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ABSTRACT

We investigate the relation between European bank acquisitiveness during the period 1990-2006 and the vulnerability of banks to the financial crisis. Our main tests use distance to default and Z-score ratios to estimate banks impact from the financial crisis in terms of bankruptcy risk and solvency. The findings shed new light on whether bank acquisitions really did contribute towards weakness; and suggest that only acquisitions of investment banking assets increased risk, while acquisition of retail banking assets actually lowered solvency risk.

JEL classification: G10, G21, G34

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1. Introduction

A supposed causal link between growth in bank size and an increase in bank risk, leading to the disastrous financial crisis has been a favoured culprit of European policy makers in recent years. This suggests a natural attention should be placed on bank acquisitions as the primary non-organic route to growth in bank size. Acquisitions not only increase bank size but also come with an extra set of risks that organic growth does not: risk of overpayment; cultural and technical difficulties of integration; management distraction; among other problems.

Various studies including Berger et al. (1999), Amel et al. (2004), and DeYoung et al. (2009) extensively review the aggressive external growth strategies pursued by the major players in the European financial industry since the 1990s. These authors argue that expansion strategies were primarily motivated by banks seeking to capitalize on various economies of scale and scope for cost and profit efficiency. Yet whether these acquisitions actually created value for acquirers remains unclear (DeYoung et al., 2009).

In a European financial crisis context, Vallascas and Hagendorff (2011) use acquisition data from 1992 to 2007 for 134 bidding banks from 17 European countries, to show that, on average, bank mergers are neutral with respect to their risk exposure, except for the safest banks which experience some increase in default risk. Large acquisitions are the most likely to increase risk. Emmons et al. (2004) report a decrease in the probability of default due to portfolio diversification effects using simulated data on 7,137 U.S. banks over a period of 1989-1993.

However other studies focused on the risk of large U.S. and European banks over the 1990s indicate that bank consolidation does not necessarily create a safe financial system (see, e.g., De Nicoló and Kwast, 2002; De Nicoló et al., 2004). To the contrary, banks' investment in correlated assets can trigger systemic risks (Acharya, 2009), and, generally, increases in bank size can increase both the standalone and systemic risk of banks (Altumbas et al., 2015; Laeven et al., 2015).

Our study delves further into the role of acquisitions in bank vulnerability to default during the financial crisis. More specifically, this paper address the role of acquisition in bank risk. To do so, we first estimate the cumulative contribution of acquisitions to growth in bank size over 17 years prior to the financial crisis (1990-2006) for the largest banks in Europe. Then we test whether there is a relationship between acquisition-led growth and a variety of bank risk measures in the heart of the crisis period. In contrast to the generalized acquisition investigation of Vallascas and Hagendorff (2011), we classify acquisitions in two categories: retail banking and investment banking. We also test a wide range of bank risk measures.

We obtain acquisitions data for the 41 largest banks in Europe from 1990 to 2006 and identify 1,603 transactions with a total value of 813 Billion USD. The data shows that the dominant proportion of acquisitions (more than half) was directed into the retail banking sub-industry while acquisitions in the investment banking industry amounted to a relatively minor 6 percent of total activity. Acquisitions in the insurance sector, real estate, and 'other financial services' make up the remainder of the acquisitions. We use several indicators to characterize the acquisition activities of these 41 banks: including the total value of completed acquisitions as a percentage of bank size, and the corresponding percentages of acquisitions in the retail banking sub-industry and the investment banking sub-industry.

For measures of bank risk, we use the Merton (1974) based distance to default (DD) to capture bankruptcy risk and the Z-score to measure bank solvency. *DD* has been recently used in several contributions dealing with the bank probability of failure (Koerniadi et al., 2015). The *DD* relies on the Black and Scholes (1973) option valuation model to estimate the standardized distance between the market value of a bank's assets and the book value of its debt, taken as a measure of bankruptcy risk. This reliance on market data raises, however, an issue in studying the effects of external growth on the financial institutions' bankruptcy risk. As financial institutions are growing in size, investors may incorporate in their anticipations a "too big to fail" effect. The *DD* will then only provide a measure of bankruptcy risk effects of external growth net of this implicit guarantee of being saved in case of an adverse outcome. Therefore, we complement the *DD* measure with the use of Z-score (Bertay et al., 2013; Laeven and Levine, 2009). The Z-score, a measure of solvency, relies only on financial statement data and incorporates both an estimate of asset profitability and the bank equity to asset ratio. The benefit of testing both approaches is that it allows us to refine our understanding of how acquisitions might affect risk. Additional robustness tests also include a Distance-to-Capital alternative to the DD measure, which has been suggested as potentially useful to understanding bank risk as it utilizes capital adequacy ratio thresholds instead of the face value of liabilities (Chan-Lau and Sy, 2007).

We estimate the relation of our risk measures during the year 2008, the heart of the financial crisis, with the cumulative size (as a proportion of market value) and nature of bank acquisitiveness from 1990 to 2006. Thus, our acquisition measure captures the relative extent to which a bank's growth has come from historic acquisitions (i.e. over the prior 17 years). An issue with this construction of acquisitiveness is why, conceptually, a hypothetical 1990 acquisition would influence risk measures in 2008? We partially address this by also testing only acquisitions over a sub-period of 1997 to 2006 to ensure our findings are not driven solely by earlier period acquisitions, and our findings remain qualitatively similar. More generally our measure acts as an estimate of the overall long-run risk attitude of each bank. Whether a bank chooses a long-term strategy of organic- or acquisition-led growth, or a mixture of both, can speak to the executive-level attitude to the trade-off between high growth and low risk, given a more immediate impact on the growth of acquisitions.

Our main results initially confirm the main Vallascas and Hagendorff (2011) findings that the aggregate amount of acquisitions has no significant impact on bank risk. We show this is the case not just for the prior utilized DD measure (higher bankruptcy risk), but also for Z-scores which examines solvency. However, the repartition of acquisitions between sub-industries of retail and investment banking does matter. In particular, the higher the percentage of acquisitions in investment banking during the 1990 to 2006 period, the lower the average 2008 DD and Z-scores. Perhaps just as importantly, our results also show that acquisitions directed to retail banking actually lead to an increase in 2008 Z-scores (i.e. higher solvency).

The next section outlines some of the most pertinent prior literature on the relationship between bank risk and acquisitiveness. Subsequently, the paper details the data and methodology utilised and presents the findings with analysis.

2. Acquisitiveness and bank risk

The finance literature suggests numerous theoretical arguments as potential factors driving the acquisitiveness of banks. From a risk management perspective acquisitions may result in a sound and stable banking system through enhanced efficiency and better risk diversification (Amel et al., 2004; Berger et al., 1999). Several studies indicate that acquisitions enable banks to achieve diversification benefits by spreading their business across different product lines and geographic areas, and thus lower their liquidity and solvency risks. Although there is some debate on how to achieve these benefits. Emmons et al. (2004) advocate risk reduction through product diversification rather than geographic expansions, while Hughes et al. (1999) find a lower insolvency risk and higher efficiency for large U.S. banks that expanded at the interstate level (i.e. geographic diversification). More recently, Hughes and Mester (2013) use data on 842 bank holding companies in U.S. in 2007 and claim that diversification emanating from geographical consolidation may increase the scale economies of banks with notably more pronounced effects for large banks.

In the case of Europe, Chionsini et al. (2003) provide evidence of diversification of credit risk in Italian banks using a sample of M&A spanning 1997 to 2001, and Cavallo and Rossi (2001) find significant economies of scale and scope in almost all asset classes of banks in Europe, using panel data of 442 banks from 1992 to 1997. As previously mentioned, Vallascas and Hagendorff (2011) use acquisition data from 1992 to 2007 for 134 bidding banks to show no general increase in risk exposure resulting from bank acquisitions (whether for diversification purposes or otherwise). But do find an increase in default risk resulting from acquisitions for the safest banks and for large acquisitions.

A contrasting body of literature suggests that acquisitions may expose banks to a higher level of risk both at the individual and systemic level (see , e.g., Weiß et al., 2014; De Nicoló et al., 2004; De Nicoló

and Kwast, 2002; Uhde and Heimeshoff, 2009). The risk-increasing implications of acquisitions stem from factors such as an increase in bank size, structural opacities, and associated moral hazard tempting banks to take on even more risk. Thus, De Nicoló and Kwast (2002) attribute an increase in risk for U.S. banks to 1990s consolidation, and Uhde and Heimeshoff (2009) find detrimental effects of rising concentration over the financial stability of European banks. Similarly, Weiß et al. (2014) provide evidence that banks' acquisitions increase the contribution of the bank to the systemic risk of the financial sector.

