existence of risk diversification motives behind M&A in the European banking industry. We report the distance to default effects of deals that can be classified as either cross-border or cross-industry mergers. The potential for merger-related risk reductions should be particularly pronounced for both geographically- and activity-diversifying mergers as both types of deals facilitate risk pooling that lowers the volatility of bank profits (Estrella, 2001; Boyd et al., 1993). However, these types of mergers may also lead to increased organizational complexity and/or significant changes in post-merger strategy which may thwart bidders from realizing risk benefits as a result of M&A.

Panel A of Table 3 focuses on geographic diversification, by comparing the risk implications of domestic and cross-border mergers, while Panel B analyzes the effect of product diversification on IADD by distinguishing between specializing and diversifying mergers (defined as deals where acquirer and the target do not share the same two-digit SIC code). These results offer further evidence that the average European bank mergers had no effect on the acquirer's distance to default. Thus, regardless of the increased risk diversification potential of some types of M&A, the mean (median) change in IADD is not statistically

significant different from zero for all merger types. It is interesting to note that, however, that following each merger type, a majority of bidders exhibits a decline in industry-adjusted risk.

4.2 Pre-merger Risk and Post-merger Changes in Default Risk

Next, we examine whether the default risk exhibited by bidding banks prior to a deal affects its risk effects. Our rationale for expecting different risk effects for low-risk and high-risk banks is based on Brewer (1989) who shows that only high-risk banks benefit from diversification. Similarly, Furfine and Rosen (2009) suggest that firms use mergers as a tool to achieve a desired level of risk. Under this perspective, if we view the average risk within the industry as a proxy of target risk, we should observe that low- (high-)risk banks converge towards the industry mean following M&A.

In Table 4, we evaluate whether the default risk implications of mergers depend on the pre-merger risk profile of the acquirer. We rank sample banks according to their pre-merger IADD and report the risk effects of M&A in the first (high-risk) and the fourth DD quartile (low risk). The results show that the percentage of bidding banks where M&A has a positive impact on default risk declines rapidly across risk quartiles (from 82.4% for high-risk banks to 26.5% for low-risk banks). More importantly, the merger-related change in IADD is statistically significant according to both parametric and non parametric tests in the first and in the fourth risk quartile. Further, we observe that M&A causes low-risk banks to lose their risk advantage vis-à-vis national banking sectors as indicated by a distance to default is not significantly different from the industry mean. Apparently, consolidation causes bidder risk for the most and the least risky banks to gradually converge towards the sector average in the post-merger period as demonstrated by Figure 1.

Thus, the results confirm that the risk effects of mergers are related to the pre-merger risk profile of the acquirer. However, to evaluate whether regulatory incentives and/or diversification motives drive this finding, we conduct further tests based on the intuition that banks with higher default risk are likely to be under increased regulatory scrutiny (Elyasiani and Jia, 2008) and, thus, face pressures to engage in M&A that is perceived to be risk-reducing. Consequently, if regulatory incentives explain our results, we expect high-risk banks to reduce their riskiness in regulatory environments where the power of the supervisory

authorities is higher, while low-risk banks are likely to increase their risk less as the supervisory power increases. By the same token, if diversification motives explain our results, we expect that any risk reduction benefits for high-risk banks are larger when mergers have higher diversification potential. Consequently, the risk reduction associated with cross-border and activity-diversifying mergers should be especially pronounced in the high-risk quartile.

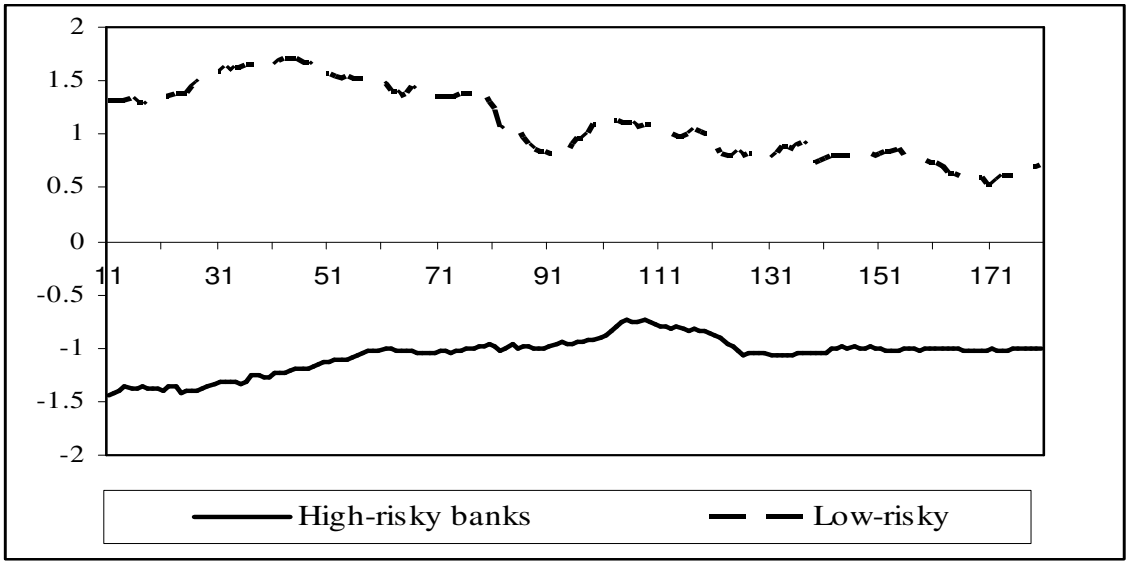

Figure 1: Daily Post-merger IADD for High- and Low-risk Banks

We analyze the regulatory influence hypothesis and the diversification hypothesis in Tables 5 and 6, respectively. Table 5 reports univariate tests for high-risk and low-risk banks and different levels of supervisory strength in the bidder's country. Similar to Buch and DeLong (2008), we assemble an index of regulatory strength from the Barth et al (2001) database.[3,4] Higher index values indicate stricter regulatory

[3] The regulatory index is based on yearly data. We obtain updated values on regulatory variables for the year of the merger announcement from the Worldbank website (http://go.worldbank.org/SNUSW978P0).

[4] Specifically, the index measures the power of bank supervisors on the basis of the following questions: (1) Does the supervisory agency have the right to meet with external auditors to discuss report without the approval of the bank? (2) Are the auditors required to communicate misconduct by managers/directors to supervisory agency? (3) Can legal action against external auditors be taken by supervisor for negligence? (4) Can supervisors force banks to change internal organizational structure? (5) Are

environments based on how sensitive regulators are to bank risk-taking, the breadth of disciplinary powers available, and the quality of enforcement. We classify countries as having high supervisory power for index values above the sample median. The results confirm the regulatory hypothesis only for low-risk banks which increase their default risk when regulatory power is low. Rather unexpectedly, high-risk institutions also reduce their risk when the supervisory power is low. In other words, the supervisory power does not appear to consistently motivate the risk-taking choices for low-risk and high-risk banks in the context of M&A.

In Table 6, we assess the relevance of diversification effects in explaining our results. Panel A focuses on the risk effects of domestic and cross-border bank mergers for high- and low-risk banks. Again, we provide parametric and non parametric tests of the hypotheses that the mean (median) value of the pre- and post-merger risk measure and the merger-related change in IADD are equal to zero. Panel B shows the results of the same type of tests for mergers classified as focusing and diversifying deals.

