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2010

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**Documentos de Trabajo
N.º 1011**

BANCO DE ESPAÑA

Eurosistema

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(*) The views expressed here are those of the authors and do not necessarily reflect those of the Banco de España, the Federal Reserve Bank of Atlanta or the Federal Reserve System. We thank Tom Berglund, Claudia Girardone, Iftekhar Hasan, Heinrich Liechtenstein, Marina Martynova, as well as the participants at a Banco de España seminar, the participants of the XVI Foro de Finanzas (Madrid), the 2009 UKEPAN Finance Conference (Leicester) and the XVIII International Tor Vergata Conference on Money, Banking, and Finance (Rome). All remaining errors are our own.

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ISSN: 0213-2710 (print)

ISSN: 1579-8666 (on line)

Depósito legal: M. 18849-2010

Unidad de Publicaciones, Banco de España

Abstract

We analyze the takeover premiums paid for a sample of European bank mergers between 1997 and 2007. We find that acquiring banks value profitable, high-growth and low risk targets. We also find that the strength of bank regulation and supervision as well as deposit insurance regimes in Europe have measurable effects on takeover pricing. Stricter bank regulatory regimes and stronger deposit insurance schemes lower the takeover premiums paid by acquiring banks. This result, presumably in anticipation of higher compliance costs, is mainly driven by domestic deals. Also, we find no conclusive evidence that bidders seek to extract benefits from regulators either by paying a premium for deals in less regulated regimes or by becoming ‘too big to fail’.

Keywords: banks, mergers, premiums, European Union.

JEL Classifications: G21, G34, G28.

1 Introduction

The purpose of this paper is to examine one aspect of the bank takeover process, the premiums paid in bank takeovers in the EU-25 (before the last enlargement) between 1997 and 2007¹. While the literature recognizes the importance of U.S. bank takeovers, far less attention has been given to takeovers in the European Union (EU).² This is unfortunate because the EU is trying to promote cross-border takeovers as a way of developing a single market in financial services, a goal which received added impetus from the adoption of the Euro throughout much of the EU and which remains unchanged by the recent banking crisis. Attaining this goal requires the growth of cross-border banks because the financial systems of most EU countries are bank-based. The European Commission has expressed concern with the slow pace and size of cross-border takeovers, especially relative to domestic takeovers as discussed in Hernando, Nieto and Wall (2009). By analyzing bank takeover pricing in the EU, we are able to shed some light on the motives which acquiring banks link to acquisitions.

The relative lack of attention to EU takeovers is also unfortunate because the EU provides greater diversity of banking and securities laws than the U.S. which allows the testing of hypotheses which cannot be tested with U.S. data. One important area where the EU allows substantial differences is in the areas of prudential supervision and deposit insurance. The EU directives set minimum standards to harmonize some aspects of bank prudential regulation and deposit insurance. However, the discretion given to member states in implementing these directives raises the possibility that the remaining cross-border differences may influence bank takeovers.

Similarly in the areas of corporate governance and takeover law, the EU sets some broad standards but important differences remain across member states. Some of these rules relate to the protection afforded to shareholders. For example, Hagendorff, Collins and Keasey (2008) show that variations in shareholder protections have a significant impact on bidding banks' stock returns around the takeover announcement. Another important difference relates to the acquisition process. In the vast majority of U.S. acquisitions, the acquirer's ownership goes from less than 5 percent of a U.S. target bank's shares to 100 percent of the target upon consummation of the merger due to federal banking and securities regulations. In contrast, staggered acquisitions in which the acquirer purchases shares in a series of transactions are much more common in Europe, especially in the financial sector [European Commission (2005)].

Our sample of bank mergers includes both domestic and cross-border mergers in the EU-25 between 1997 and 2007. Targets include both listed banks and non-listed banks. Along with a general analysis of takeovers that may provide insights useful in building a single market for financial services in the EU, this paper provides evidence on the valuation effects of safety nets, shareholder protection as well as some aspects of takeover legislation in the context of bank mergers.

1. Other possible dimensions for European bank mergers include: (1) the wealth implications for shareholders [Cybo-Ottone and Murcia (2000); Hagendorff, Collins and Keasey (2008); Ekkayokkaya et al. (2009)], (2) the long-run performance following bank M&A [Diaz et al. (2004); Campa and Hernando (2006); Hagendorff and Keasey (2009)], and (3) the determinants which make banks takeover targets [Hernando, Nieto and Wall (2009)].

2. For an overview of the European banking literature, see Bergl  f, Fulghieri, Gual, Mayer, Barros and Vives (2005) and Goddard, Molyneux, Wilson and Tavakoli (2007).

The paper is organized as follows. The next section provides a brief informal model of the determinants of the prices paid in bank takeovers and applies this informal model to a review of the existing literature and develops testable hypotheses. The third section reviews the data and empirical model. The fourth and fifth sections present the univariate and multivariate empirical analysis, respectively. The paper concludes with a review and policy implications.

2 Literature Review and Testable Implications

Table 1 summarizes a number of studies of bank takeover pricing in terms of their sample selection criteria and whether they value takeovers using pre-takeover book values or market values of the target institution.³ The only study we are aware of which specifically focuses on Europe is Díaz and Azofra (2009). However, unlike our study, Díaz and Azofra (2009) include bank mergers only up to 2000 and do not consider any implications linked to the government regulation of banks.

The next subsection provides a brief informal model of bank takeover pricing. The following subsections apply that model to evaluate the existing literature on the determinants of bank takeover prices.

2.1 An Informal Model of Bank Takeover Pricing

The starting point in valuing a bank to another bank acquirer is the existing value of the bank based on its current profitability, its risk and its likely growth based on its recent experience. A bank acquirer must also evaluate how assuming control of the target is likely to change the target bank's value. These changes in value arise both from changes intrinsic to the business due to the change in control and changes in the external environment that are unique to banking — in particular, changes in the combined banks' exposure to prudential supervision and coverage by the safety net.