Boyd and Graham (1991), and John et al. (1991) contend that banks pursue acquisition strategies merely to become "too big to fail" in the presence of deposit insurance schemes. The availability of government support in the form of deposit insurance and bailouts invokes moral hazard problem as the banks' survival becomes less dependent on their choice of risk (Acharya et al., 2013; Bertay et al., 2013). Therefore, large banks continue to engage in risky activities and maximize the subsidy from such government support during the times of distress and financial crisis (Stiglitz, 2010; De Nicoló et al., 2004).

Stiglitz (2010) notes that if a "too big to fail" bank succeeds in a risky venture then shareholders retain the profits, however in the case of failure the taxpayer takes the burden of such risky bets while the surviving banks may become even bigger and more "too big to fail". De Nicoló et al. (2004) deduce from the deterioration in the risk profile of large U.S. and European banks that consolidation and conglomeration may not necessarily lead to a safe financial system. In addition, although banks' investment in uncorrelated assets can result in reduction of idiosyncratic risk, it can also increase their aggregate risk and trigger a shock at the systemic level (Acharya, 2009). Altunbas et al. (2015) relate pre-crisis variations in bank characteristics including large size, high leverage, and less reliance on deposit funding with an increase in bank risk during 2008 financial crisis.

Questions have also been raised about the diversification effects of bank acquisitions as in reality these diversifying attempts to broaden the scope of their activities or expand geographically stop short of targets or are offset by an even higher level of default risk (Wagner, 2010). Further, activity diversification within the financial sector may result in strategic similarities among large size banks that may, in turn, amplify the likelihood of systemic risk (Wagner 2010; De Nicoló and Kwast, 2002).
Regarding mergers between retail and investment banks, it has been argued by Stiglitz (2010) that this may expose the whole financial system to the culture of risk-taking that is more prevalent in investment banks. Moreover, due to the volatile nature of investment banking activity, banks may witness a significantly higher decline in their income generated from investment banking than that of the traditional deposits based income in turbulent situations like the financial crisis.

Boyd et al. (1993) investigate the risk implications for U.S. bank holding company mergers with investment and real estate firms during the period of 1971-1984 and find that such mergers tend to increase bank risk. Stiroh (2006) and Stiroh and Rumble (2006) observe a positive link between risk of U.S. banking firms and levels of nontraditional income and suggest a cap on expansion in investment banking by commercial banks. Similarly, Lepetit et al. (2008) find a higher level of insolvency risk linked to noninterest income activities for European banks over a period of 1996 to 2002. De Jonghe (2010) provides evidence on a rise in systemic risk of European banking system due to their increased reliance on non-traditional activities, although they utilize generalized income measures of these activities and don't investigate acquisitions.

For our study, therefore, we have a range of motivations from the prior literature; the evidence, some of it mixed, which on a general level suggests that larger bank size is related to increased bank risk; the more specific studies showing that acquisitions drive some of this increased risk; and separate studies showing the particular risk of investment banking activities in banks.

3. Data and methodology

3.1. Acquisition Data

We compile a dataset of acquisitions by the largest European financial institutions over a long period before the 2008 financial crisis. Our motivation for selecting large financial institutions is to be able to track banks with a systematic risk profile[1]. For each year between 1990 and 2006, we first use Thomson One Banker financial database to identify the 50 largest European firms that are active in the banking industry with the SIC-codes ranging from 6000 to 6299 or equalling 6712 to cater for bank holding companies. The ranking is based on total assets. When we merge these 17 yearly lists of the 50 largest banks each year to one unique list, there are 72 unique financial firms over the entire time period. An inspection of the individual firms on this list determines that 19 of the firms on this list do not have banking as their core activity, thus leaving a list of 53 banks from 17 European countries. 12 banks had missing or insufficient control and acquisition data. This leaves us with a final sample of 41 firms.

Next, we collect M&A transactions undertaken by these 53 banks using Thomson SDC Platinum database. Our selection criteria are that (1) the acquirer must be one of the 53 banks identified in the first step; (2) deal size must be reported; (3) the transaction must be completed; and (4) the transaction must be undertaken by a single acquirer[2]. In order to obtain information about acquisition strategies

[1] While the decision to focus on these largest banks is particularly useful from a policy perspective due to their systematic risk, we note that smaller banks could very well be subject to greater risks from acquisitions due to the vulnerability inherent in their size.

[2] Acquisitions by multiple acquirers operating jointly are quite frequent in the banking industry. We collect 458 such transactions during the 1990-2006 period for our 41 banks or approximately 20% of the total sample. It is in practice very difficult to allocate these acquisitions to specific banks, thus they are excluded from the sample.

which is as exhaustive as possible, we put no restriction on the deal size, on the deal type (mergers, acquisitions, acquisitions of partial assets, etc.), target industry, target geographic location etc.

Table 1 displays descriptive statistics about our sample, with the distribution of bank acquisitions by year and country. The aggregate value of acquisitions is 813 Million USD (in year 2006 USD terms), with the UK comprising almost 30% of the aggregate value of acquisitions, followed by Italy, Switzerland, and France. Table 1 also shows that our sample size is steadily growing through time due to data availability constraints in earlier periods. To partially control for this potential sample selection bias we further run our tests over a shorter period of 1997 to 2006.

3.2. Bank risk measures

We compute two measures of bank risk as dependent variables: the Merton (1974) based distance to default (*DD*) as used notably in Koerniadi et al. (2015), Vallascas and Hagendorff (2011), and Vassalou and Xing (2004), and the Z-score used by Bertay et al. (2013), Boyd et al. (2006), and Laeven and Levine (2009) among others.

The DD relies on investor anticipations because its computation requires stock market data. As financial institutions are growing in size, investors most probably incorporate in their anticipation the "too big to fail" effect (in fact, under the semi-strong efficient market hypothesis, it should be the case). The DD will then only provide a measure of bankruptcy risk effects of external growth net of this implicit guarantee of being saved in case of adverse outcome. The Z-score on the other side relies only on financial statement data and is, therefore, free of this issue.

To compute the *DD*, we follow Vassalou and Xing (2004). The *DD* for financial institution i at time t is as follows:

$$DD_{i,t} = \frac{\ln\left(V_{A,i,t}/X_{i,t}\right) + \left(\left(\mu_{A,i} - \left(1/2\sigma_{A,i}^2\right)\right) \times T\right)}{\sigma_{A,i} \times \sqrt{T}}, \qquad (1)$$

where $V_{A,i,t}$ is financial institution i's asset value at time t, $X_{i,t}$ is the corresponding debt value, $\mu_{A,i}$ is the expected rate of return of financial institution i's assets, $\sigma_{A,i}^2$ is the corresponding variance, and T is the time horizon. The model assumes that $V_{A,i,t}$ follows a Brownian motion. However, $V_{A,i,t}$ is not directly observable. Vassalou and Xing (2004) advocate the use of Black and Scholes's (1974) formula to infer $V_{A,i,t}$ from the financial institution's market value of equity $V_{E,i,t}$. For the risk-free rate, we use

This means that we are quite conservative in our estimation of the acquisition activities of the set of banks included in our analysis.

yield on 1-year treasury bills or certificate of sample bank's home country.[3] The terms $\mu_{A,i}$ and $\sigma_{A,i}^2$ are the arithmetic average and the variance of daily estimated $V_{A,i,t}$ returns, respectively. We estimate these parameters on a 1-year window. These estimates are then used iteratively to compute $V_{A,i,t}$ until convergence. The initial values of $\mu_{A,i}$ and $\sigma_{A,i}^2$ are set to correspond with the values for equity, taking into account firm leverage. Finally, $X_{i,t}$ is financial institution i's debt value at time t. We estimate the debt value by summing the book value of debts and deposits of each financial institution. Taking deposits into account is particularly important as we are analysing banks.[4] In our multivariate analyses, we use, for each financial institution i, the arithmetic average of daily *DD* estimated during the year 2008 (255 trading days), the heart of the financial crisis:

$$\overline{DD_i} = \frac{\sum_{t=1}^{255} DD_{i,t}}{255} \qquad (2)$$

For descriptive purposes, Figure 1 displays the behaviour of the sample daily average $DD_{i,t}$ during the period 2005-2008. A clear observation here is that banks included in our sample underwent a considerable shock during the year 2008 with average value of DD declining from 3.723 in 2005 to -0.674 in 2008; and the financial crisis started already during the 2007 year, in the mid of which average DD showed a steep decline and fell below zero. This second observation motivates our choice to exclude the 2007 year from the acquisition strategy intensiveness estimation period of banks selected in our sample.