The results of these tests provide mixed evidence as regards the importance of diversification and bidders' pre-merger risk profile. While the percentage of high-risk banks with an increase in IADD is higher for cross-border and activity-diversifying mergers (than for domestic and focusing deals), we cannot find any statistically significant differences in terms of merger-related risk reduction benefits between diversifying and non-diversifying deals in either Panel A or Panel B. We infer from this that risk-reduction benefits realized by high-risk banks are not the result of geographic or activity diversification effects. High risk banks experience a statistically significant increase in IADD following both diversifying and focusing mergers in Panel A and Panel B of Table 6. In short, we find evidence of positive risk effects in the risk groups and merger types where we expect to find these under the diversification hypothesis. However,

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off-balance sheet items disclosed to supervisors? (6) Can the supervisory agency order directors/management to constitute provisions to cover actual/potential losses? (7) Can the supervisory agency suspend director's decision to distribute: a) Dividends? b) Bonuses? c) Management fees? (8) Can the supervisory agency supercede bank shareholder rights and declare bank insolvent? (9) Does banking law allow supervisory agency to suspend some or all ownership rights of a problem bank? (10) Regarding bank restructuring and reorganization, can the supervisory agency or any other government agency do the following: a) suspend shareholder rights? b) remove and replace management? c) Remove and replace directors?

merger-related risk benefits also seem to exist for types of mergers where we do not expect them under this hypothesis.

To summarize, the initial tests show the risk effects produced by mergers depend on the pre-merger risk the acquiring bank. However, we are not able to conclude that either regulatory incentives or the diversification effects drive our results. More specifically, while low-risk banks behave according to the regulatory influence hypothesis, our findings for highly risky banks are inconsistent with this explanation. Furthermore, we note that there are some differences in the risk effects produced by diversifying and non-diversifying mergers in the high-risk quartile of bidders. However, merger-related reduction in default risk exist for all deals in these groups, irrespective of the merger type considered. Our results imply that market mechanisms are more likely to induce opposite merger strategies within these two groups of banks.

It is worth noting that our analysis does not control for either deal or bidding bank characteristics that may help explain our results. The following section examines the risk effects of European bank mergers in a multivariate setting.

4.3 The Determinants of Changes in Default Risk

This section investigates the determinants of the change in the industry-adjusted distance to default (ΔIADD) in a multivariate framework. We assess how merger-related risk changes are affected by merger strategies and pre-merger characteristics of the acquirer. Our model, estimated via OLS with robust standard errors, assumes the following specification:

$$\Delta IADD_i = \alpha_0 + \gamma' \mathbf{MC}_i + \theta' \mathbf{AC}_{i,t-1} + \varepsilon_i \tag{5}$$

where:

- $\Delta IADD_i$ is the change in the industry-adjusted distance to default as described in Section 2;
- $\mathbf{MC}_i$; is a $(k \times 1)$ vector of merger characteristics;
- $\mathbf{AC}_{i,t-1}$ is a $(k \times 1)$ vector of acquirer characteristics at the end of the fiscal year before the announcement of the merger.

Among other variables, the vector of merger characteristics includes the method of payment, the status of

the target bank, and deal size. The payment method is described through a dummy variable equal to one if the merger is fully paid by cash and zero otherwise (CASHONLY). Furfine and Rosen (2009) suggest that fully cash-financed mergers are likely to increase bidder risk, because bidders are substituting safe liquid assets with the (more risky) balance sheet of the target. As a second merger characteristic, we consider the status of the target by distinguishing via a dummy variable between public and private target firms (PUBLIC). We expect bank mergers involving public targets to produce positive risk effects, because listed firms are likely to be larger and more diversified than private targets. Also, the increased disclosure requirements pertaining to public firms facilitate effective due diligence by bidding banks—with positive implications for the bidder's risk assessment capabilities.

The third variable measures the relative size of the merger as the ratio between the value of the deal and bidder total assets at the end of the year before the merger (RELSIZE). Deal size can affect the risk profile of the acquirer in several ways. Larger deals may produce more diversification benefits and reduce the default risk of the acquiring bank. However, larger mergers are also more complex to integrate into the context of the bidding bank and may lead to organizationally more complex institutions (Knapp et al., 2005). At least in the short run, therefore, large mergers may cause an increase in default risk.

Echoing the univariate tests on the potential diversification effects of bank mergers above, we also capture the geographic relatedness (cross-border versus domestic mergers, CROSSB) and activity relatedness (focusing versus diversifying mergers, CONGLOMERATE) between acquirer and target. Also, we test if highly-specialized mergers that are simultaneously activity focusing and domestic affect our measure of relative banking risk (DOMESTICFOCUS).

Moving to the vector of acquirer characteristics, we consider measures of pre-merger performance and size. Some of these variables are related to agency explanations of M&A which stress potential conflicts between managers and shareholders as regards the deployment of corporate resources and the riskiness of the institution (Jensen and Meckling, 1976). For example, declining market performance can be interpreted as an indicator that managers are acting against the interests of shareholders and are, possibly, pursuing their own agenda. We measure pre-merger market performance (PREMERGERPERF) as the industry-adjusted

buy and hold return of the bidding bank equity over the period from 180 to 11 days before the deal announcement. Further, the market-to-book ratio can be used as a proxy for executive hubris which we expect to be negatively related to merger-related changes in distance to default. In our analysis, we capture this effect through a binary variable which equal to one if the market-to-book ratio is greater than one and zero otherwise (DUMTBV).

Berger and Bonnacorsi di Patti (2006) show that financial leverage reduces agency cost in banking. Leverage increases the risk of liquidation (with the prospect of pay losses for executives) and pressures to generate cash flows sufficiently high to cover interest payments. Consequently, managers at low leverage banks are more likely to use free cash flows to maximize their own benefits by undertaking strategies (mergers) which increase their salaries as well as, possibly, the likelihood of default. We control for this effect in the regression model through a dummy equal to one for low-leverage banks, defined as banking firms in the last distribution quartile of the equity-to-assets ratio (CAD).

To control for the influence of management quality on the risk effect of mergers, we also control for operating efficiency. We create a binary variable that is equal to one for relatively inefficient banks that are located in the last quartile of the sample distribution of this ratio (DUMOPCOSTS). Further, we expect a negative influence of acquirer size—measured as the log transformation of total bank assets (SIZE)—on merger-related changes in default risk. If the diversification benefits of mergers decline with bidder size, large banks face incentives to increase risk through M&A and to extract too-big-to-fail benefits from regulators (see Benston et al., 1995)

Following our univariate tests, we control for the pre-merger risk profile of the acquiring bank. We consider two dummy variables that identify high-risk (HIGHRISK) and low-risk (LOWRISK) banks which are positioned in the first and last pre-merger DD quartile, respectively. These variables should not enter the multivariate framework with statistically significant coefficients if the merger-related risk effects between high-risk and low-risk banks discussed in the previous section depend on merger strategies or pre-merger characteristics of the acquirer. Finally, to evaluate whether the expected performance gains of a bank merger are related to the risk implications of a deal, we also include the cumulative abnormal returns for -

11 to +1 days (CAR) relative to the merger announcement date as in Amihud et al. (2002) and Buch and DeLong (2008). Market model parameters are estimated using 110-day daily return observations starting from 120 days to 11 days before the acquisition announcement date supplied by Thomson Financial.

An overview of our variables and summary statistics is provided by Table 7.

4.3.1 The Influence of Deal and Acquirer Characteristics

Table 8 reports the results of the regressions on merger-related changes in industry-adjusted distance to default. The first two columns focus on the relationship between deal characteristics and the risk effects of bank mergers, while the remaining columns expand the analysis to include the influence of acquiring bank characteristics.

The results in Columns (1) and (2) suggest that deal characteristics do not play a strong role in driving changes in distance to default produced by mergers. For example, in line with the results of the univariate tests, we do not find any evidence of potential risk diversification benefits from mergers. Both the cross-border and the activity diversification dummies are not significant at conventional levels. However, we also do not observe any significant effect on acquirer risk by highly-specialized mergers. Accordingly, mergers that are both domestic and activity-focusing do not influence the change in IADD in any statistically significant way.