The valuation effects of bank M&A may also depend upon the rules regarding the corporate governance of the target and the takeover process. Rules that strengthen the protection of the target bank's shareholders increase the share of the target's profits going to the shareholders and, hence, their takeover reservation price. Rules related to the takeover process may also be important in an environment with staggered takeovers. Absent such rules, the acquirer may pay a premium to a few shareholders to obtain effective control and then use such control to squeeze the other shareholders into selling at a lower price [see Nenova (2006)].⁴

2.2 Current Profitability and Risk

Almost all empirical analyses of takeover pricing follow theory by including a profitability measure as a proxy for the target's expected cash flow as an explanatory variable. Target profitability is typically proxied by the target's return on assets, and, as predicted by theory, the coefficient on it is generally significantly positive.⁵

3. The dependent variable in almost all papers is some variation on the ratio of the merger price divided by the target's pre-merger value, where pre-merger value is either its pre-announcement accounting (book) value or its pre-announcement market value. However, some papers estimate the merger price with either the pre-merger book or market value as a control variable.

4. Prior studies have also considered other hypotheses that are either not relevant to the EU or not testable for our sample of banks. An example of a hypothesis that is not relevant to this paper is Adkisson and Fraser's (1990) inclusion of a binary variable for restrictions on intrastate takeovers that existed during for its sample. A common set of hypotheses that are not testable with the available data for this paper's sample relate to the board and ownership structure of the target and sometimes also that of the acquirer. Papers including measures of these structures include Brewer, Jackson and Jagtiani (2000), Brewer, Jackson and Jagtiani (2007), and Palia (1993).

5. Studies that found a positive coefficient on their measure of profitability include Adkisson and Fraser (1990), Beatty, Santomero and Smirlock (1987), Brewer, Jackson and Jagtiani (2000), Cheng, Gup and Wall (1989), Díaz and Azofra (2009), Palia (1993), and Shawky, Kilb and Staas (1996). Rogowski and Simons (1989) estimate an insignificant

Many studies of takeover price do not include a risk term. Those studies that do include such terms often follow Benston, Hunter and Wall (1995) in analyzing whether acquirers pay more for banks that would reduce the combined firm's overall risk (diversification hypothesis) or more for banks that would increase the value of the government safety net to the combined firm (deposit insurance put hypothesis). The diversification hypothesis predicts that acquirers will pay less for targets with high variance of own profitability and high covariance with the acquirer's profitability. The deposit insurance put hypothesis predicts that acquirers will pay more for targets with high variance and high covariance. Benston, Hunter and Wall (1995) and Brewer, Jackson and Jagtiani (2000) find support for the diversification hypothesis with significant negative coefficients on the variance of the target's ROE and insignificant coefficients on the covariance of the target and acquirer's ROE. Brewer, Jackson and Jagtiani (2007) report different results, but where significant, the coefficients on the target's variance of ROA and covariance also support the diversification hypothesis.⁶ By contrast, Carbó et al. (2009), using a sample of European banks that undertook cross-border M&A activity, find that these banks were responding principally to opportunities for shifting risk onto EU safety nets, what would be consistent with the deposit insurance put hypothesis.

A related strand of literature has analyzed the type of mergers that appear to create more value for the shareholders of the merging companies. A common result is that focusing mergers usually generate larger returns than diversifying transactions [see DeLong (2001) and Beitel et al. (2004)]. Thus, bidders might be willing to pay higher premiums in non-diversifying deals as they are potentially more value creating.

2.3 Changes in Profitability Post Acquisition

Along with the historic profitability of the target, acquirers also value opportunities to grow the target's profits. One source of profit growth is the asset growth rate of the target bank. A common proxy for the potential future growth rate of the target is its historical growth rate. Cheng, Gup and Wall (1989) obtain a positive coefficient on core deposit growth and on asset growth in many of their specifications. However, Brewer and Jagtiani (2007) obtain negative, often significant coefficients in a model estimating premium over market value. One way to reconcile these seemingly contradictory results is that a premium for growth may already be priced into the targets' stock price and acquirers' are not expected to increase this growth rate. The coefficients on the target asset growth rate in Díaz and Azofra (2009) and in Palia (1993) are insignificant.

Higher levels of target bank capital provide some benefits to acquirers in that it allows acquirers to grow without a capital contribution from the acquirer while continuing to pay dividends. On the other hand, higher levels of capital also mean a greater value of shares must be acquired which would dilute the premium paid per share. Although the literature finds mixed results for the level of capital, the more common result of a negative coefficient supports the premium dilution hypothesis. A significantly positive coefficient on capital is found in the model estimated by Adkisson and Fraser (1990). Significantly negative coefficients are estimated in Beatty, Santomero and Smirlock (1987), Díaz and Azofra (2009), Hakes, Brown and Rappaport (1997), Rogowski and Simonson (1989), Shawky, Kilb and Staas (1996), and in most of the models estimated in Brewer, Jackson and Jagtiani (2007). The estimated coefficient is insignificant in Palia (1993).

coefficient on return on equity when the dependent variable is the purchase price to book ratio, but obtain a significant positive coefficient when the dependent variable is the purchase price premium to deposits ratio.

6. Brewer, Jackson and Jagtiani (2007) find that the coefficient on the covariance is significantly negative when it is interacted with a binary variable that takes a value of one when both the acquirer and target are 'too-big-to-fail'.

Another source of profitability and potential growth in profitability is the degree of market concentration in the target's market. More concentrated markets may offer greater opportunities to increase profits.⁷ Beatty, Santomero and Smirlock (1987) obtain a positive coefficient on the Herfindahl index of the target's markets and Palia (1993) find that the coefficient on the four firm concentration ratio in the target's state is significantly positive in a model estimating the book value premium. However, the coefficient on the four-firm concentration ratio of the target state in Hakes, Brown and Rappaport (1997) is insignificant as is the Herfindahl index in Rogowski and Simonson (1989) and in Díaz and Azofra (2009).