The Z-score of bank i at time t is defined as follows:

$$Z_{i,t} = \frac{AROA_{i,t} + \frac{Equity_{i,t}}{Assets_{i,t}}}{\sigma(AROA)_{i,t}}, \qquad (3)$$

where $AROA_{i,t}$ is the arithmetic average of the bank return on assets over years t to $t-4$, a proxy for the bank assets expected returns, $\sigma(AROA)_{i,t}$ is the corresponding standard deviation, an estimate of the bank assets expected return risk and $\frac{Equity_{i,t}}{Assets_{i,t}}$ is the capital to assets ratio, estimated as the arithmetic average of realized capital to assets ratio also over the past 5 years.

The Z-score is a bank's distance-to-insolvency measure as it provides the lower bound for the number of standard deviations the bank's expected return have to drop to exhaust the bank's equity (Laeven and Levine, 2009; Boyd et al., 2006). A higher Z-score indicates that the bank is in the zone of low

[3] For some countries including Denmark, Switzerland, Portugal where we face lack of data on one year bills, 2 years annualized yield on government bond is used.
[4] Similar to Vassalou and Xing (2004), we divide long-term debts by 2, because these debts must not be rolled over on short horizons and therefore are less likely to lead to default than short-term debts.

probability of insolvency. The popularity of Z-score as a measure of bank's soundness is due to its low data requirements, only information from financial statements being required, and its statistical interpretation (Cihak and Phogosyan, 2009). The main limitation is related to the frequency at which financial statements are published (at best quarterly).

Figure 2 and 3 depict the trend in average Z-score for our sample banks and a comparison of Z-score with distance to default measure respectively. We observe that the Z-score starts moving in tandem with the DD values from almost mid of 2007 but remain overall in a positive band during the crisis period. Moreover, the decline in Z-score is relatively less steep than the one in DD values that enter into a negative zone in the crisis episode and remain there till the end of 2008. We also report the descriptive statistics on Z-score in Panel B of Table 2 besides DD values. The average value of Z-score remains quite stable during the period 2005 to 2007 around 25, but in the year 2008, it comes down to 15.295, for a 60% decline. However, the movement of Z-score is relatively stable and indicates that adverse effects on the liquidity side were more significant than the solvency of banks (a distinct feature of the 2008 financial crisis).

3.3. Independent variables

We measure the cumulative size of the bank acquisition strategy by the sum of investment in M&A divided by the bank's market value:

$$AcqM\&A_i = \frac{\sum_{k=1}^{N} Deal\ Size_{i,k}}{MV_i}, \qquad (4)$$

where N is the number of M&A completed by bank i during the period 1990-2006, $Deal\ Size_{i,k}$ is the corresponding deal size in 2006 equivalent million USD (home country consumer price index for inflation adjustment), MV_i is the bank i market value at the end of year 2006.

To gain further understanding of the implications of external growth strategies on bank risk exposure, we create two variables capturing the importance of acquisitions in investment banking and retail banking sub-industries:

$$InvestM\&A_i = \frac{\sum_{k=1}^{NI} Deal\ Size_{i,k}}{MV_i} \qquad (5)$$

$$RetailM\&A_i = \frac{\sum_{k=1}^{NR} Deal\ Size_{i,k}}{MV_i} \qquad (6)$$

where NI and NR are respectively the number of acquisitions in the investment banking sub-industry and in the retail banking sub-industry. We distinguish between retail and investment banking acquisitions based on SIC code (which reflect the predominant business activity of the bank)[5].

In our multivariate analyses, we use a large set of control variables. Concerning the M&A acquisition strategy, we choose Cash M&A Percentage (acquisitions paid through a cash consideration), Large *M&A Percentage* (deals with a value above 1 billion USD) and *Out of Europe M&A Percentage* (deals outside of Europe). These characteristics of M&A may play a significant role in shaping risk profile of banks. For instance, concerning the percentage of cash M&A transactions, Furfine and Rosen (2011) argue that an extensive use of cash in M&A transforms acquirer's safe assets (cash) into the target riskier balance sheet items. This transformation may increase exposure to bankruptcy. With respect to the percentage of large size M&A, such transactions may not only entice banks towards excessive post-merger risk taking but also increase the level of opacity in an even bigger and more complex resulting firms; thus, it increases risk of default for banks (Vallascas and Hagendorff, 2011; Hughes et al., 1999). Transactions outside of Europe may have risk implications due to international factors (exchange rates, political instability, regulatory issues, cyclical sensitivities, etc.) affecting a particular region (Caiza et al., 2012; Chionsini et al., 2003).

The selected bank characteristics are *Interest Expense to Interest Income ratio* (ratio of bank interest expenses to interest income), *Market to Book Ratio* (market value to book value of equity), *Mutual* (dummy variable if bank is classified as a mutual) and *Global Focus* (dummy variable if majority of bank business is outside of Europe). These variables should capture the different dimensions of the bank profile that may potentially affect their risk (valuation, interest rate margins, financial environment and geographical scope of activities). In the robustness section of our paper, we also use variables *Deposit Funding* and *Interbank Funding* to test the stability of our results relating to M&A in the sub-industries retail banking and investment banking while controlling for bank funding structure, as it may enable us to understand the impact of banks funding structure on banks' risk (Altunbas et al., 2015). Lastly, banks increasing focus on non-traditional activities (e.g., investment banking and insurance businesses) may enhance their exposure to such volatile sources of income and foster instability at both idiosyncratic and systemic level (Wagner, 2010; De Jonghe, 2010). *Deposit Funding* is the ratio of customer deposits to total assets at the end of the year 2006, and *Interbank Funding* is the ratio of short-term funds borrowed from the interbank market to total assets. Table 2 provides descriptive statistics for these variables.

[5] All the acquiring banks in our sample are general banks, albeit some with a significant investment banking division (for example, Credit Suisse and UBS, but these are also both full service banks), so we do not distinguish by the type of acquirer, only by what is being acquired.

3.4. Methodology

The academic literature introduces a broad range of econometric approaches to model bank exposure to bankruptcy, which is in most cases is transpositions of techniques used to model firm bankruptcy. Several studies including Altman (1968) and more recent works of Vallascas and Hagendorff (2011), and Kerstin and Andreas (2011) rely on classical ordinary least square regression (OLS), which is the method we apply in this study as it enables comparison with the most closest prior study, that of Vallascas and Hagendorff (2011).

Even though the aggregate total assets of the 41 banks included in our sample amounts to 28,517 Billion USD at the end of 2006, 52% of the aggregate total assets of the European banking industry at that time, our sample size is small with respect to econometric criteria. We are, therefore, faced with a trade-off between omitted variable biases and power of tests. By including few control variables in our specification, the number of degrees of freedom is higher, but the results may be affected by the potential omission of variables (and vice-versa). Therefore, we report three specifications with various trade-offs: the first includes only the independent variable(s) of interest, the second adds acquisition activity control variables and the third one, the bank characteristics control variables.

For the inference, we use the percentile *t* bootstrap procedure to compute *p*-values in our multivariate analyses. Bootstrap is indeed particularly interesting for small sample analyses, in the case where asymptotic normality of estimators does not apply (see Horowitz, 2001). We bootstrap the Student statistics for each coefficient in our multivariate models as follows: (1) we draw, with replacement from the original data matrix, 1000 bootstrap samples of the same size as the original sample, (2) for each bootstrap sample, we estimate the coefficients and t statistics of the multivariate model under consideration using heteroskedastic robust standard errors, (3) we collect for each coefficient the bootstrapped t-statistics and thereby build their bootstrapped empirical cumulative distribution functions, and (4) we use the bootstrapped empirical cumulative distribution functions to compute the coefficients' p-values (with a null hypothesis of the coefficient being equal to 0). We adopt a case-by-case resampling, which is robust to heteroskedasticity.

4. Findings and Analysis

We first focus on the distance to default (DD) findings. Table 3 reports results using *AcqM&A* (the sum of investment in M&A divided by the bank's market value, see Equation 4) as independent variable (Panel A) and then in Panel B, *RetailM&A* and *InvestM&A* (the importance of acquisitions in retail banking and investment banking sub-industries respectively, defined in Equations 5 and 6). In each panel, the first column provides results with the inclusion of only the independent variable(s). In the second column, we add M&A related control variables and in the third, bank feature control variables.

Table 3 – Panel A results show that the overall acquisition variable, *AcqM&A*, is not significant (though with a negative sign) in all three specifications. Indeed, only the third (most complete) specification has overall model significance. Thus, the aggregate amount of acquisitions does not appear to affect the *DD* during the 2008 financial crisis at any statistically significant level. In the full specification (column 3), *Market to Book* and *Interest Expense to Interest Income* ratios are significant with negative coefficients: banks with high market valuations and low management efficiency appear to be more exposed to the financial crisis in terms of the *DD measure* of risk. A positive and significant coefficient for *Global Focus* variable indicates more stability to banks which have a significant presence outside Europe. The market to book findings are unexpected and might suggest that banks that were highly valued compared to book value before the crisis were being highly valued precisely because of the elevated risk they were taking (Eatwell et al. 2011). This is also argued by Vallascas and Hagendorff (2011) and Weiß et al. (2014) who use market-to-book ratios to proxy management hubris. While Weiß et al. (2014) find a positive correlation between management hubris and financial instability, Vallascas and Hagendorff (2011) observe no statistically significant results in this regard.