Among the set of deal characteristics, only the relative size variable is significant at conventional levels showing that larger deals decrease IADD (i.e. increase risk). This result is consistent with the argument large bank mergers pose cultural and procedural hurdles in the post-merger integration process that thwart benefits from materializing (Knapp et al., 2005). Further, the negative sign on the relative size variable is inconsistent with the notion that larger deals offer more scope for diversification benefits.

Columns (3) to (6) re-estimate the regression model to include acquiring bank characteristics. We first observe that, in spite of the introduction of a large number of explanatory variables, the coefficient on the relative size variable is still significant (at the 5%-level). However, the new set of variables substantially

increases the explanatory power of the regression model, suggesting a prominent role of acquirer characteristics in driving changes in IADD.

In addition, consistent with the univariate analysis, we observe the importance of the pre-merger risk profile of the acquirer in determining the risk effects of financial consolidation. The HIGHRISK dummy shows a negative and highly statistically significant coefficient that contrasts with the positive, and statistically significant, coefficient of the LOWRISK dummy. These results suggest that any influence of pre-merger acquiring bank risk on the realized risk effects of M&A is not the consequence of differences in deal strategies or financial characteristics between low-risk and high-risk banks.

Consistent with our expectation that larger banks have less scope for diversification and pursue more aggressive risk-taking strategies, we observe that bidder size is negatively related to distance to default. As banks become larger (and, possibly, too-big-to-fail), they are more likely to increase risk-taking through mergers. Further, the negative relationship between IADD and bank efficiency (at 5% level of significance) can be explained by the difficulties that highly inefficient banks face to successfully complete a merger. Similarly, if we interpret our measure of efficiency as a proxy of management quality, this result implies that poorly-managed banks are less likely to select acquisition targets that lower default risk.

We also observe a positive coefficient on DUMTBV which is significant at the 5%-level. The fact that banks with higher market-to-book ratios use M&A to lower default risk contrasts with the notion frequently advanced in non-financial studies that managers of high-valuation firms suffer from hubris and overestimate their abilities when engaging in acquisitions. For banking firms, we argue that this result is consistent with the charter value hypothesis (Keeley, 1990) which postulates that higher charter values (as measured by the market-to-book ratio) act as a risk control device on banks. In other words, banks with higher charter values, in fear of losing future cash flows, have no incentive to assume additional risk (Galloway et al., 1997).

Consistent with the agency explanation that managers of low performing banks are more likely to increase the risk of default, the coefficient on the buy and hold returns is negative (albeit not statistically significant at conventional levels). Similar explanations apply to the negative coefficient on DUMCAD (not

statistically significant either). Also, we do not find any evidence consistent with a statistically significant relationship between the risk implications and the expected performance of a deal (CAR).

Finally, Columns (5) and (6) of Table 8 control for real GDP growth and banking market concentration (both in the acquirer's country). The country variables do not exhibit any statistically significant effect on IADD, while leaving our prior results unaffected.

4.3.2 The Influence of Supervisory Power

Next, we examine whether, in a multivariate framework, regulatory incentives motivate bank risk-taking in mergers. Second, we test whether any impact of regulatory incentives on risk-taking varies by the level of bidder's pre-merger risk.

Table 9 expands the previous regression models by adding the index of supervisory power (SUPOWER). The results reported in Column (1) show that the coefficient on SUPOWER is positive, as predicted by the regulatory influence hypothesis, but it is not significant at conventional levels. In Columns (2) to (4), we consider the interaction between SUPOWER and the LOWRISK (HIGHRISK) dummy variable. The results of this are shown in Panel B of Table 9 where we compute the marginal effect of LOWRISK (HIGHRISK) on IADD for different supervisory strengths. The marginal effects can be interpreted as measuring the change in IADD when the dummy LOWRISK (HIGHRISK) changes from 0 to 1 in a given supervisory regime. Accordingly, if the regulatory influence hypothesis holds, we expect that, as SUPOWER increases, the incentive for taking on less (more) risk should be higher (lower) for high- (low-)risk banks.

Our results, however, do not confirm this expectation, but offer evidence that is in line with the results of the univariate analysis. Thus, when the supervisory power is high, the risk effect of mergers on either low-risk or high-risk bidders is not significantly different from the risk effect of M&A on the rest of the sample.

Different risk effects of M&A are present only in regulatory systems characterized by low supervisory power where low (high) risk banks tend to increase (decrease) their risk of default.[5]

These results confirm the evidence offered by the univariate tests and are consistent with the hypothesis that market mechanisms, and not supervisory incentives, are driving merger-related changes in IADD for high-risk and low-risk banks.

4.3.3 Pre-merger Risk and Diversification Benefits

As a final test, Table 10 analyzes the interaction effects between the bidding bank's pre-merger default risk and diversifying mergers (CONGL and CROSSB dummies) on the risk effects of M&A. The results produce a clear picture of the relationship between pre-merger risk and the potential diversification gains for low-risk banks. In Panel A of Table 10, we observe that the risk effects of M&A for product and geographically focusing deals are not significantly different for low-risk banks. Panel B points out that the marginal effect of the LOWRISK dummy on IADD is negative and strongly significant when low-risk banks are involved in product and geographically diversifying mergers.

However, the results of the analysis of the group of high-risk banks is less consistent with the diversification hypothesis. We observe that only geographically-diversified mergers produce a positive and significant marginal effect on IADD (in line with the argument that high-risk banks benefit most from diversification), but we acknowledge that the risk reduction effect of mergers involving high-risk banks does not seem to be closely related to product diversification.

4.4 Robustness

We conducted several tests to evaluate the robustness of our results. First, we consider an alternative measure of default risk. We estimate a relative measure of risk as the difference between the ratio of the bidder DD and industry DD after the effective date of the merger and before the announcement of the

[5] In unreported tests, the same evidence is provided when we measure the supervisory power through a dummy that assumes a value equal to 1 for regulatory regimes where SUPOWER is above the sample median (and zero otherwise). In other words, we still observe that low- (high-)risk banks increase (decrease) their risk through M&A under relatively weak supervisory regimes.

merger. Given the high correlation between this metric and IADD (r=.89), it is not surprising that the results of all empirical tests remain unaffected when employing the relative risk measure.

Second, the risk effects of M&A may be partly determined by target bank characteristics beyond those that we have already controlled for in our analysis (e.g. via target status or the degree of activity diversification). Accordingly, we expand our analysis to test whether target characteristics such as performance, size, capital adequacy, and operating efficiency explain the risk effects of M&A on bidding banks. None of these variables enter the regressions with coefficients that are statistically significant at customary levels. However, despite the large decline in sample size (to n=64)—owing to the unavailability of some target data on Datastream—deal size still shows a significant and negative sign when including the vector of target bank characteristics. Furthermore, albeit not significant at conventional levels, the coefficients on a number of variables (size, ROA, operating efficiency) exhibit the expected sign after controlling for target characteristics. Although we recognize the limitations of this analysis, we argue that these results proffer evidence that our main conclusions are robust to the inclusion of target bank characteristics.

Third, the different risk effects that mergers produce for high-risk and low-risk banks may result from risk transfers between target and acquiring banks. We analyze whether high-risk and low-risk banks select target banks with different risk profiles for sub-samples of targets that were acquired by high-risk or low-risk bidders. However, when comparing several accounting ratios that are likely to summarize the target risk profile (ROA, leverage, cost efficiency and size), we do not find evidence that the targets acquired by high-risk banks differ with respect to their risk profile from the targets acquired by low-risk banks.