Cross-border acquisitions offer opportunities to both increase and decrease the profitability of the target. The opportunity to increase the profitability comes from the potential for the acquirer to take innovations in its home market and bring them to the acquirer's market. However, cross-border mergers limit the scope for cost savings (e.g. by saving on duplicate branch networks) and increase the possibility that the acquirer will make cultural or legal mistakes in its management and marketing of the target bank after the acquisition.

'Cross-border' takeovers in a U.S. context are takeovers across state boundary lines. As the differences between U.S. states are generally smaller than those between EU member states, cross-border acquisitions in the U.S. arguably offer both smaller potential benefits and costs. Palia (1993), Rogowski and Simonson (1989) and Shawky, Kilb and Staas (1996) estimate a significantly positive coefficient on interstate banking whereas Brewer, Jackson and Jagtiani (2000) obtain significantly negative coefficients. The estimated coefficient for cross-border takeovers is insignificant in Brewer, Jackson and Jagtiani (2007) and Hakes, Brown and Rappaport (1997). The coefficients on a binary variable for cross-border takeovers in Europe estimated by Díaz and Azofra (2009) in various models are consistently insignificant.

One of the costs of a takeover is that of integrating the target bank into the acquirer. Banks that are smaller relative the acquirer are likely to be easier and lower cost to integrate into the acquirer. However, once the integration is complete, relatively larger targets may provide the acquirer with greater economies of scale. Relatively larger targets may also increase the chances that the post-merger banking organization will be considered 'too-big-to-fail.' Consistent with lower costs of integration, significant negative coefficients on size are found by Benston, Hunter and Wall (1995), Brewer, Jackson and Jagtiani (2007), Cheng, Gup and Wall (1989), Hakes, Brown and Rapport (1997) and Palia (1993). However, Brewer, Jackson and Jagtiani (2000), Brewer and Jagtiani (2007) and Rogowski and Simonson (1989) obtain a positive coefficient. The estimated coefficient on relative asset size is insignificant in Díaz and Azofra (2009).

Another potential cost of integration arises if there is a mismatch between the extent of business line diversification of acquirer and target. The more dissimilar the two firms, the greater the potential for high integration costs. However, more dissimilar business lines may also provide greater opportunities for diversification gains. Díaz and Azofra (2009) use cluster analysis to group banks by product strategies and proxy diversification by whether the two banks are in the same product group. That paper estimates an insignificant coefficient on their diversification measure.

7. A positive correlation would also be expected if banks in more concentrated markets can maintain their current level of profitability without increasing their risk.

2.4 Bank Regulation and Deposit Insurance

The principle of minimum harmonization of regulation has led to different regulatory and supervisory requirements across EU member states. While EU Directives on solvency and depositor protection were mainly designed to prevent regulatory arbitrage on the basis of soundness and safety requirements, there continue to be differences across the EU as regards the costs of government regulation and deposit insurance [see Kane (2000); Carbó, Kane and Rodríguez (2008 and 2009)]. It is conceivable that acquirers pay more for targets with lower regulatory and deposit insurance costs. On the other hand, for cross-border mergers, stricter regulatory regimes may increase the bidder's valuation of the target bank. This could be because, given the additional complexity that cross-border M&A entails, stricter regulators may increase the acquirer's trust in the disclosure practices and the veracity of the financial condition of the target [Buch and DeLong (2004)].

Studies of domestic bank merger premiums in the U.S. cannot consider regulatory and deposit insurance costs because most of those costs are determined by federal policy. The U.S. has an incentive compatible mechanism for resolving small and medium-sized banks aimed at minimizing tax payers' costs of resolving banks in crisis.⁸ Such ability has not been demonstrated for the largest U.S. banks with the result that many market participants believed some U.S. banks were 'too-big-to-fail' (TBTF).⁹ Brewer and Jagtiani (2007) find evidence that acquirers pay more for deals that are likely to strengthen the impression that the post-merger organization is TBTF.

2.5 Investor Protection and Takeover Laws

The value that bidders assign to control over a target bank will depend on the bidder's trust in the quality of the target's disclosure practices as well as in the enforceability of the ownership rights which are being acquired. The legal protection of minority shareholders varies substantially across countries with wide-ranging implications for the development of financial systems and the design of corporate governance systems [LaPorta et al. (1998); Djankov et al. (2008)]. When investor protection is weak, insiders (managers and majority shareholders) enjoy more opportunities to expropriate minority shareholders and extract higher private benefits of control [Dyck and Zingales (2004)]. Rossi and Volpin (2004) and Bris and Cabolis (2008) show that takeover premiums increase under higher protection regimes and interpret this as evidence that investor protection increases activity in the market for corporate control.

Studies of domestic bank takeover premiums in the U.S. do not consider investor protection rules, which are partly determined by federal standards and partly by state policies. Díaz and Azofra (2009) also do not consider investor protection. However, Hagendorff, Collins and Keasey (2008) analyze the impact of investor protection regimes in Europe and the U.S. on stock returns around bank takeover announcements. Their results indicate that bidding banks receive higher returns when the target is in a low investor protection country. This is consistent with target shareholders receiving a higher portion of any merger-related performance gains in countries with high investor protection.

8. The U.S. banking literature has historically focused on size as a proxy for a bank's importance to financial stability, thus, the focus in literature on 'too-big-to-fail' banks. Most recently, many analysts have come to recognize that while size is correlated with a bank's importance to financial stability, size per se is neither necessary nor sufficient for a bank to be systemically important.

9. See Stern and Feldman (2004).

Finally, bank merger valuations may also reflect the extent to which takeover legislation requires premiums to be shared among equity holders. For listed firms, the EU Takeover Directive has introduced mandatory bid rules (MBRs) in most countries (see Directive 2004/25/EC of the European Parliament and of the Council of 21 April 2004 on takeover bids).¹⁰ By requiring bidders to (i) tender for all remaining shares once they exceed a certain ownership threshold in the target and (ii) to pay a price based on when it passed the MBR threshold, MBRs protect minority shareholders from being squeezed into accepting a low premium once the transfer of the controlling block of voting rights has been completed [Nenova (2006)]. Since controlling shareholders in the target will be unable to attract the type of large premium that reflects their private benefits of control, MBRs are likely to lower their premiums, while increasing the premiums going to minority shareholders [see Dyck and Zingales (2004)]. The model in Díaz and Azofra (2009) includes the acquirer's pre-acquisition ownership interest as a control for staggered takeovers. However, the model does not have any control for whether the acquisition triggers the MBR.