Turning to the separation of retail and investment banking acquisitions reported in Table 3 – Panel B, these results show a negative and significant coefficient for *InvestM&A* in all three specifications. More acquisitions in the investment banking sub-industry appear, therefore, to increase bank risk during the 2008 financial crisis, as perceived by investors. In our second specification, a significant and positively signed *RetailM&A* variable indicates that M&A dedicated to retail banking tend to reduce the overall risk of sample banks, however, this overall model is not significant. In the third estimation, the control variables on bank features including *Market to Book*, *Interest Expense to Interest Income* ratios and *Global Focus* report significant coefficients with signs consistent with those reported in Panel A. Moreover, a positive and significant coefficient of dummy variable *Mutual* demonstrate less exposure to the risk of failure for mutual banks during the crisis period. Column 2 of Table 3 (Panel A) reports a weak (at the 10% level) positive effect of *Cash M&A* on the distance to default. According to estimates, a 1% increase in the percentage of cash used in acquisitions increases the distance to default by 4%. This finding is opposite to Furfine and Rosen (2011) who report a positive relationship between cash transactions and risk. Yet, this effect disappears in the augmented model reported in Column 3 and in the other regressions reported in Panel B and Tables 4-6.

The Z-score analysis is reported in Table 4, with the table organized similar to Table 3. Panel A shows that *AcqM&A*, like for DD, is never significant, and only in the most complete model 3 is the model significant. Using the Z-score as a measure of bank risk during the 2008 financial crisis, we confirm the results obtained with the DD indicator: the intensiveness of the bank past acquisition strategy does not appear to be a significant determinant of bank risk during the 2008 financial crisis. Similarly, ratios for *Market to Book* and *Interest Expense to Interest Income* in the third estimation of Panel A provide

results consistent with the results reported in Panel A of Table 3. However, in this estimation coefficient for *Mutual* dummy turns significantly positive and *Global Focus* dummy turns negative but with a loss of significance.

For the Z-score separated by type of acquisition, the models are always significant indicating that our model best fits with this risk variable. *InvestM&A* has a negative and highly significant coefficient in all three estimations. *RetailM&A* provides positive and significant coefficients in all three specifications. These results show that acquisitions in the investment banking sub-industry improved bank solvency risk exposure to the 2008 financial crisis and acquisitions in retail banking actually lessened solvency risks. In column (2) of the Panel B, the significant coefficient for *Out of Europe M&A Percentage* with positive sign advocates the risk mitigating effects of M&A outside of Europe. Whereas a negative and significant coefficient for *Large M&A Percentage* means an increase in risk level (decline in Z-score) for banks due to the high proportion of large size deals in the sample. Both the variables maintain their signs in the full specification reported in column (3) of the table but *Large M&A Percentage* turns insignificant. The results for our bank feature variables remain largely consistent with the results provided in our full specification of Panel B of Table 3. Only *Global Focus* variable gives a contradictory sign but without any statistical insignificance.

The statistics reported in Table 1 highlights that the number of banks included in our sample increases significantly through time. Before 1997, it varies between 10 and 16 while in the next ten years, it is above 20. We, therefore, run a sub-period analysis just of the years 1997 to 2006 and report these findings in Tables 5 and 6.

The results for these sub-period tests show a strong consistency with the full sample tests and thus suggest that a more sparse data in earlier periods is not driving results. Once again we see the poor performance of the overall DD model, but with investment banking acquisitions remaining a significantly negative influence. In the Z-score solvency tests, the model is strong for the separated tests of retail and investment banking acquisitions, and investment banking is negatively related to Z-scores while retail banking acquisitions are positively related to Z-scores.

A general freeze in the interbank markets of the U.S. and Europe after a dramatic rise in interbank rate is considered to be a significant event that further propagated instability during the 2008 financial crisis. The Interbank market is normally considered as a convenient and well-disciplined source of funding activity of banks, as it allows banks to raise large volumes of funds at relatively low cost (Calomiris and Kahn, 1991; Demirgüc-Kunt and Huizinga, 2010), a common requirement of investment banking divisions. Retail deposits, by contrast, are a relatively less flexible source of funding due to their instantly demandable nature (Demirgüc-Kunt and Huizinga, 2010). Acquisition of investment banking firms also indicates a growing focus of banks on generating income from non-traditional banking

activities. Therefore, we conduct additional tests which incorporate bank funding structure and non-interest income as independent variables, in order to be able to discern if it is these fundings and income outcomes from having an investment banking division that are really driving the findings.

We replicate the first two estimations of our baseline model (see Table 3 – Panel B) that use *RetailM&A* and *InvestM&A* as independent variables. We introduce the variables *Deposit Funding, Interbank Funding* and *Non-interest Income* to represent bank funding structure and income from non-traditional activities in both specifications. Table 7 – Panel A, report results using DD as the dependent variable. Panel B of the table uses Z-score as the dependent variable.

Our results from these new tests are, if anything, stronger than the original tests. The negative influence of investment banking acquisitions remains, as does the positive influence of retail acquisitions in the Z-score model. We also find that, in the case of DD, *Interbank Funding* impacts the risk of our sample banks with a negative and statistically significant coefficient in both estimations. However, there is no relationship found for *Deposit Funding* and *Non-interest Income*. For the Z-score tests, we also find that interbank funding levels are significantly negatively related to solvency risk. Deposit funding provides a positive and statistically significant coefficient, but only in the first estimation. We also observe a negative and statistically significant coefficient for Non-interest Income under the two specifications, which indicates an increase in the risk of insolvency for banks due to income from investment banking activities.

Overall, therefore, these results confirm the negative influence of investment banking acquisitions and positive influence of retail banking acquisitions (for Z-score solvency only); but with the added information that interbank funding levels, and to some extent non-interest income, also played a role in the risk responses banks experienced during the financial crisis.

5. Robustness Tests

The successful commercial implementation of Merton (1974) based DD measure has made it an increasingly popular market risk measure in banking during the last few years. However, Chan-Lau and Sy (2007) suggest some limitations associated with the DD measure. For instance, DD may assign a higher risk score to banks due to their higher leverage compared to the nonfinancial firms. While this is not an issue in a comparison between banks, it might mean that the DD measures in this study are unrealistic in their raw measures. Moreover, given that regulators typically take corrective action at a stage prior to the complete depletion of bank equity capital, use of bank liabilities as a relevant default barrier may overstate likelihood of taking a corrective action by the bank.

Thus, we also perform a robustness check by using distance to capital (DC)[6] as an alternate measure of market risk as proposed by Chan-Lau and Sy (2007). The DC measure is similar to DD in that it is based on Merton (1974) and Black and Scholes (1973), but differs in terms of the choice of default barrier as it uses capital thresholds instead of the face value of bank liabilities as a default barrier. We, therefore, calculate DC for the year 2008 for our sample banks in line with the method of DD calculation stated in section 3.2 except using bank capital adequacy ratio thresholds which are consistent with the prevailing prompt corrective action (PCA) framework for banks.

Similar to the main results, we report the results of the full period analysis (1990-2006) in Table 8 while Table 9 presents results of the sub-period (1997-2006) analysis. Analogous to the Table 5, Panel A focuses on the overall acquisition strategy while Panel B reports the analysis of the corresponding sub-industries of retail banking and investment banking. Our results remain broadly consistent with the main analysis using the DD measure. The overall value of acquisitions has no statistically significant effects, M&A directed to investment banking segments demonstrate a negative and statistically significant relation with the distance to capital measure of risk in both the full period and the sub-period. However, the M&A of banks in the retail banking segment is now insignificant.

The main results highlighted the Z-score measure of risk, using only financial statement data, as demonstrating the greatest risk impact from acquisitiveness, and we suggested that DD was subject to investor anticipation of banks being saved due to being 'too big to fail'. As our banks were selected based on their systematic importance, it might be that the lower impact of acquisitiveness on DD during the crisis might also be being captured in the DC method findings. To some extent the usefulness of DD/DC compared to Z-score for future analysis depends on whether the implicit promise of 'too big to fail' is still something that investors incorporate in their views of bank default probability. Regulatory changes though do seem to suggest a move towards greater reliance on fundamental solvency, as measured by the Z-score.