Finally, some studies have demonstrated the importance of the single currency on the European banking industry. For example, Ekkayokkaya et al. (2009) show that the value effects of bidding bank shareholders have fallen during European Monetary Union (EMU). Similarly, Haq and Heaney (2009) point out that EMU has caused a decline in banking risk in adopting countries and neighboring European countries. Since our analysis covers a sample period which partly coincides with EMU, we test if the adoption of the euro impacts the risk effects produced by bank mergers. We introduce a dummy variable that takes the value of

1 for mergers announced after 1999 (and zero otherwise). The variable enters the regression model with a positive coefficient showing that EMU has increased IADD (not significant at conventional levels), while leaving the findings discussed in the previous section unaffected. We, therefore, conclude that controlling for euro effects does not modify our findings.

5 Conclusions

Sound financial intermediation relies on banks' ability to manage risks effectively. The default of banking firms poses difficult trade-offs for policymakers between the negative externalities associated with bank failures and costly government bailouts. Over past decades, repeated bank merger waves have raised concerns among bank stakeholders as regards the risk implications of financial consolidation on individual banks and on the banking system as a whole.

This paper analyzes how mergers impact the default risk of a sample of European bidders. We show that, on average, M&A do not modify the risk profile of acquiring banks. However, in contrast to the extant empirical evidence, we identify pre-merger risk as a key determinant of the risk implications of M&A. Specifically, low-risk banks significantly increase their risk of default after deals, while high-risk banks exhibit a significant reduction in risk. We confirm this result in a multivariate setting where we control for a set of other possible determinants of the risk effects of M&A. We conclude that the pre-merger risk of the acquirer is not a proxy for other deal or bidder characteristics .

Contrary to our expectations, we show that supervisory incentives cannot explain the contrasting risk-taking behavior by low- and high-risk banks in the context of M&A. We observe, in fact, that only under weak supervisory regimes, banks show a significant change in their default risk after a merger. Furthermore, we do not find evidence that risk reduction via M&A is the result of diversification gains realized by the two risk groups. We argue that these results suggest that our market forces and post-merger strategies are likely to drive the risk effects of mergers in the high- and low-risk group and that mergers provide a mechanism for banking firms to let their risk profile converge to the industry mean.

Future research should focus on the bank-specific drivers of risk-taking in the context of mergers. Outside the banking literature, Furfine and Rosen (2009) assess the effect of mergers on the acquirer's default risk. The authors identify executive remuneration (higher risk increases occur when CEOs have a higher share of option-based compensation) and the level of asymmetric information (expressed by the value of idiosyncratic volatility) as drivers of merger-related changes in default risk.

Overall, our results convey a critical view of the risk-reduction potential of bank M&A and suggest that European policy makers should consider the costs and benefits of bank consolidation carefully. Outside the group of very risky institutions, mergers only provide limited potential to lower default risk. Further, our finding that bid size exerts a negative influence on industry-adjusted distance to default raises concerns about the implications of banking mega-mergers on banking sector stability.

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Table 1: Overview of M&A Sample

	Number of Mergers		Total Value		Average Value
Panel A: Distribution of M&A by year					
	n	%	n	%	n
1992	3	0.022	282.39	0.001	94.13
1993	2	0.015	270.66	0.001	135.33
1994	4	0.029	4846.75	0.010	1211.69
1995	8	0.059	3436.22	0.007	429.53
1996	8	0.059	6147.08	0.013	768.39
1997	13	0.096	55365.59	0.113	4258.89
1998	13	0.096	50067.09	0.102	3851.32
1999	19	0.140	115618.5	0.236	6085.18
2000	16	0.118	51135.40	0.104	3195.96
2001	11	0.081	38565.04	0.079	3505.91
2002	5	0.037	2526.71	0.005	505.34
2003	3	0.022	4302.40	0.009	1434.13
2004	4	0.029	22296.37	0.046	5574.09
2005	9	0.066	33903.64	0.069	3767.07
2006	12	0.088	60433.41	0.123	5036.12
2007	6	0.044	40620.48	0.083	6770.08
Total	136	1.000	489817.70		

Panel B: Geographic Distribution

Acquirer nation	**Target nation**																			
	AU	BE	DE	FI	FR	GE	GR	IR	IT	LU	NE	NO	PT	SP	SW	ST	UK	USA	Others	Total
AU	1																		4	5
BE		2									2									4
DE			3									1								4
FI				2																2
FR					7				1										4	12
GE	2	1			1	4													3	11
GR							5												4	9
IR								1									1			2
IT						1			2										1	30
									8											
LU														2						2
NE		1							1		2								4	8
NO												3								3
PT													5						1	6
SP													1	6			1	1	5	14
SW				1											2				1	4
ST																3		1		4
UK					1												7	2	6	16
Total	3	4	3	3	9	5	5	1	30		4	4	6	8	2	3	9	4	33	136

Table 2: Bank Mergers and Industry-Adjusted Distance to Default

This table reports the sample mean (median) of the Industry-Adjusted Distance to Default (IADD) computed for the period before the announcement of the merger and for the period after the effective date of the merger.
For each bidder, distance to default before the merger is computed as the average of the distance to default over the period from -180 day to -11 days relative to the announcement, while the distance to default after the merger is computed as the average of the distance to default over the period from +11 days to +180 days after the effective date. These measures are then industry- adjusted as described in Section 3. The change in the Industry-Adjusted Distance to Default is the difference between the post-effective date and pre-announcement period IADD, winsorized at the 1% level. The *t*-test (sign-test) evaluates the null hypothesis that the mean (median), IADD- Pre-Merger, IADD- Post-Merger and ΔIADD are equal to zero. The percentage of positive changes is the ratio between the number of mergers with an increase in the IADD and the total number of mergers in the sample.

	N	**Mean (p-value)**	**Median (p-value)**	**% of positive changes**
IADD: Pre-Merger (-180, -11)	136	-0.103	-0.276**	
		(0.460)	(0.020)	
IADD: Post- Merger (+11, +180)	136	-0.076	-0.237***	
		(0.579)	(0.000)	
ΔIADD	136	0.031	0.117	55.9%
		(0.785)	(0.198)	

***(**;*) denotes significance at 1% (5%; 10%)

Table 3: Diversification and the Effects of Bank M&A on the Industry-Adjusted Distance to Default

Panel A reports the sample mean (median) of the industry-adjusted distance to default (IADD), computed for the period before the announcement of the merger and for the period after the effective date of the merger, for domestic and cross border aggregations. Panel B reports the sample mean (median) of the same risk measures computed for focus and diversified mergers. A merger is defined as diversified when the bidder and the target do not share the same two digit SIC code. For each bank the distance to default before the merger is computed as the average of the distance to default over the period from -180 day to -11 days from the announcement, while the distance to default after the merger is computed as the average of the distance to default over the period from +11 days to +180 days after the effective date. These measures are then industry- adjusted as described in section 3. The change in the Industry-Adjusted Distance to Default is the difference between the post-effective date and pre-announcement period IADD, winsorized at the 1% level. The *t*-test (sign-test) evaluates the null hypothesis that the mean (median), IADD- Pre-Merger, IADD- Post-Merger and ΔIADD are equal to zero. The percentage of positive changes is the ratio between the number of mergers with an increase in the IADD and the total number of mergers in each category.