10. See OJ L 142, 30.4.2004, pp. 12-23.

3 Empirical Strategy: Data and Model

3.1 The Sample

We obtain the sample of European bank mergers from Thomson Financial's M&A database. Deals are announced and completed between 1997 and 2007. Sample banks include commercial banks, mortgage and real estate banks, medium- and long-term credit banks, and bank holding companies which are chartered in the EU-25. We impose the following sampling criteria: The acquirer purchases at least 1% of the target's equity. Thomson Financial reports the value of the acquisition. Sample banks are not subsidiaries of financial institutions chartered outside the EU. We eliminate share repurchases from our sample. Finally, target and bidder banks have accounting data available on Fitch IBCA's Bankscope database. We ensured that accounting data are consistently reported in either International Financial Reporting Standards (IFRS) or local accounting principles for every deal.¹¹

We then applied the following data cleaning procedure to our initial sample:

- We verified the deal characteristics from Thomson Financial (announcement date, offer price, deal value) against news articles from various sources on LexisNexis. Inconsistencies between the data obtained from Thomson Financial and the press coverage were corrected (this affected three transactions) or, if left unresolved, were omitted from our sample (this affected 19 deals).
- We omit 11 distressed target banks. We delete deals where the press coverage surrounding a transaction indicates that the target was a failing institution or the book value premium paid by the target was smaller than -20%.
- We omit a further three deals where the target was a government-owned institution and the deals more akin to privatization than bank mergers.
- We delete six observations from our sample where the price paid by the acquirer was linked to the exercise of a call option on the target's equity. In these cases, the takeover premium is likely to have been determined by factors prevailing at the time period the option was underwritten.

The final sample contains 236 European bank acquisitions. A total of 143 of these involved listed targets and 74 were cross-border deals. We present an overview of the sample in Table 2.

3.2 Takeover Premiums

In order to compensate for the varying size of the target banks, most studies of bank merger pricing incorporate a measure of the pre-merger value of the target's equity [Shawky, Kilb and Staas (1996); Brewer, Jackson and Jagtiani (2000); Díaz et al. (2008)]. One such measure of the pre-merger equity is the target's book value as of the last reporting period before the merger announcement. Although book values are imperfect measures of economic values, bank accounting values are likely to be closer to their economic value because both sides of banks' balance sheets are dominated by short-term financial claims whose book value is likely to be close to its economic value.

11. IFRS have been introduced after 2004 and apply only to listed banks in our sample. IFRS introduced the fair value treatment of a larger variety of bank assets. Hence, combining different accounting standards for one bank may cause severe measurement errors. For example, Barclays experienced a year-on-year increase in the value of total assets of 30% following the adoption of IFRS.

An alternative is to deflate by the market value of the target's equity. The advantage of a market measure of takeover pricing is that it incorporates the profitability of the target as it is currently being operated. One disadvantage is that it also incorporates investors' estimate of the expected discounted value of the takeover premium. This component of the target's stock price may be relatively large to the extent that the bank has long been regarded as a takeover target or to the extent that individuals with knowledge of the takeover discussions buy the target's stock in anticipation of the takeover. Therefore, studies using market-based takeover premiums implicitly assume the takeover is a surprise and that the market believes the probability of being acquired is zero (or very low). In Europe, the presence of staggered takeovers limits the value of this assumption. Following the purchase of an initial toehold stake by the acquirer, the market value of target's equity will reflect a substantial probability of future acquisitions.

Another disadvantage is that market values are only available for publicly traded banks. The unavailability of takeover premium data for non-listed banks is an important issue, given the prominence of non-listed financial institutions as suppliers of banking services in the EU as well as their involvement in the consolidation of national banking sectors [see Goddard et al. (2007)]. Finally, a European study using market data of acquisition pricing needs to pool data from different stock markets of the EU. The lack of a single European stock market and the low levels of integration of existing stock markets in the EU [see ECB (2009)] mean that the comparability of market-based takeover premiums is inevitably impaired by the extent to which market values reflect differences in liquidity and the informational efficiency of asset prices across EU stock markets.

Against this background, we measure bank merger premiums as the purchase Price paid for by the acquiring institution scaled by the pre-merger book value of the target bank's equity. We define the percentage book value premium (BVPREM) as

$$\text{BVPREM} (\%) = \left(\frac{\text{deal value}}{s \times \text{BV(equity)}} - 1 \right) \times 100, \quad (1)$$

where s is the equity stake purchased and the book value of equity refers to the fiscal year before the merger announcement supplied by Thomson Financial.

3.3 Regulatory Data

One of our aims is to investigate whether regulatory differences affect target valuations in bank takeovers. We measure regulatory differences using measures of regulatory strength, deposit insurance design, and the level of investor protection as summarized in Table 3.

3.3.1 PRUDENTIAL REGULATION AND SUPERVISION (REGULATORY STRENGTH)

We compile an index of regulatory and supervisory strength based on the Barth et al. (2001) database on global banking supervision. We follow Buch and DeLong (2008) and use this database to assemble a regulatory and supervisory strength index which reflects the adoption of twelve supervisory powers by national authorities. The index components are: banks disclose risk management procedures; risk-weights are in line with Basle guidelines; the capital-asset ratio varies with credit risk; the capital-asset ratio varies with market risk; there is a formal definition of 'non-performing loan' (these components are related to prudential regulatory strength); there are automatic mechanisms to sanction directors and managers; the supervisory agency can order directors/management to make

provisions to cover losses; the supervisory agency can suspend the distribution of dividends, bonuses, or management fees; the latter has been enforced in the past five years; the supervisory agency can declare a bank insolvent; the agency can suspend ownership rights of a problem bank; the supervisory agency (or any other government agency) can take measures aimed at bank restructuring and reorganization (these components are related to the enforcement powers of supervisors).