6. Conclusions

In this paper, we have investigated the effects of banks' external growth strategies implemented through acquisition on their risk during the 2008 financial crisis for a sample of large size European banks. Using Merton based distance to default and Z-score as bank's measures of risk; we find no evidence of any statistically significant relation between the overall value of banks' acquisitions and their risk during the 2008 financial crisis. At the aggregate level of activity, the potential negatives of acquisitions relating to moral hazard associated with "too big to fail" phenomenon, diseconomies of scale and

[6] We are grateful to an (anonymous) referee for suggesting this robustness check as well as numerous other improvements to the paper.

limited competition are perhaps offset by positive effects emanating from diversification, exploitation of synergies between acquirers and targets, and monopoly rents under more concentrated markets.

However, our analysis of acquisitions in sub-industries of retail banking and investment banking does provide significant findings on the influence of bank acquisitions on risk. Investment banking acquisitions increase both default and solvency risk, despite making up only 6 percent of acquisitions. By contrast, retail banking acquisitions lowered solvency risk. This positive finding on the role of retail banking in reducing risk is in contrast to prior studies which have primarily focused on what went wrong for banks. Further, prior studies often just choose one measure of risk – bankruptcy risk or solvency risk, albeit that this is justified within the context of their particular research questions. We find a strong benefit to utilizing two measures of risk as there are differing findings and influences across the two measures, and therefore, suggest this pair of risk measures for future research related to ours.

We also test the robustness of our results after taking into account banks' funding structure and non-interest income generated mainly through investment banking activities. While, interbank funding tends to substantially increase bankruptcy risk and solvency risk, we find the negative risk implications of non-interest income on bank risk are limited to the solvency side. These findings not only corroborate our main results but also help us to understand further about channels through which acquisitions in investment banking may transmit risk to the financial institutions; namely that it is not just acquisitions *per se* that matter, but also their implications for future funding structures of the bank.

Our findings have clear implications. First, we show that, in contrast to prior studies, acquisitions did play an important role in driving up bank risk. But only investment banking acquisitions. This suggest that further efforts to distinguish and monitor the implications of retail and investment banking acquisitions should continue, particularly for the large banks. While the Vickers rule has started the process of separation in the UK, the European Parliament is currently, at the time of writing, stalled on whether such reform is needed across Europe. By contrast, retail banking acquisitions which make up over half of all acquisitions across our time period actually reduced the risk of insolvency. There is a need to balance this positive news against the detrimental effects of banks becoming "too big to fail", but our findings do echo US studies which show some of the same positive effects there from retail banks engaging in geographic expansion.

Finally, a possible extension of this paper is to examine a possible reverse causality between bank risk and acquisition strategy. We find that bank acquisitions increase their level of risk. Yet, one can imagine that banks with a high risk of failure represent potential takeover targets, thus reversing the causality. Given that firms, in general, and banks, in particular, prefer avoiding being a takeover target, one can wonder why they don't foresee the impact of their acquisition strategy in the event of a crisis which increases their default risk? We believe that executive hubris might be an explanation for this

inadvertent outcome, with successful acquisitions during earlier calmer market periods increasing executive confidence in their strategy and leading to higher levels of follow-on acquisitions irrespective of increased market risk conditions. This perspective could be explored in future research around the behavioural aspects of bank risk-taking.

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Figure 1 – Daily average Merton (1974) based distance to default

Figure 1 reports the evolution of the daily average of Merton (1974) based distance to default for our sample of 41 European banks during the period 2005-2008. The Merton (1974) based distance to default is computed as in Vassalou and Xing's (2004). Section 3.2 presents the details.

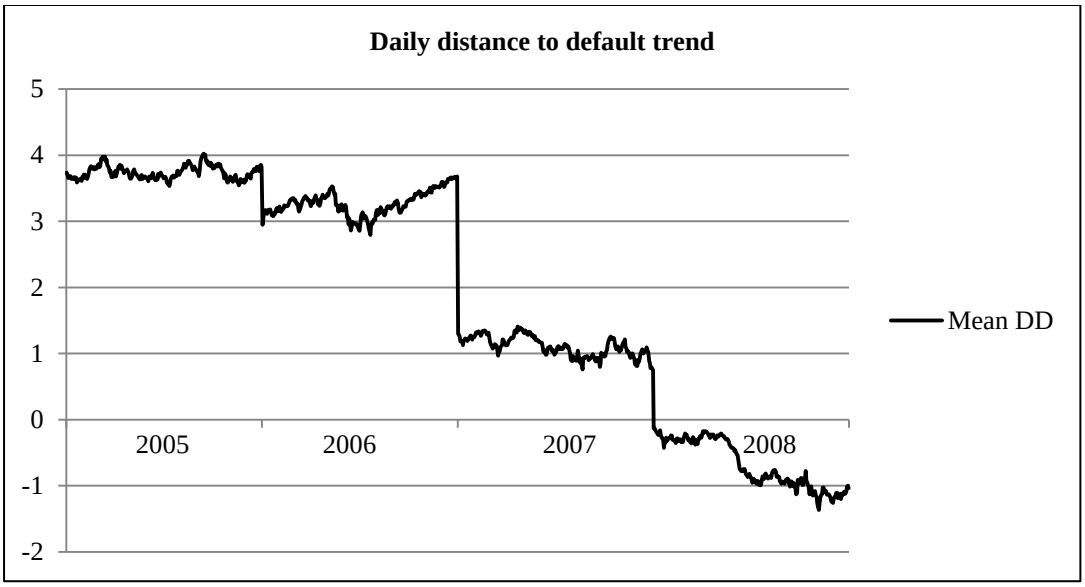

Figure 2 – Bank Z-Score

Figure 2 reports the trend in Z-score values (second risk measure) for our sample of 41 European banks during the period 2005-2008. Section 3.2 presents the details on the calculation of Z-Score.

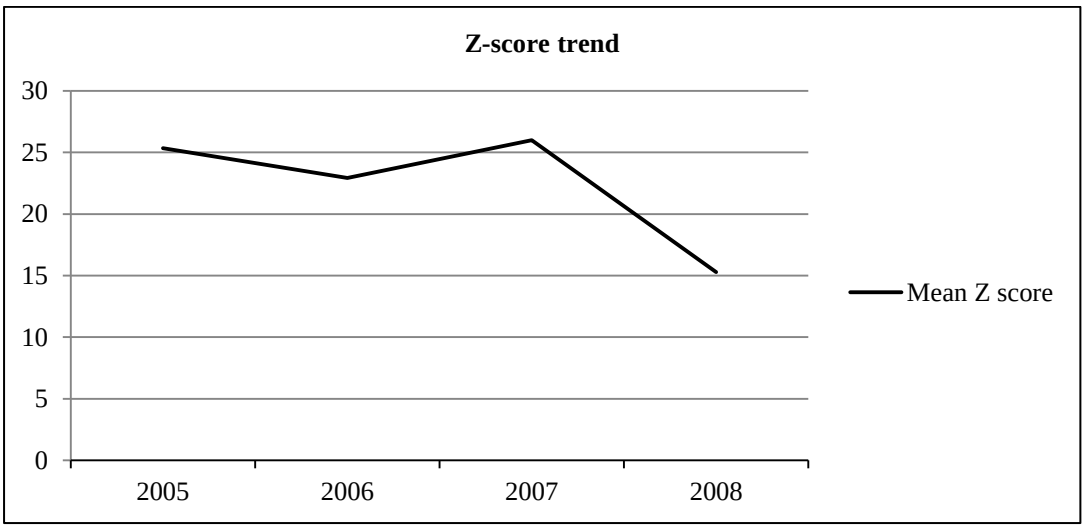

Figure 3 – Average distance to default and Z-Score measures of risk

Figure 3 puts together figure 1 and 2 for a comparative trend analysis of distance to default and Z-score values on an annual basis for our sample banks during the period 2005-2008. Solid line depicts the distance to default (left vertical axis) and dotted line is used for Z-score values (right vertical axis).