Panel A: Geographic diversification	**Domestic (1)**				**Cross-Border (2)**				**1=2**	
	N	Mean	Median	% positive	N	Mean	Median	% positive	t-Statistic	Z-statistic
IADD: Pre-Merger (-180, -11)	81	0.030	-0.249		55	-0.298	-0.292			
		(0.879)	(0.119)			(0.121)	(0.105)			
IADD: Post- Merger (+11, +180)	81	0.072	-0.128**		55	-0.296	-0.399***			
		(0.733)	(0.014)			(0.031)	(0.001)			
ΔIADD	81	0.050	0.080	55.6%	55	0.002	0.289	56.4%	0.209	-0.497
		(0.748)	(0.374)			(0.989)	(0.419)		(0.835)	(0.619)
Panel B: Product diversification	**Focusing (3)**				**Diversifying (4)**				**3=4**	
	N	Mean	Median	% positive	N	Mean	Median	% positive	t-Statistic	Z-statistic
IADD: Pre-Merger (-180, -11)	103	0.025	-0.249*		33	-0.502**	-0.292			
		(0.880)	(0.076)			(0.045)	(0.163)			
IADD: Post- Merger (+11, +180)	103	0.050	-0.154***		33	-0.436**	-0.268**			
		(0.812)	(0.001)			(0.034)	(0.013)			
ΔIADD	103	0.015	0.102	56.3%	33	0.080	0.155	54.5%	-0.249	-0.140
		(0.911)	(0.237)			(0.702)	(0.728)		(0.804)	(0.889)

***(**;*) denotes significance at 1% (5%; 10%)

Table 4 Merger-related Changes in Industry-Adjusted Distance to Default, by Default Quartiles

This table reports the sample mean (median) of the industry-adjusted distance to default (IADD), computed for the period before the announcement of the merger and for the period after the effective date, for banks classified in risk classes. These classes are defined on the basis of the value of the Industry-adjusted Distance to Default in the pre-event period. For each bank the distance to default before the merger is computed as the average of the distance to default over the period from -180 day to -11 days from the announcement, while the distance to default after the merger is computed as the average of the distance to default over the period from +11 days to +180 days after the effective date of the merger. These measures are then industry- adjusted as described in section 3. The change in the Industry-Adjusted Distance to Default is the difference between the post-effective date and pre-event period IADD, winsorized at the 1% level. The t-test (sign-test) evaluates the null hypothesis that the mean (median), IADD-Pre-Merger, IADD- Post-Merger and ΔIADD are equal to zero. The percentage of positive changes is the ratio between the number of mergers with an increase in the IADD and the total number of mergers in each class.

Industry-Adjusted Distance to Default classes		**N**	**Mean**	**Median**	**% positive**
1. First Quartile- low distance to default (High-risk)	IADD: Pre-Merger (-180, -11)	34	-1.667***	-1.471***	
			(0.000)	(0.000)	
	IADD: Post- Merger (+11, +180)	34	-1.049***	-0.881***	
			(0.000)	(0.000)	
	ΔIADD	34	0.631***	0.743***	82.4%
			(0.000)	(0.000)	
2. Second Quartile	IADD: Pre-Merger (-180, -11)	34	-.0.559***	-0.524***	
			(0.000)	(0.000)	
	IADD: Post- Merger (+11, +180)	34	-0.355*	-0.332***	
			(0.075)	(0.000)	
	ΔIADD	34	0.179	0.229	64.7%
			(0.335)	(0.121)	
3. Third Quartile	IADD: Pre-Merger (-180, -11)	34	0.029	0.068	
			(0.377)	(0.392)	
	IADD: Post- Merger (+11, +180)	34	0.021	-0.049	
			(0.886)	(0.864)	
	ΔIADD	34	-0.008	0.013	50.0%
			(0.954)	(1.000)	
4. Fourth Quartile- high distance to default (Low-risk)	IADD: Pre-Merger (-180, -11)	34	1.786***	1.025***	
			(0.000)	(0.000)	
	IADD: Post- Merger (+11, +180)	34	1.078***	0.463	
			(0.009)	(0.122)	
	ΔIADD	34	-0.679**	-0.606***	26.5%
			(0.038)	(0.009)	

***(**;*) denotes significance at 1% (5%; 10%)

Table 5: Risk Classes, Supervisory Power and Changes in Industry-Adjusted Distance to Default

Panel A reports the sample mean (median) of the industry-adjusted distance to default (IADD), computed for the period before the announcement of the merger and for the period after the effective date for domestic and cross border aggregations involving high or low-risk banks. Panel B reports the sample mean (median) of the same risk measures for focus and diversified mergers involving high or low-risk banks.. A merger is defined as diversified when the bidder and the target do not share the same two digit SIC code. For each bank the distance to default before the merger is computed as the average of the distance to default over the period from -180 day to -11 days from the announcement, while the distance to default after the merger is computed as the average of the distance to default over the period from +11 days to +180 days after the effective date of the merger. These measures are then industry- adjusted as described in section 3. The change in the Industry-Adjusted Distance to Default is the difference between the post-effective date and pre-announcement period IADD, winsorized at the 1% level. The t-test (sign-test) evaluates the null hypothesis that the mean (median), IADD- Pre-Merger, IADD- Post-Merger and ΔIADD are equal to zero. The percentage of positive changes is the ratio between the number of mergers with an increase in the IADD and the total number of mergers in each category. T-test ((wilcoxon rank-sum test) is used to test the null hypothesis of mean (median) equality between the change in IADD for high-risk banks with high and low supervisory power

		High Supervisory Power (1)				**Low Supervisory Power (2)**				**(1 – 2)**	
		N	Mean	Median	% positive	N	Mean	Median	% positive	t-Statistic	Z-statistic
	IADD: Pre-Merger (-180, -11)	14	-1.721***	-1.619***		20	-1.629***	-1.405***			
High-risk			(0.000)	(0.000)			(0.000)	(0.000			
banks	IADD: Post-Merger (+11, +180)	14	-1.272***	-.1.144***		20	-0.894***	-0.606***			
			(0.000)	(0.000)			(0.000)	(0.000)			
	ΔIADD	14	0.449	0.773	71.4%	20	0.759***	0.742***	90.0%	0.928	0.175
			(0.131)	(0.179)			(0.001)	(0.000)		(0.360)	(0.861
	IADD: Pre-Merger (-180, -11)	14	1.603***	0.930***		20	1.913***	1.127***			
Low-risk			(0.004)	(0.000)			(0.000)	(0.000)			
banks	IADD: Post-Merger (+11, +180)	14	1.233**	0.735		20	0.970	0.324			
			(0.028)	(0.179)			(0.106)	(0.504)			
	ΔIADD	14	-0.371	-0.501	35.7%	20	-0.896**	-0.700***	25.0%	-0.820	-0.752
			(0.505)	(0.424)			(-0.029)	(0.012)		(0.418)	(0.452)

***(**;*) denotes significance at 1% (5%; 10%)

`Table 6: Risk classes, Diversification and Changes in Industry-Adjusted Distance to Default

Panel A reports the sample mean (median) of the industry-adjusted distance to default (IADD), computed for the period before the announcement of the merger and for the period after the effective date for domestic and cross border aggregations involving high or low-risk banks. Panel B reports the sample mean (median) of the same risk measures for focus and diversified mergers involving high or low-risk banks.. A merger is defined as diversified when the bidder and the target do not share the same two digit SIC code. For each bank the distance to default before the merger is computed as the average of the distance to default over the period from -180 day to -11 days from the announcement, while the distance to default after the merger is computed as the average of the distance to default over the period from +11 days to +180 days after the effective date of the merger. These measures are then industry- adjusted as described in section 3. The change in the Industry-Adjusted Distance to Default is the difference between the post-effective date and pre-announcement period IADD, winsorized at the 1% level. The t-test (sign-test) evaluates the null hypothesis that the mean (median), IADD- Pre-Merger, IADD- Post-Merger and ΔIADD are equal to zero. The percentage of positive changes is the ratio between the number of mergers with an increase in the IADD and the total number of mergers in each category. T-test (wilcoxon rank-sum test) is used to test the null hypothesis of mean (median) equality between the change in IADD for high-risk and low-risk banks between different merger strategies