The regulatory strength index is an equally-weighted sum of these 12 indicators.¹² Consequently, the index varies between 0 and 12 with higher scores indicating that banking sectors exhibit stronger supervisory environments and better enforcement.

3.3.2 DEPOSIT INSURANCE

We also measure the strength of the deposit insurance regime by assembling a deposit insurance index, based on the information reported by the member states. The index reflects if (i) insurance premiums are risk-based, and (ii) the deposit guarantee scheme is pre-funded. Consequently, the deposit insurance index varies between 0 and 2 with higher values indicating stricter, and to banks, more costly deposit insurance arrangements.

3.3.3 INVESTOR PROTECTION

We obtain an index of anti-director rights from La Porta et al. (1998) and, for updated values after 2003, from Djankov et al. (2008). The index measures the extent to which national laws protect minority shareholders from opportunistic behavior by managers. Specifically, it reflects the inclusion of six legal provisions as regards the voting rights that shareholder possess to influence director appointments and other major corporate issues. The index varies between 0 and 6 by adding one when: shareholders can mail their proxy vote; there are no restrictions on selling shares prior to the time of shareholders' meetings; there is proportional representation of minority shareholders on the board of directors; minority shareholders may require their shares to be bought back if in disagreement with major managerial initiatives (e.g. M&A, asset dispositions); an extraordinary shareholders' meeting can be called using 10% or less of the share capital; shareholders have pre-emptive rights to new issues of equity. Higher values of this index show that a financial system is more shareholder-oriented — with possible implications for the valuation of bank mergers [see Hagendorff et al. (2008)].

In some countries, stricter enforcement of the existing legal provisions may partly substitute for weaker investor protection and vice versa [La Porta et al. (1998)]. To capture the quality of law enforcement, we follow Rossi and Volpin (2004) and multiply the anti-director index by an index of the rule of law. We use the rule of law index developed by the World Bank (which we rebase such that it varies between 0 and 10) to capture the efficiency of the judiciary and enforceability of contracts through the courts. We call the resulting index investor protection.

12. Where the database lists more than one indicator for a single question, we assign an index value of one if at least half of the sub-questions apply.

4 Univariate Analysis

In this section, we present preliminary results on some of the key drivers of target valuations in European bank mergers. We examine the price paid for control as well as regulation and other deal characteristics on the premiums paid in European bank mergers.

4.1 Premiums Paid for Control

In Section 2, we discussed the presence of a premium for control as well as the existence of MBR rules that protect minority shareholders in the target bank. Many (bank) M&A studies define control conservatively as the acquiring institution owning the majority of the voting equity in the target. In order to explore the threshold which bidding banks associate with a control transfer, Table 4 presents takeover premiums (BVPREM) at various control thresholds. We calculate mean and median BVPREM for deals which involve the bidder increasing its ownership in the target bank above 10%, 20%, 30%, 40%, 50% or the MBR trigger. We use the MBRs which are applicable to the target country as reported in Nenova (2006). We observe that bidders pay a higher premium at each of these control thresholds. The median differences in BVPREM are statistically significant for each of the threshold portfolios defined above. Further, the premium differences appear to be particularly large at the 30% ownership level.¹³

This seems to indicate that, while bidders price in a control transfer at various ownership stakes, a premium for control over a target is likely to be paid at ownership levels much lower than 50%. A control threshold of less than 50% is consistent with IFRS accounting rules as well as the minimum threshold for authorization by EU prudential supervisors (see Directive 2007 / 44 / CE of the European Parliament). Both accounting and supervisory rules in the EU have set a 20% ownership level for disclosure and authorization purposes, respectively.

4.2 Regulation and Other Deal Characteristics

Table 5 presents acquisition premiums for different types of bank acquisitions. The results show that regulation affects takeover pricing in European bank mergers. On the one hand, stricter regulation may facilitate due diligence for bidders and increase their trust in the quality of the target's disclosure practices as well as in the soundness of the target bank in general. On the other hand, stronger regulatory regimes impose higher compliance costs on bidding banks and, in the case of bank regulation, may well restrict managerial discretion — with potential implications for bank profitability in the post-merger period.

The results in Table 5 show acquirers pay lower premiums for banks in countries with better protection of minority shareholders. This difference is substantial in absolute terms and statistically significant both for both average and median premiums (below 1%). Similarly, bidders pay lower premiums for banks in countries where the strength of the bank regulatory regime is below the EU median (mean and median premium differences are statistically significant at 10% and 11%, respectively). Along similar lines, stricter deposit

13. In unreported tests, we also analyze the premiums linked to staggered bank acquisitions. Acquisitions are staggered when purchases of bank shares take place in a series of transactions. In our sample, 33 acquisitions involved more than one transaction (typically two) between the same acquirer and target. In most cases (23), the acquirer ultimately bought 100% of the target's equity during the sampling period. We find that the highest premiums in staggered deals are paid for deals in which the bidding banks increases its ownership above 20%. However, we do not find that the premium differences between lower and higher control thresholds are statistically significant at customary levels.

insurance arrangements (in terms of the funding and risk-based premiums) also mean that investors pay lower premiums (albeit premium differences are statistically significant at 12%). These results are consistent with the explanation that regulation entails costs for the bidding bank that seem to outweigh any benefits that stricter regulatory frameworks bring about in terms of investor protection and banks' safety and soundness.

Further, Table 5 shows that cross-border deals do not fetch a lower premium over domestic deals. This is somewhat surprising, given the more pronounced potential to cut costs in domestic mergers and the increased costs of cross-cultural and cross-regulatory differences that are linked to bank merger across borders [Buch and DeLong (2004)]. However, for a number of acquirers from markets with already concentrated banking sectors, particularly in small countries, there is little alternative to consolidation across borders [see Bergl  f et al. (2005)].