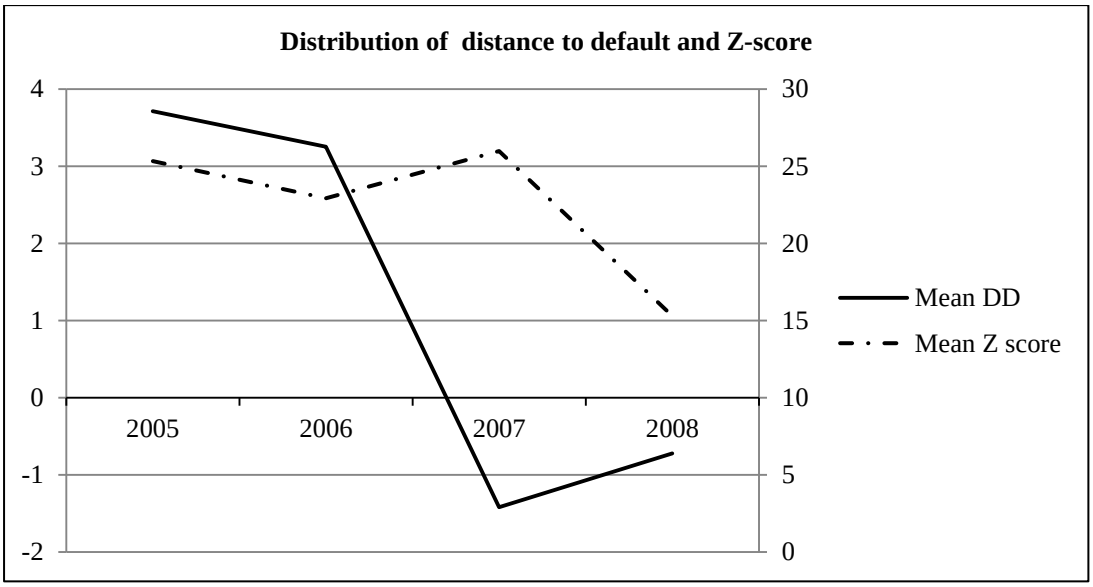

Table 1 – Sample Composition

Table 1 reports the descriptive statistics about the sample composition. The table includes the distribution by year of the number of banks, number of M&A deals and the corresponding aggregate deal values in millions of USD (inflation adjusted to 2006 prices using national CPI indices) are provided. Also included is the number of banks by country.

Yearly distribution						Country distribution		
Year	**Number of banks**	**Number of M&A deals (%)**		**Value of M&A deals (Value, %)**		**Country**	**Number of banks**	**Value of M&A deals (Value, %)**
1990	10	32	1.79	3,836.97	0.47	Austria	1	8,237.34 (1.01)
1991	11	23	1.28	4,512.71	0.55	Belgium	2	21,004.04 (2.58)
1992	14	37	2.06	10,948.71	1.35	Denmark	1	10,637.11 (1.31)
1993	12	36	2.01	3,499.24	0.43	Finland	1	76.76 (0.01)
1994	14	44	2.46	9,243.50	1.14	France	4	100,155.82 (12.32)
1995	16	47	2.62	29,561.86	3.63	Germany	3	70,849.22 (8.71)
1996	15	39	2.18	13,555.02	1.67	Great Britain	6	242,455.16 (29.81)
1997	23	72	4.02	61,337.88	7.54	Greece	1	9,447.49 (1.16)
1998	23	102	5.69	48,704.66	5.99	Ireland	2	8,646.31 (1.06)
1999	25	141	7.87	110,082.28	13.54	Italy	7	102,315.80 (12.58)
2000	29	178	9.93	106,992.81	13.16	Luxembourg	1	36.16 (0.00)
2001	27	151	8.43	38,711.00	4.76	Netherland	1	48,957.44 (6.02)
2002	25	114	6.36	65,394.60	8.04	Norway	1	399.82 (0.05)
2003	29	128	7.14	34,996.14	4.30	Portugal	1	12,948.94 (1.59)
2004	32	144	8.04	71,051.04	8.74	Spain	4	60,476.66 (7.44)
2005	29	155	8.65	82,113.34	10.10	Sweden	3	14,793.34 (1.82)
2006	30	160	8.93	118,718.87	14.60	Switzerland	2	101,823.24 (12.52)
Total		1,603	100.00	813,260.64	100.00		41	

Table 2 – Univariate Statistics

Table 2 reports univariate statistics for the 41banks that compose our sample. Sample mean, median and standard deviation are reported respectively in columns (1) to (3). Panel A focuses on M&A activities. Panel B highlights bank features. Total M&A is the sum of (inflation adjusted) M&A deal values for transactions completed by a given bank. M&A Cash Payments are the corresponding payments in cash. Retail Banking is the sum of (inflation adjusted) M&A deal values for acquisitions in the retail banking sub-industry by a given bank. Investment Banking is the corresponding amount in the investment banking sub-industry. These four variables are reported in Million USD. Consumer price index of year 2006 for each sample country is used as reference for inflation adjustment. The banks' risk measures (DD and Z-score) and all other variables are defined in Section 3. *N* stands for the number of observations in a given sample. For dummy variables, averages correspond to percentages.

Panel A – M&A activities

	All Sample *N* = 1603		
	(1)	(2)	(3)
	Average	**Median**	**Standard Deviation**
Total M&A	19,835.62	9,447.49	22,632.40
M&A Cash Payments	8,641.14	3,515.84	11,739.00
Total Retail Banking	10,832.34	5,239.64	14,037.33
Total Investment Banking	996.55	144.31	2,005.53
AcqM&A	0.337	0.321	0.246
RetailM&A	0.180	0.132	0.192
InvestM&A	0.015	0.002	0.025
Cash M&A Percentage	0.372	0.385	0.276
Out of Europe M&A Percentage	0.197	0.069	0.266
Large M&A Percentage	0.396	0.375	0.331

Panel B – Bank features

	All Sample *N* = 1603		
	(1)	(2)	(3)
	Average	**Median**	**Standard Deviation**
Risk measures (DD and Z−score)*			
DD_{2008}	-0.674	-0.644	0.913
DD_{2007}	1.113	1.099	1.771
DD_{2006}	3.286	3.341	1.585
DD_{2005}	3.723	3.681	1.481
Z-Score $_{2008}$	15.295	14.914	8.221
Z-Score $_{2007}$	25.987	16.710	31.313
Z-Score $_{2006}$	22.923	18.274	18.002
Z-Score $_{2005}$	25.340	16.822	19.154
Other controls			
Size (Million USD)	710,512.55	470,916.52	637,845.60
Market to Book Ratio	2.583	2.030	3.383
Interest Expense to Interest Income Ratio	0.670	0.637	0.163
Deposit Funding	0.353	0.360	0.117
Interbank Funding	0.147	0.130	0.084
Non-interest Income	0.008	0.100	0.007
Mutual	0.150		0.362
Global Focus	0.292		0.461

*We use average *DD and Z-score of 2008* as dependent variables in our estimations.

Table 3 – Average Distance to Default Determinants (period 1990-2006)

Table 3 reports results using the Merton (1974) based distance to default as the dependent variable. In column (1), only the independent variable(s) of interest is included. In column (2), M&A related control variables are added. In column (3), bank related control variables are added. Variables are defined in Section 3. Panel A focus on the proportion of acquisitions as a percentage of market value (measured by the variable *AcqM&A*). Panel B reports the corresponding findings in the sub-industries retail banking and investment banking (variables *RetailM&A* and *InvestM&A*). Independent variables are calculated over the period 1990-2006. All estimations are obtained by OLS. P-values, in italic, are obtained using a percentile-t approach (see Section 3). N is the number of observations. R^2 is the R-square and $Fisher$ is the Fisher statistic of joint test of coefficients (except constant) equal zero. *,**,*** indicate statistical significance at 10%, 5%, and 1% two-tailed levels, respectively.

Panel A – Overall Acquisition Strategy

Variables	(1)		(2)		(3)	
Constant	-0.54*	*0.08*	-0.58**	*0.05*	0.96**	*0.05*
Independent variable						
AcqM&A	-0.38	*0.33*	-0.71	*0.12*	-0.81	*0.18*
M&A Features						
Cash M&A Percentage			0.04*	*0.07*	0.04	*0.12*
Out of Europe M&A Percentage			-0.32	*0.42*	-0.80	*0.17*
Large M&A Percentage			0.31	*0.36*	0.12	*0.69*
Bank Features						
Market to Book Ratio					-0.06*	*0.09*
Interest Expense to Interest Income Ratio					-2.29**	*0.03*
Mutual					0.47	*0.14*
Global Focus					0.77*	*0.08*
N	40		40		40	
R^2	0.01		0.06		0.37	
Fisher	0.42	*0.52*	0.58	*0.68*	2.31**	*0.05*

Panel B – Retail Banking versus Investment Banking Acquisitions

Variables	(1)		(2)		(3)	
Constant	-0.55**	*0.05*	-0.64**	*0.04*	0.63	*0.14*
Independent variable						
RetailM&A	0.41	*0.25*	0.82*	*0.08*	-0.02	*0.96*
InvestM&A	-12.58***	*0.01*	-12.95**	*0.02*	-9.24*	*0.10*
M&A Features						
Cash M&A Percentage			0.04**	*0.04*	0.03	*0.21*
Out of Europe M&A Percentage			0.32	*0.40*	-0.43	*0.37*
Large M&A Percentage			-0.31	*0.30*	-0.23	*0.37*
Bank Features						
Market to Book Ratio					-0.06*	*0.09*
Interest Expense to Interest Income Ratio					-1.86*	*0.07*
Mutual					0.56*	*0.09*
Global Focus					0.75*	*0.08*
N	40		40		40	
R^2	0.11		0.15		0.40	
Fisher	2.46*	*0.10*	1.27	*0.30*	2.22**	*0.05*

Table 4 – Z-score Determinants (period 1990-2006)

Table 4 reports results using the Z-score as the dependent variable. In column (1), only the independent variable(s) of interest is included. In column (2), M&A related control variables are added. In column (3), bank related control variables are added. Variables are defined in Section 3. Panel A focus on the proportion of acquisitions as a percentage of market value (measured by the variable *AcqM&A*). Panel B reports the corresponding findings in the sub-industries retail banking and investment banking (variables *RetailM&A* and *InvestM&A*). Independent variables are calculated over the period 1990-2006. All estimations are obtained by OLS. P-values, in italic, are obtained using a percentile-t approach (see Section 3). N is the number of observations. R^2 is the R-square and $Fisher$ is the Fisher statistic of joint test of coefficients (except constant) equal zero. *,**,*** indicate statistical significance at 10%, 5%, and 1% two-tailed levels, respectively.