Panel A: Geographic Diversification		**Domestic (1)**				**Cross-Border (2)**				**(1 – 2)**	
		N	Mean	Median	% positive	N	Mean	Median	% positive	t-Statistic	Z-statistic
	IADD: Pre-Merger (-180, -11)	19	-1.530***	-1.153***		15	-1.840***	-1.656***			
High-risk			(0.000)	(0.000)			(0.000)	(0.000)			
banks	IADD: Post-Merger (+11, +180)	19	-1.048***	-0.582***		15	-1.051***	-1.087***			
			(0.000)	(0.000)			(0.000)	(0.000)			
	ΔIADD	19	0.506*	0.701**	78.9%	15	0.790***	0.960***	86.7%	-0.854	-1.509
			(0.051)	(0.019)			(0.002)	(0.007)		(0.399)	(0.134)
	IADD: Pre-Merger (-180, -11)	21	2.038***	1.098***		13	1.377***	0.869***			
Low-risk			(0.000)	(0.000)			(0.006)	(0.000)			
banks	IADD: Post-Merger (+11, +180)	21	1.437**	0.125		13	0.498	0.523			
			(0.025)	(0.383)			(0.126)	(0.267)			
	ΔIADD	21	-0.556	-0.579**	23.8%	13	-0.879*	-0.632	30.7%	0.624	-0.106
			(0.214)	(0.027)			(0.071)	(0.267)		(0.495)	(0.915)
High-Low			1.062**				1.668***				
			(0.042)				(0.002)				
Panel B: Product Diversification		**Focusing (3)**				**Diversifying (4)**				**(3 – 4)**	
		N	Mean	Median	% positive	N	Mean	Median	% positive		
	IADD: Pre-Merger (-180, -11)	24	-1.435***	-1.342***		10	-2.224***	-2.200***			
High-risk			(0.000)	(0.000)			(0.000)	(0.002)			
banks	IADD: Post-Merger (+11, +180)	24	-0.938***	-0.705***		10	-1.317***	-1.032***			
			(0.000)	(0.000)			(0.008)	(0.002)			
	ΔIADD	24	0.497**	0.807***	79.2%	10	0.954**	0.691**	90.1%	-1.283	-0.680
			(0.012)	(0.007)			(0.021)	(0.021)		(0.209)	(0.496)
	IADD: Pre-Merger (-180, -11)	25	2.049***	0.872***		9	1.054***	1.062***			
Low-risk banks			(0.000)	(0.000)			(0.000)	(0.004)			
	IADD: Post Merger (+11, +180)	25	1.459***	0.677		9	0.019	0.105			
			(0.008)	(0.108)			(0.946)	(1.000)			
	ΔIADD	25	-0.551	-0.577	32.0%	9	-1.035**	-0.792**	11.1%	0.674	0.761
			(0.190)	(0.108)			(0.016)	(0.039)		(0.505)	(0.446)
High-Low			1.048**				1.989**				
			(0.025)				(0.000)				

***(**;*) denotes significance at 1% (5%; 10%)

Table 7 Summary Statistics

This table reports summary statistics for the measures of default risk, deal characteristics, acquirer characteristics, the regulatory environment and country control variables. The sample consists of 136 mergers announced over the period from 1992 to 2007 involving bidders in the European Union, Norway and Switzerland. All variables, apart from SUPOWER, are winsorized at the 1% level.

		Definition	N	Mean	Median	St.Dev.	Min	Max
Risk measures	IADD: Pre-Merger (-180, -11)	Pre-merger Industry-Adjusted Distance to Default	136	-0.103	-0.276	1.617	-3.208	6.999
	IADD: Post- Merger (+11, +180)	Post-merger Industry-Adjusted Distance to Default	136	-0.076	-0.237	1.602	-3.445	7.004
	ΔIADD	Change in industry-adjusted distance to default	136	0.031	0.117	1.309	-4.269	4.956
Deal characteristics	CASHONLY	Dummy equal to 1 if the deal is completely cash-financed	136	0.206	0.000	0.406	0.000	1.000
	PUBLIC	Dummy equal to 1 if the target is a public company	136	0.522	1.000	0.501	0.000	1.000
	RELSIZE	Ratio between the deal value and the bidder's total assets	136	0.039	0.017	0.067	0.000	0.388
	CONGL	Dummy equal to 1 if the acquirer and the target do not share the same two digit SIC code	136	0.243	0.000	0.430	0.000	1.000
	CROSSB	Dummy equal to 1 for cross-border mergers	136	0.404	0.000	0.493	0.000	1.000
	DOMESTICFOCUS	Dummy equal to 1 for mergers that are both domestic and focus	136	0.456	0.000	0.500	0.000	1.000
Acquirer Characteristics	DUMOPCOSTS	Dummy equal to 1 if the bank is in the last quartile of the distribution of total operating costs to total assets	132	0.250	0.000	0.435	0.000	1.000
	ROA	Pre tax profits over total assets	133	0.010	0.010	0.007	-0.010	0.042
	DUMTBV	Dummy equal to 1 if the market to book ratio is greater than 1	134	0.873	1.000	0.334	0.000	1.000
	PREMERGERPERF	Buy and hold return from -180 day to -11 days before the merger minus the return on the market portfolio	136	-0.044	-0.037	0.201	-0.734	0.741
	CAR (-10, +1)	Cumulative abnormal return between -10 days to +1 day of the merger announcement	136	0.006	0.006	0.070	-0.181	0.191
	LOWRISK	Dummy equal to 1 if the bidder is in the lowest pre-merger risk quartile	136	0.250	0.000	0.435	0.000	1.000
	HIGHRISK	Dummy equal to 1 if the bank is in the highest pre-merger risk quartile	136	0.250	0.000	0.435	0.000	1.000
	TOTAL ASSETS	Bidder total assets (USD million)	136	242,639	109,867	322,920	738.95	1,06.316
	SIZE	Log of bidder total assets (USD million)	136	18.101	18.260	1.700	13.592	20.983
	CAD	Dummy equal to 1 if the bank is in the last quartile of the distribution of the ratio of book value of common equity to total assets	136	0.250	0.000	0.435	0.000	1.000
Regulatory environment	SUPOWER	Measures the extent to which the supervisory environment is sensitive to bank risk-taking, the breadth of disciplinary powers available to regulators, and how well these powers are enforced. *Source*: Barth et al. (2001)	136	8.95	8.67	2.16	6.3	13.7
Country control variables	RGDPG	Real GDP growth rate	136	0.028	0.028	0.014	0.000	0.083
	HH	Asset-based Herfindhal Index	136	0.097	0.085	0.060	0.026	0.240

Table 8: Changes in Industry-adjusted Distance to Default: Deal and Acquirer Characteristics