Finally, one of the advantages of our book value-based measure of takeover premiums is that we can also include a wider range of banking firms than listed banks. Listed banks have higher disclosure requirements which may facilitate effective due diligence and could prevent bidders from overpaying for targets.¹⁴ On the other hand, the market for corporate control for listed targets should be more liquid and any resulting bidding contests are likely to drive up acquisition premiums. The results in Table 5 show that the premiums paid in European bank acquisitions do not vary by whether the target bank is listed or not.

14. Experienced buyers of private firms should be expected to learn about the problems in valuing privately held buyers and, in a large sample, we would not expect experienced buyers on average to overpay. However, many banks have limited experience buying other banks and may not fully appreciate the added difficulties posed by buying a privately owned bank.

5 Regressions

5.1 Specification

To analyze the factors that determine target bank valuations in a multivariate setting, we estimate the following regression model with heteroskedasticity-robust standard errors:

$$BVPREM (\%) = \alpha + \beta_1 DC + \beta_2 TC + \gamma REGULAT + \varepsilon, \quad (2)$$

where **DC** a vector of deal characteristics,
TC is a vector of target bank characteristics, and
REGULAT includes regulatory variables.

The deal characteristics include the following variables. CONTROL is a dummy variable indicating whether the deal involves a change in shareholder control of the target bank. Following Hernando, Nieto and Wall (2009), we assume that a change in control takes place when a non-listed bank that owns less than 20% of the target equity increases its shareholding to at least 20%. For listed banks, CONTROL is one when a bank with an initial stake in the target below the MBR (as applicable to the target country) reaches that threshold after the transaction has been completed. CROSSB is a dummy variable that is one if bidder and target are chartered in different countries (and zero otherwise). Market concentration in the target country is measured by a Hirschman-Herfindahl index (HHI) where the market is defined as the country in which the bank is headquartered.¹⁵ All else equal, more concentrated markets may afford higher rents to banking firms which would consequently be prepared to pay higher premiums for acquisitions in more concentrated banking markets [Palia (1993)]. Growth opportunities are proxied with the annual growth rate of the target country's gross domestic product (TGDPGROWTH). The expected sign on this variable is positive since growing target markets should offer acquirers increased profit potential. RELSIZE measures the combined bidder and target assets divided by bidder total assets. We employ this measure as an indicator of the easiness to integrate the target unit.

We include the following target bank characteristics. Return on equity (ROE) is the average for the three years preceding a deal and the riskiness of the target (RISK) is proxied by the standard deviation of ROE in the pre-merger years.¹⁶ We expect higher values of ROE and lower levels of RISK to attract higher takeover premiums. Leverage (LEV) is the equity-to-assets ratio in the fiscal year before the acquisition announcement. This definition of leverage accords with the bank supervisory use of the term and contrasts with a common definition of leverage in the corporate finance literature (where equity is the denominator as in the debt-to-equity ratio or the assets-to-equity ratio). Following Benston et al. (1995), we measure potential diversification benefits by the covariance of ROE for bidder and target banks in the pre-merger years (COVROE). A negative sign on this variable would indicate that bidders pay more for targets with greater potential to smooth earnings.

15. Yearly values of HHI are calculated according to a common methodology as explained in ECB (2006, Annex 2).

16. We have also used other measures of profitability (ROA) and efficiency (cost-to-income ratio) which did not enter the model with a statistically significant coefficient when included in the regression together with ROE. However, ROE kept its statistical significance in the absence and presence of both ROA and the cost-to-income ratio.

Based on Laeven and Levine (2007), we compute an asset-based measure of how focused banks are on lending as $1 - |(\text{net loans-other earning assets})/\text{total earning assets}|$. ASSETDIV is the absolute value of the difference of this ratio for bidders and targets. Bidders may be willing to pay larger premiums for banks that generate large shares of non-lending related income (e.g. fee, dividends and trading income) rather than taking deposits and making loans. TAGRWTH is an asset-based growth measure over three years. A positive sign on the growth variable would indicate a valuation premium associated with targets operating in expanding markets. Finally, we capture the type of business specialization of target banks as supplied by Bankscope. We distinguish between commercial banks (COMMERCIAL), medium and long term (investment) banks (INVEST) and holding company banks (HOLDING).¹⁷

5.2 Results: Target and Deal Characteristics

Table 6 shows the results of regressions of deal and target bank characteristics on BVPREM. The first column reports the results for the whole sample, while we report the results for the subsample of listed targets in the second column. The third column reports the p-values of tests for differences between the coefficients estimated for the full results and the sub-sample of listed targets.

We find that higher target profitability (ROE) and lower target leverage (LEV) are associated with higher premiums. The magnitude of these effects is non-negligible. For the full sample (listed sub-sample), a 1 percentage point increase in ROE is associated with a 2.13% (7.71%) increase in the average premium paid. The larger effect found for listed targets (which is statistically significant at 2%) may be explained by two factors. First, the stricter transparency requirements imposed on listed companies (in terms of the schedule and content of the audit of their financial statements) makes their profitability data more reliable from the view point of the acquirer. Second, when bank equity is publicly traded, there will be more competition for takeover targets and highly-performing targets are most likely to be subject to bidding contests that drive up premiums.

Further, acquirers pay less for targets that are riskier (RISK), but more for targets whose ROE exhibits a higher covariance (COV) with their own profitability. The results for these two variables appear contradictory, with acquirers paying less for the target's own risk but more for covariance. Perhaps RISK or COV are actually serving as proxies for something other than risk. For example, COV could be a better proxy for the extent to which the acquirer and target have similar operations than our other measures of similarity. The positive and (weakly) significant coefficient on target growth found for the full sample indicates that acquirer value fast-growing target banks.