Panel A – Overall Acquisition Strategy

Variables	(1)		(2)		(3)	
Constant	16.87***	*0.00*	17.39***	*0.00*	34.70***	*0.00*
Independent variable						
AcqM&A	-4.79	*0.23*	-6.10	*0.28*	-3.26	*0.39*
M&A Features						
Cash M&A Percentage			-0.22	*0.19*	-0.23	*0.13*
Out of Europe M&A Percentage			-2.63	*0.42*	3.22	*0.25*
Large M&A Percentage			2.15	*0.56*	1.62	*0.53*
Bank Features						
Market to Book Ratio					-0.49*	*0.07*
Interest Exp to Interest Income Ratio					-27.69***	*0.01*
Mutual					6.90*	*0.06*
Global Focus					-1.14	*0.45*
N	41		41		*41*	
R^2	0.02		0.04		0.48	
Fisher	0.83	*0.37*	0.38	*0.82*	3.63***	*0.00*

Panel B – Retail Banking versus Investment Banking Acquisitions

Variables	(1)		(2)		(3)	
Constant	14.78***	*0.00*	15.87***	*0.00*	29.21***	*0.00*
Independent variable						
RetailM&A	11.91**	*0.03*	20.63***	*0.00*	11.32*	*0.07*
InvestM&A	-108.21***	*0.01*	-122.57***	*0.00*	-73.05**	*0.05*
M&A Features						
Cash M&A Percentage			-0.10	*0.33*	-0.23	*0.15*
Out of Europe M&A Percentage			5.93*	*0.07*	7.62*	*0.09*
Large M&A Percentage			-8.33***	*0.00*	-3.78	*0.12*
Bank Features						
Market to Book Ratio					-0.46*	*0.06*
Interest Expense to Interest Income Ratio					-20.72**	*0.02*
Mutual					7.47*	*0.05*
Global Focus					-1.21	*0.44*
N	41		41		41	
R^2	0.15		0.23		0.52	
Fisher	3.47**	*0.04*	2.16*	*0.08*	3.76***	*0.00*

Table 5 – Average Distance to Default Determinants (period 1997-2006)

Table 5 reports results using the Merton (1974) based distance to default as the dependent variable. In column (1), only the independent variable(s) of interest is included. In column (2), M&A related control variables are added. In column (3), bank related control variables are added. Variables are defined in Section 3. Panel A focus on the proportion of acquisitions as a percentage of market value (measured by the variable *AcqM&A*). Panel B reports the corresponding findings in the sub-industries retail banking and investment banking (variables *RetailM&A* and *InvestM&A*). Independent variables are calculated over the period 1997-2006. All estimations are obtained by OLS. P-values, in italic, are obtained using a percentile-t approach (see Section 3). N is the number of observations. R^2 is the R-square and $Fisher$ is the Fisher statistic of joint test of coefficients (except constant) equal zero. *,**,*** indicate statistical significance at 10%, 5%, and 1% two-tailed levels, respectively.

Panel A – Overall Acquisition Strategy

Variables	(1)		(2)		(3)	
Constant	-0.53**	*0.05*	-0.58*	*0.06*	1.00**	*0.05*
Independent variable						
AcqM&A	-0.51	*0.24*	-0.72	*0.12*	-0.60	*0.25*
M&A Features						
Cash M&A Percentage			0.04	*0.47*	0.14	*0.44*
Out of Europe M&A Percentage			0.02	*0.99*	-0.35	*0.37*
Large M&A Percentage			0.12	*0.69*	-0.27	*0.35*
Bank Features						
Market To Book Ratio					-0.06*	*0.09*
Interest Expense to Interest Income Ratio					-2.33**	*0.02*
Mutual					0.58*	*0.07*
Global Focus					0.71*	*0.09*
N	40		40		40	
R^2	0.02		0.03		0.35	
Fisher	0.69	*0.41*	0.30	*0.87*	2.04*	*0.07*

Panel B – Retail Banking versus Investment Banking Acquisitions

Variables	(1)		(2)		(3)	
Constant	-0.64***	*0.01*	-0.73***	*0.01*	0.60	*0.14*
Independent variable						
RetailM&A	0.72	*0.11*	1.21**	*0.03*	0.31	*0.53*
InvestM&A	-12.73***	*0.01*	-13.09***	*0.01*	-10.25*	*0.09*
M&A Features						
Cash M&A Percentage			0.06	*0.19*	0.03	*0.58*
Out of Europe M&A Percentage			0.60	*0.17*	-0.16	*0.62*
Large M&A Percentage			-0.58*	*0.07*	-0.62	*0.11*
Bank Features						
Market To Book Ratio					-0.06*	*0.10*
Interest Expense to Interest Income Ratio					-1.73*	*0.08*
Mutual					0.65**	*0.05*
Global Focus					0.76*	*0.09*
N	40		40		40	
R^2	0.14		0.19		0.39	
Fisher	3.07*	*0.06*	1.63	*0.18*	2.14*	*0.06*

Table 6 – Z-score Determinants (period 1997-2006)

Table 6 reports results using the Z-score as the dependent variable. In column (1), only the independent variable(s) of interest is included. In column (2), M&A related control variables are added. In column (3), bank related control variables are added. Variables are defined in Section 3. Panel A focus on the proportion of acquisitions as a percentage of market value (measured by the variable *AcqM&A*). Panel B reports the corresponding findings in the sub-industries retail banking and investment banking (variables *RetailM&A* and *InvestM&A*). Independent variables are calculated over the period 1997-2006. All estimations are obtained by OLS. P-values, in italic, are obtained using a percentile-t approach (see Section 3). N is the number of observations. R^2 is the R-square and $Fisher$ is the Fisher statistic of joint test of coefficients (except constant) equal zero. *,**,*** indicate statistical significance at 10%, 5%, and 1% two-tailed levels, respectively.

Panel A – Overall Acquisition Strategy

Variables	(1)		(2)		(3)	
Constant	15.99***	*0.00*	16.88***	*0.00*	33.91***	*0.00*
Independent variable						
AcqM&A	-2.41	*0.45*	-3.97	*0.39*	0.38	*0.91*
M&A Features						
Cash M&A Percentage			-0.61	*0.11*	-0.54	*0.16*
Out of Europe M&A Percentage			-3.57	*0.30*	-1.36	*0.65*
Large M&A Percentage			2.96	*0.47*	0.72	*0.75*
Controls – Bank Features						
Market to Book Ratio					-0.47*	*0.07*
Interest Expense to Interest Income Ratio					-26.96***	*0.00*
Mutual					7.17*	*0.07*
Global Focus					0.28	*0.84*
N	41		41		41	
R^2	0.01		0.04		0.47	
Fisher	0.20	*0.66*	0.40	*0.81*	3.48***	*0.01*

Panel B – Retail Banking versus Investment Banking Acquisitions

Variables	(1)		(2)		(3)	
Constant	14.74***	*0.00*	15.92***	*0.00*	29.42***	*0.00*
Independent variable						
RetailM&A	12.31**	*0.05*	20.12***	*0.00*	11.48*	*0.08*
InvestM&A	-119.25***	*0.00*	-123.77***	*0.00*	-69.93*	*0.06*
M&A Features						
Cash M&A Percentage			-0.31	*0.30*	-0.49	*0.20*
Out of Europe M&A Percentage			2.70	*0.20*	0.87	*0.78*
Large M&A Percentage			-6.81**	*0.05*	-3.35	*0.20*
Bank Features						
Market To Book Ratio					-0.47*	*0.06*
Interest Expense to Interest Income Ratio					-20.52**	*0.02*
Mutual					7.39*	*0.07*
Global Focus					0.93	*0.51*
N	41		41		41	
R^2	0.17		0.23		0.51	
Fisher	3.95**	*0.03*	2.16*	*0.08*	3.64***	*0.00*

Table 7 – Bank Risk: M&A Types with Bank Funding and Income Features

Table 7 reports results on the relationship between banks M&A type, funding structure and risk. Panel A provide results using the Merton (1974) based distance to default as the dependent variable. In column (1) independent variable(s) corresponding to M&A in the sub-industries of retail banking and investment banking (variables *RetailM&A* and *InvestM&A*) are tested with bank funding and income variables. In Column (2), M&A related control variables are further added to the first specification. Panel B replicates specifications used in Panel A with the Z - score as the dependent variable. Variables are defined in Section 3. Independent variables are calculated over the period 1990-2006. All estimations are obtained by OLS. P-values, in italic, are obtained using a percentile-t approach (see Section 3). *,**,*** indicate statistical significance at 10%, 5%, and 1% two-tailed levels, respectively.