This table reports the estimation results of the regression model described in section 5.3 in which the dependent variable is the change in the industry-adjusted Distance to Default. The model is estimated via OLS with robust standard errors; t-statistics are in parentheses. The explanatory variables describe deal characteristics and acquirer characteristics. **Deal characteristics** include a dummy equal to 1 if the merger is fully paid by cash (CASHONLY), a dummy equal to 1 if the target is a public company (PUBLIC-TARGET), the ratio between the deal value and the bidder total assets at the end of the year before the announcement (RELSIZE), a dummy equal to 1 if the bidder and the target do not share the same two digit SIC code (CONGLOMERATE)a dummy equal to 1 for Cross-border merger (CROSS-BORDER) and a dummy equal to 1 if the merger is both domestic and focus (DOMESTICFOCUS).**Acquirer characteristics** include a dummy equal to 1 for highly inefficient banks, defined as banking firms in the last quartile of the distribution of the ratio between operating costs and total assets (DUMOPCOST), the ratio between pre-tax profit and total assets (ROA)**,** a dummy equal to 1 if the market-to-book value is higher than 1 (DUMTBV), the buy and hold return for the period from -180 to -11 before the announcement net of the same return computed for the market index (PREMERGERPERF), the cumulative abnormal return from -10 days to + 1 day over the announcement period computed from a market model estimated from -120 to -11 days before the event (CAR (-10+1)), a dummy equal to 1 if the bidder is the last quartile of the distribution of the pre-merger Industry-Adjusted Distance to Default (LOWRISK), a dummy equal to 1 if the bidder is the first quartile of the distribution of the pre-merger Industry-adjusted Distance to Default (HIGHRISK), the log of the bidder total assets at the end of the year before the announcement, measured in thousands of USD (SIZE) and a dummy equal to 1 if the bank is in the last quartile of the equity to assets ratio before the merger (DUMCAD). Control variables include the real GDP growth rate (RGDPG) and an asset based Herfindhal index of banking market concentration (HH).

	1	2	3	4	5	6
CASHONLY	-0.059	-0.057	-0.160	-0.135	-0.180	-0.158
	(-0.190)	(-0.18)	(-0.50)	(0.43)	(-0.55)	(-0.49)
PUBLIC	0.250	0.256	0.301	0.287	0.238	0.231
	(1.110)	(1.13)	(1.31)	(1.26)	(0.99)	(0.981)
RELSIZE	-2.275*	-2.510**	-5.121***	-5.371***	-4.674***	-5.000***
	(-1.700)	(1.98)	(-3.12)	(-3.28)	(-2.80)	(-3.00)
CONGL	0.031		-0.018		-0.017	
	(0.120)		(-0.08)		(-0.07)	
CROSS-BORDER	-0.110		-0.143		-0.223	
	(-0.440)		(-0.58)		(-0.84)	
DOMESTICFOCUS		0.215		0.320		0.412
		(0.97)		(1.27)		(1.53)
DUMOPCOST			-0.688**	-0.727**	-0.704**	-0.752**
			(-2.24)	(-2.31)	(-2.28)	(-2.36)
ROA			-1.933	-2.641	-8.958	-11.311
			(-0.13)	(-0.18)	(-.0.57)	(-0.72)
DUMTBV			0.677**	0.710**	0.595**	0.633**
			(2.28)	(2.36)	(2.04)	(2.16)
PREMERGERPERF			-0.380	-0.249	-0.449	-0.288
			(-0.70)	(-0.47)	(-0.85)	(-0.56)
CAR (-10+1)			-0.422	-0.434	-0.475	-0.601
			(-0.33)	(-0.35)	(-0.36)	(-0.46)
LOWRISK			-0.761**	-0.723**	-0.746**	-0.690**
			(-2.27)	(-2.21)	(-2.31)	(-2.22)
HIGHRISK			0.668***	0.696***	0.754***	0.790***
			(3.01)	(3.07)	(-3.19)	(3.31)
SIZE			-0.237**	-0.226**	-0.207**	-0.199**
			(-2.45)	(-2.37)	(-2.10)	(-2.05)
DUMCAD			-0.060	-0.059	-0.027	-0.027
			(-0.18)	(-0.18)	(-0.08)	(-0.08)
RGDPG					14.795	14.578
					(1.53)	(1.60)
HH					0.209	0.844
					(0.13)	(0.510)
Constant	0.038	-0.092	4.110**	3.681**	3.287*	2.804
	(0.160)	(-0.43)	(2.33)	(2.15)	(1.82)	(1.61)
Obs	136	136	132	132	132	132
R^2	2.2%	2.6%	24%	24.8%	26.0%	27.0%

***(**;*) denotes significance at 1% (5%; 10%)

Table 9: Changes in Industry-adjusted Distance to Default: The Regulatory Environment

Panel A reports the estimation results of the regression model described in the sub-section 5,3,2 in which the dependent variable in the change in the Industry-adjusted Distance to Default. The model is estimated via OLS with robust standard errors; t-statistics are in parentheses. The explanatory variables describe deal characteristics and acquirer characteristics. **Deal characteristics** include a dummy equal to 1 if the merger is fully paid for by cash (CASHONLY), a dummy equal to 1 if the target is a public company (PUBLIC-TARGET), the ratio between the deal value and the bidder total assets at the end of the year before the announcement (RELSIZE), a dummy equal to 1 if the bidder and the target do not share the same two digit SIC code (CONGLOMERATE), a dummy equal to 1 for Cross-border merger (CROSS-BORDER). **Acquirer characteristics** include a dummy equal to 1 for highly inefficient banks, defined as banking firms in the last quartile of the distribution of the ratio between operating costs and total assets (DUMOPCOST), the ratio between pre-tax profit and total assets (ROA), a dummy equal to 1 if the market-to-book value is higher than 1 (DUMTBV), the buy and hold return for the period from -180 to -11 before the announcement net of the same return computed for the market index (PREMERGERPERF), the cumulative abnormal return from -10 days to + 1 day over the announcement period computed from a market model estimated from -120 to -11 days before the event (CAR (-10+1)), a dummy equal to 1 if the bidder is the last quartile of the distribution of the pre-merger Industry-adjusted Distance to Default (LOWRISK), a dummy equal to 1 if the bidder is the first quartile of the distribution of the pre-merger Industry-adjusted Distance to Default (HIGHRISK), the log of the bidder total assets at the end of the year before the announcement, measured in thousands of USD (SIZE) and a dummy equal to 1 if the bank is in the last quartile of the equity to assets ratio before the merger (DUMCAD). **The regulatory environment** is described through an index of the power of Supervisory Authorities in the bidder's country from the WorldBank database on bank regulation and supervision (SUPOWER) . This index measures the degree to which the supervisory authority has the power to take specific actions on banks. **Panel B** shows the marginal effects of LOWRISK and HIGHRISK on IADD in three supervisory regimes: low (5 percentile value SUPOWER), average (medianvalue of SUPOWER) and high (95 percentile of SUPOWER)

Panel A	**1**	**2**	**3**	**4**
CASHONLY	-0.164	-0.168	-0.145	-0.151
	(-0.52)	(-0.52)	(-0.46)	(-0.46)
PUBLIC	0.264	0.272	0.299	0.297
	(1.14)	(1.17)	(1.24)	(1.23)
RELSIZE	-4.889***	-4.724***	-4.444***	-4.435***
	(-3.25)	(-3.07)	(-2.80)	(-2.77)
CONGLOMERATE	-0.030	-0.007	-0.158	-0.004
	(-0.12)	(-0.03)	(-0.07)	(-0.02)
CROSS-BORDER	-0.189	-0.199	-0.196	0.202
	(-0.70)	(-0.75)	(-0.74)	(-0.76)
DUMOPCOST	-0.710**	-0.700**	0.696**	-0.695**
	(-2.24)	(-2.21)	(-2.21)	(-2.19)
ROA	-1.838	-1.118	-2.244	-1.760
	(-0.12)	(-0.07)	(-0.15)	(-0.09)
DUMTBV	0.606**	0.546*	0.535*	0.512
	(2.05)	(1.76)	(1.74)	(1.62)
PREMERGERPERF	-0.424	-0.476	-0.515	-0.527
	(-0.76)	(-0.86)	(-0.93)	(-0.95)
CAR (-10+1)	-0.460	-0.544	-0.588	-0.611
	(-0.35)	(-0.43)	(-0.47)	(-0.49)
LOWRISK	-0.763**	-1.889	-0.762**	-1.398
	(-2.32)	(-1.15)	(-2.31)	(-0.81)
HIGHRISK	0.679***	0.668***	2.000*	1.746*
	(3.03)	(3.00)	(1.91)	(1.74)
SIZE	-0.224**	-0.213**	-0.223**	-0.217**
	(-2.39)	(-2.24)	(-2.35)	(-2.24)
DUMCAD	-0.064	-0.013	-0.061	-0.034
	(-0.19)	(-0.04)	(-0.19)	(-0.09)
SUPOWER	0.056	0.022	0.109	0.080
	(0.82)	(0.37)	(1.20)	(0.96)
SUPOWER ×LOWIRSK		0.125		0.070
		(0.68)		(0.36)
SUPOWER ×HIGHIRSK			-0.151	-0.123
			(-1.26)	(-1.04)
Constant	3.470**	3.582**	3.000.*	3.150*
	(2.03)	(2.08)	(1.70)	(1.83)
Obs	132	132	132	132
R^2	24.7%	25.6%	26.0%	26.2%