Finally, the effects of deal characteristics on European takeover premiums are far from conclusive. For the full sample, the only significant coefficient is the cross-border dummy (CROSSB). The negative coefficient reported is consistent with bidders facing greater operational difficulties to integrate foreign banks. The coefficients of the remaining deal characteristics are not statistically significant. Deals involving a change in control, thus, do not result in higher premiums than those observed in purchases of minority stakes (even though the coefficient has the expected positive sign). Similarly, takeover premiums are neither related to the legal status of the target (listed vs. unlisted) nor to the degree of market concentration (HHI) or the GDP growth (TGDGROWTH) in the host country. Further, we do

17. This paper does not include the medium of payment in acquisitions (equity versus cash) because our data source appears to contain some errors.

not observe a significant relationship between relative size (RELSIZE) and target valuations. Finally, differences in the degree to which the merging banks engage in lending (ASSETDIV) are not related to takeover premiums.¹⁸

5.3 Results: Regulation and Takeover Premiums

Table 7 reports the results of regressions that estimate the impact of the regulatory variables for investor protection, deposit insurance, and regulatory strength on the takeover premiums paid in European banking.

Concerning the results for the regulatory variables, we do not find a significant effect for the shareholder protection proxy neither for the full sample nor for the listed subsample. However, we obtain negative coefficients for both the deposit insurance and the regulatory strength indices. Both measures are significant for the sample of listed targets, while the deposit insurance proxy is also statistically significant for the full sample ($p\text{-value}=0.10$). The negative relationship between takeover premiums and the regulatory indices is consistent both with banks seeking weaker insurance and regulatory systems to exploit the safety net and with higher compliance costs resulting from stronger regulatory regimes and risk-based and pre-funded deposit insurance.

It is interesting to note that the inclusion of regulatory variables into our regression model leaves most of the findings from previous regression specifications unchanged. The estimated coefficients on the risk (RISK) and return (ROE) variables suggest that acquirers are willing to pay higher premiums for more profitable and lower premiums for riskier institutions. In turn, the target growth term (TARGRWTH) is only significant for the full sample. Interestingly, the quadratic asset growth term (TARGRWTHSQ) is negative and statistically significant. This result indicates decreasing marginal benefits to growth. In fact, three-year asset growth rates above 47% cause the effect of this variable on BVPREM to be negative.

As regards the coefficients on the deal characteristics, we find some differences with respect to the results reported in Table 6. For the full sample, the cross-border dummy (CROSSB) is no longer significant. The mandatory bid rule (MBR) defines the ownership threshold at which the bidder is obliged to make a tender offer to all shareholders. The CONTROL dummy (which is defined in terms of the MBR for listed banks) enters the regression with a positive and significant coefficient suggesting that mandatory bid rules increase the cost of takeovers for listed targets.

Finally, Table 8 shows the results of the estimation of a specification which allows for a differential effect of the regulatory variables depending on whether the deal is domestic or cross-border.¹⁹ The estimated coefficients for both target and deal characteristics are qualitatively similar to those reported in Table 7. However, the coefficient estimates of the regulatory variables provide interesting insights. In the case of listed banks, we find that the estimated coefficients on both the regulatory strength and the deposit insurance indices are negative and significant, while the corresponding interaction terms are positive and significant. In the full sample, the interaction terms are also positive albeit not statistically significant. There is no indication that the interaction effects are statistically different for listed

18. When we replace the ASSETDIV variable with a binary variable that captures if the business specialization between the merging banks is different, this new variable turns out to be also non-significant.

19. We have also estimated a specification which allows for a differential effect of the regulatory variables depending on whether the target banks belongs to a Member State that has joined the EU since 2004 (e.g., Hungary, Poland). We do not find any differential effect as all the interaction terms are insignificant. Nevertheless, this result might be driven by the small number of targets of those countries.

banks and for the full sample. These results echo the univariate analysis above and suggest that in the case of domestic deals, stricter regulatory regimes as well as stronger deposit insurance arrangements impose higher compliance costs on acquirers that are reflected in lower premiums. However, in the case of cross-border deals, these regulatory costs are compensated by the potential benefits associated with entry into a market with a stricter regulatory framework.²⁰ This is consistent with Buch and DeLong (2004) who argue that stricter regulation makes targets more attractive in cross-border deals as a result of increased trust in the target bank's disclosure practices.²¹

20. The estimated effects for the regulatory strength and for the deposit insurance variables in the case of cross-border deals are not significantly different from zero. In particular, we cannot reject the hypothesis that the sum of the coefficients on the regulatory strength index and the corresponding interaction term is zero (the p-values for the full sample and for listed banks are 0.88 and 0.34, respectively). Analogously, we cannot reject the hypothesis that the sum of the coefficients on the deposit insurance index and the corresponding interaction term is zero (the p-values are 0.57 for the full sample and 0.92 for listed targets).

21. We further analyse whether the interaction effects differ by whether a target is located in an equally strict (or stricter) regulatory environment or, alternatively, in a less strict environment relative to the bidding bank (both in terms of regulatory strength and deposit insurance). We find no evidence that takeover pricing reflects the direction of regulatory differences (stricter / less strict) in cross-border deals. When we include the new interaction variables, the non-interacted regulatory variables (DEP_INS and REG_STRENGTH) maintain their negative sign and their statistical significance in all specifications.

6 Conclusions and Policy Considerations

A substantial body of research has examined the patterns and performance of bank mergers and acquisitions. To date, this literature has largely focused on the U.S. with only limited evidence outside the U.S. market and very few studies which have examined Europe. While M&A has transformed the size of banking firms and widened the scope of activities they perform in a number of European economies, policymakers have long been concerned that the hitherto slow pace at which bank consolidation takes place in Europe (especially cross-border bank consolidation) runs contrary to the Single Market policy of the EU. In this paper, we analyze the premiums paid in European bank mergers. By analyzing the premiums paid by bidding banks, we are able to draw some conclusions as to the motives behind bank M&A in Europe. The EU offers a unique setting to analyze the extent to which regulatory considerations motivate M&A and are, thus, reflected in the pricing of bank acquisitions. This is mainly because high levels of freedom of capital movement coexist in the EU with continuing regulatory differences in the areas of bank regulation, deposit insurance, and investor protection regimes.