Panel A – Distance to Default

Variables	(1)		(2)	
Constant	0.47	*0.51*	0.47	*0.51*
RetM&A	0.44	*0.46*	0.24	*0.81*
InvestM&A	-14.11**	*0.02*	-14.17**	*0.02*
M&A Features				
Cash M&A Percentage			0.06	*0.58*
Out of Europe M&A Percentage			0.36	*0.58*
Large M&A Percentage			0.25	*0.69*
Funding & Income Features				
Deposit Funding	-0.95	*0.47*	-0.08	*0.96*
Interbank Funding	-5.37**	*0.02*	-6.95***	*0.00*
Non-interest Income	1.21	*0.95*	-13.38	*0.57*
N	40		40	
R^2	0.24		0.33	
Fisher	2.16*	*0.08*	1.94*	*0.09*

Panel B – Z-Score

Variables	(1)		(2)	
Constant	15.51***	*0.01*	15.30***	*0.01*
RetM&A	8.93*	*0.09*	12.40*	*0.06*
InvestM&A	-106.77***	*0.00*	-116.62***	*0.00*
M&A Features				
Cash M&A Percentage			8.93*	*0.09*
Out of Europe M&A Percentage			-106.77***	*0.00*
Large M&A Percentage			8.93*	*0.09*
Funding & Income Features				
Deposit Funding	19.91*	*0.08*	20.38	*0.12*
Interbank Funding	-42.06***	*0.01*	-44.54**	*0.02*
Non-interest Income	- 245.09*	*0.09*	-282.59*	*0.06*
N	41		41	
R^2	0.42		0.44	
Fisher	5.09***	*0.00*	3.23***	*0.00*

Table 8 - Alternate Measure of Risk: Distance to Capital Determinants (period 1990-2006)

Table 8 reports results using distance-to-capital as the dependent bank risk variable. In column (1), only the independent variable(s) of interest is included. In column (2), M&A related control variables are added. In column (3), bank related control variables are added. Variables are defined in Section 3, and distance-to-capital is expanded upon in Section 5. Panel A focus on the proportion of acquisitions as a percentage of market value (measured by the variable *AcqM&A*). Panel B reports the corresponding findings in the sub-industries retail banking and investment banking (variables *RetailM&A* and *InvestM&A*). Independent variables are calculated over the period 1990-2006. All estimations are obtained by OLS. P-values, in italic, are obtained using a percentile-t approach (see Section 3). N is the number of observations. R^2 is the R-square and $Fisher$ is the Fisher statistic of joint test of coefficients (except constant) equal zero. *,**,*** indicate statistical significance at 10%, 5%, and 1% two-tailed levels, respectively.

Panel A- Overall Acquisition Strategy

Variables	(1)		(2)		(3)	
Constant	-0.54*	*0.05*	-0.58*	*0.05*	0.27	*0.78*
Independent Variable						
AcqM&A	-0.40	*0.49*	-0.73	*0.42*	-0.93	*0.28*
M&A Features						
Cash M&A Percentage			0.04	*0.72*	0.03	*0.78*
Out of Europe M&A Percentage			-0.32	*0.66*	-0.94	*0.28*
Large M&A Percentage			0.32	*0.66*	0.09	*0.88*
Bank Features						
Market to Book Ratio					0.18	*0.52*
Interest Expense to Interest Income Ratio					-1.82	*0.11*
Mutual					0.43	*0.50*
Global Focus					0.76*	*0.08*
N	40.00		40.00		37.00	
R^2	0.01		0.06		0.32	
Fisher	0.48	*0.49*	2.03	*0.11*	4.04***	*0.00*

Panel B- Retail Banking versus Investment Banking Acquisitions

Variables	(1)		(2)		(3)	
Constant	-0.55***	*0.01*	-0.64**	*0.02*	0.20	*0.85*
Independent Variables						
RetailM&A	0.35	*0.57*	0.69	*0.41**	0.09	*0.93*
InvestM&A	-12.53**	*0.02*	-12.88**	*0.04*	-11.82	*0.13*
M&A Features						
Cash M&A %			0.04	*0.73*	0.03	*0.83*
Out of Europe M&A			0.28	*0.71*	-0.51	*0.59*
Large M&A %			-0.27	*0.67*	-0.33	*0.62*
Bank Features						
Market to Book Ratio					0.08	*0.79*
Interest Expense to Interest Income Ratio					-1.52	*0.24*
Mutual					0.53	*0.40*
Global Focus					0.70	*0.11*
N	40		40		37	
R^2	0.12		0.16		0.35	
Fisher	3.92**	*0.03*	2.74**	*0.04*	3.68***	*0.00*

Table 9 - Alternate Measure of Risk: Distance to Capital Determinants (period 1997-2006)

Table 9 reports results using distance-to-capital as the dependent bank risk variable. In column (1), only the independent variable(s) of interest is included. In column (2), M&A related control variables are added. In column (3), bank related control variables are added. Variables are defined in Section 3, and distance-to-capital is expanded upon in Section 5. Panel A focus on the proportion of acquisitions as a percentage of market value (measured by the variable *AcqM&A*). Panel B reports the corresponding findings in the sub-industries retail banking and investment banking (variables *RetailM&A* and *InvestM&A*). Independent variables are calculated over the period 1997-2006. All estimations are obtained by OLS. P-values, in italic, are obtained using a percentile-t approach (see Section 3). N is the number of observations. R^2 is the R-square and $Fisher$ is the Fisher statistic of joint test of coefficients (except constant) equal zero.*,**,*** indicate statistical significance at 10%, 5%, and 1% two-tailed levels, respectively.

Panel A- Overall Acquisition Strategy

Variables	(1)		(2)		(3)	
Constant	-0.52**	*0.05*	-0.60**	*0.04*	0.37	*0.70*
Independent Variable						
AcqM&A	-0.52	*0.37*	-0.84	*0.33*	-0.97	*0.30*
M&A Features						
Cash M&A Percentage			0.04	*0.75*	0.03	*0.81*
Out of Europe M&A Percentage			-0.29	*0.69*	-0.89	*0.31*
Large M&A Percentage			0.35	*0.62*	0.09	*0.89*
Bank Features						
Market to Book Ratio					0.13	*0.66*
Interest Expense to Interest Income Ratio					-1.88*	*0.10*
Mutual					0.44	*0.50*
Global Focus					0.77*	*0.08*
N	40		40		37	
R^2	0.02		0.07		0.32	
Fisher	0.82	*0.37*	1.97	*0.12*	3.78***	*0.00*

Panel B- Retail Banking versus Investment Banking Acquisitions

Variables	(1)		(2)		(3)	
Constant	-0.56***	*0.01*	-0.63**	*0.02*	0.12	*0.91*
Independent Variables						
RetailM&A	0.31	*0.61*	0.65	*0.43*	0.16	*0.89*
InvestM&A	-12.33**	*0.03*	-12.13*	*0.06*	-12.32*	*0.10*
M&A Features						
Cash M&A %			0.04	*0.73*	0.03	*0.83*
Out of Europe M&A			0.17	*0.82*	-0.63	*0.48*
Large M&A %			-0.26	*0.69*	-0.36	*0.60*
Bank Features						
Market to Book Ratio					0.10	*0.74*
Interest Expense to Interest Income Ratio					-1.46	*0.26*
Mutual					0.55	*0.39*
Global Focus					0.72*	*0.10*
N	40		40		37	
R^2	0.11		0.15		0.35	
Fisher	3.51**	*0.04*	2.61**	*0.04*	3.46***	*0.01*