Panel B	**Marginal effects**			
	LOWRISK		HIGHRISK	
	MODEL 2	MODEL 4	MODEL 3	MODEL 4
Low supervisory power	-1.056**	-0.928*	0.994***	0.927***
	(-2.10)	(-1.79)	(3.17)	(3.21)
Median supervisory power	-0.806**	-0.787**	0.691***	0.682***
	(-2.49)	(-2.42)	(3.07)	(3.08)
High supervisory power	**-0.178**	**-0.432**	**-0.718**	**0.065**
	(-0.18)	**(-0.43)**	**(-0.11)**	**(0.10)**

Table 10: Diversification Effects for High- and Low-Risk Banks

Panel A reports the estimation results of the regression model described in the sub-section 5.3.3 in which the dependent variable in the change in the Industry-adjusted Distance to Default. The model is estimated via OLS with robust standard errors; t-statistics are in parentheses. The explanatory variables describe deal characteristics and acquirer characteristics. **Deal characteristics** include a dummy equal to 1 if the merger is fully paid by cash (CASHONLY), a dummy equal to 1 if the target is a public company (PUBLIC-TARGET), the ratio between the deal value and the bidder total assets at the end of the year before the announcement (RELSIZE), a dummy equal to 1 if the bidder and the target do not share the same two digit SIC code (CONGLOMERATE)a dummy equal to 1 for Cross-border merger (CROSS-BORDER). .**Acquirer characteristics** include a dummy equal to 1 for highly inefficient banks, defined as banking firms in the last quartile of the distribution of the ratio between operating costs and total assets (DUMOPCOST), the ratio between pre-tax profit and total assets (ROA)**,** a dummy equal to 1 if the market-to-book value is higher than 1 (DUMTBV), the buy and hold return for the period from -180 to -11 before the announcement net of the same return computed for the market index (PREMERGERPERF), the cumulative abnormal return from -10 days to + 1 day over the announcement period computed from a market model estimated from -120 to -11 days before the event (CAR (-10+1)), a dummy equal to 1 if the bidder is the last quartile of the distribution of the pre-merger Industry-adjusted Distance to Default (LOWRISK), a dummy equal to 1 if the bidder is the first quartile of the distribution of the pre-merger Industry-adjusted Distance to Default (HIGHRISK), the log of the bidder total assets at the end of the year before the announcement, measured in thousands of USD (SIZE) and a dummy equal to 1 if the bank is in the last quartile of the equity to assets ratio before the merger (DUMCAD). **Panel B** shows the marginal effects of LOWRISK and HIGHRISK on IADD when CONGL (CROSSB) is equal to 1.

Panel A	**1**	**2**	**3**	**4**	**5**	**6**
CASHONLY	-0.123	-0.129	-0.115	-0.213	-0.144	-0.180
	(-0.41)	(-0.41)	(-0.38)	(-0.63)	(-0.46)	(-0.54)
PUBLIC	0.337	0.316	0.340	0.254	0.244	0.222
	(1.42)	(1.36)	(1.42)	(1.13)	(1.09)	(0.99)
RELSIZE	-4.808***	-4.956***	-4.771***	-4.925***	-5.194***	-5.057***
	(-2.95)	(-3.04)	(-2.92)	(-3.02)	(-2.95)	(-2.93)
CONGL	0.187	-0.126	0.137	-0.036	-0.035	-0.044
	(0.71)	(-0.46)	(0.43)	(-0.15)	(-0.15)	(-0.18)
CROSSB	-0.160	-0.144	-0.159	0.001	-0.400	-0.270
	(-0.66)	(-0.58)	(-0.65)	(0.00)	(1.27)	(-0.86)
DUMOPCOST	-0.656**	-0.682**	-0.656**	-0.739**	-0.776**	-0.796**
	(-2.13)	(-2.23)	(-2.12)	(-2.27)	(-2.39)	(-2.38)
ROA	-0.293	--2.207	-0.486	-2.573	-2.254	-2.618
	(-0.02)	(-0.15)	(-0.03)	(-0.17)	(-0.15)	(-0.17)
DUMTBV	0.687**	0.667**	0.683**	0.715**	0.697**	0.718**
	(2.30)	(2.28)	(2.29)	(2.40)	(2.48)	(2.53)
PREMERGERPERF	-0.388	-0.362	-0.381	-0.413	-0.359	-0.384
	(-0.70)	(-0.66)	(-0.69)	(-0.75)	(-0.67)	(-0.70)
CAR (-10+1)	-0.691	-0.400	-0.667	-0.260	-0.660	-0.521
	(-0.51)	(-0.31)	(-0.50)	(-0.19)	(-0.54)	(-0.39)
LOWRISK	-0.560	-0.742**	-0.565	-0.504	-0.754**	-0.590
	(-1.34)	(-2.19)	(-1.34)	(-1.04)	(-2.24)	(-1.21)
HIGHRISK	0.660***	0.581**	0.630**	0.658***	0.321	0.366
	(2.98)	(2.41)	(2.53)	(3.04)	(1.05)	(1.16)
SIZE	-0.223**	-0.226**	-0.220**	-0.244**	-0.237**	-0.241**
	(2.42)	(2.40)	(2.39)	(2.16)	(2.40)	(2.39)
DUMCAD	-0.043	-0.026	-0.032	-0.135	-0.103	-0.1
	(-0.13)	(-0.08)	(-0.10)	(-0.38)	(-0.31)	(-0.31)
CONGL × LOWIRSK	-0.731		-0.687			
	(-1.18)		(-1.05)			
CONGL × HIGHIRSK		0.367	0.127			
		(0.75)	(0.25)			
CROSSB × LOWIRSK				-0.638		-0.410
				(-0.90)		(-0.57)
CROSSB × HIGHIRSK					0.839*	0.715*
					(1.89)	(1.68)
Constant	3.740**	3.900**	3.688**	4.214**	4.299**	4.299**
	(2.23)	(2.28)	(2.22)	(2.33)	(2.33)	(2.33)
Obs	132	132	132	132	132	132
R^2	25.0%	24.2%	25.0%	24.9%	25.7%	26.0%
Panel B			**Marginal effects**			
	1	2	3	4	5	6
LOWRISK (product diversification)	-1.291***		-1.252***			
	(-2.77)		(-2.56)			
HIGHRISK (product diversification)		0.948**	0.757			
		(2.10)	(1.64)			
LOWRISK (geographic diversification)				-1.142**		-1.000**
				(-2.36)		(-2.06)
HIGHRISK (geographic diversification)					1.160***	1.081***
					(3.77)	(3.94)