Our results show that bidding banks value more profitable and high-growth banks, and pay less for institutions with high equity ratios and high return volatility. In addition, bidders attach a valuation premium to focusing mergers that generate greater shareholder value. We also find that stricter prudential regulatory regimes and stronger deposit insurance schemes lower the takeover premiums paid in bank mergers. This result may reflect an attempt to gain greater safety net subsidies or it may reflect concern about higher compliance costs. In either case, the result seems to be mainly driven by domestic deals. On the whole, we find no conclusive evidence consistent with bidders paying to extract benefits from regulators either by paying a premium for less regulated regimes or becoming ‘too big to fail’ in cross-border deals.

REFERENCES

- ADKISSON, J. A., and D. R. FRASER (1990). "The Effect of Geographical Deregulation on Bank Acquisition Premiums", *Journal of Financial Services Research*, 4 (2), pp. 145-155.
- BARTH, J. R., G. CAPRIO and R. LEVINE (2001). *Banking Systems around the Globe: Do Regulation and Ownership Affect Performance and Stability? In Prudential Supervision: What Works and What Doesn't*, Ed. F. S. Mishkin, University of Chicago Press, Chicago.
- BEATTY, R., A. M. SANTOMERO and M. L. SMIRLOCK (1987). *Bank Merger Premiums: Analysis and Evidence*, Salomon Brothers Center for the Study of Financial Institutions Mongraph Series in Finance and Economics, Monograph 1987-3.
- BEITEL, P., D. SCHIERECK and M. WAHRENBURG (2004). "Explaining M&A Success in European Banks", *European Financial Management*, 10 (1), pp. 109-140.
- BENSTON G., W. HUNTER and L. WALL (1995). "Motivations for Bank Mergers and Acquisitions: Enhancing the Deposit Insurance Put Option versus Earnings Diversification", *Journal of Money, Credit and Banking*, 27 (3), pp. 777-788.
- BERGLÖF, E., P. FULGHIERI, J. GUAL, C. MAYER, P. BARROS and X. VIVES (2005). *Integration of European Banking: The Way Forward*, Centre for Economic Policy Research, London.
- BREWER, E., III, W. E. JACKSON III and J. JAGTIANI (2000). *Impact of Independent Directors and the Regulatory Environment on Bank Merger Prices: Evidence from Takeover Activity in the 1990s*, Federal Reserve Bank of Chicago Working Paper No. 2000-31.
- (2007). *Target's Corporate Governance and Bank Merger Payoffs*, Federal Reserve Bank of Kansas City Working Paper RWP 07-13.
- BREWER, E., III, and J. JAGTIANI (2007). "How Much Would Banks Be Willing to Pay to Become "Too-Big-to-Fail" and to Capture Other Benefits?", Federal Reserve Bank of Kansas City Working Paper RWP 07-05.
- BRIS, A., and C. CABOLIS (2008). "The Value of Investor Protection: Firm Evidence from Cross-Border Mergers", *The Review of Financial Studies*, 21 (2), pp. 605-648.
- BUCH, C. M. and G. DELONG (2004). "Cross-Border Bank Mergers: What Lures the Rare Animal?", *Journal of Banking and Finance*, 28, pp. 2077-2102.
- (2008). "Do Weak Supervisory Systems Encourage Bank Risk-Taking?", *Journal of Financial Stability*, 4, pp. 23-39.
- CAMPA, J. M. and I. HERNANDO (2006). "M&As performance in the European financial industry", *Journal of Banking and Finance*, 30, pp. 3367-3392.
- CARBÓ-VALVERDE, S., E. KANE and F. RODRÍGUEZ-FERNÁNDEZ (2008). "Evidence of Differences in the Effectiveness of Safety-Net Management in European Union Countries", *Journal of Financial Services Research*, 34, pp. 151-176.
- (2009). *Evidence of regulatory arbitrage in cross-border mergers of banks in the EU*, NBER Working Paper No. 15447.
- CHENG, D. C., E. G. BENTON and L. D. WALL (1989). "Financial Determinants of Bank Takeovers", *Journal of Money, Credit and Banking*, 21 (4), pp. 524-536.
- CYBO-OTTONE, A., and M. MURGIA (2000). "Mergers and shareholder wealth in European banking", *Journal of Banking and Finance* 24, pp. 831-859.
- DELONG, G. (2001). "Stockholder gains from focusing versus diversifying bank mergers", *Journal of Financial Economics*, 59, pp. 221-252.
- DÍAZ, B., M. GARCÍA and S. SANFILIPPO (2004). "Bank acquisitions and performance: evidence from a panel of European credit entities", *Journal of Economics and Business*, 56, pp. 377-404.
- DÍAZ DÍAZ, B., and S. SANFILIPPO AZOFRA (2009). "Determinants of premiums paid in European banking mergers and acquisitions", *International Journal of Banking, Accounting and Finance*, 1 (4), pp. 358-380.
- DJANKOV, S., R. LA PORTA, F. LÓPEZ-DE-SILANES and A. SHLEIFER (2008). "The law and economics of self-dealing", *Journal of Financial Economics*, 88, pp. 430-465.
- DYCK, A., and L. ZINGALES (2004). "Private Benefits of Control: An International Comparison", *Journal of Finance*, 59, pp. 537-600.
- ECB (2006). *EU Banking Structures*, European Central Bank, October.
- (2009). *Financial Integration in Europe*, European Central Bank, April.
- EKKAYOKKAYA, M., P. HOLMES and K. PAUDYAL (2009). "The Euro and the Changing Face of European Banking: Evidence from Mergers and Acquisitions", *European Financial Management*, 15, pp. 451-476.
- GODDARD, J., P. MOLYNEUX, J. O. S. WILSON and M. TAVAKOLI (2007). "European banking: An overview", *Journal of Banking and Finance*, 31 (7), pp. 1911-1935.
- HAGENDORFF, J., M. COLLINS and K. KEASEY (2008). "Investor protection and the value effects of bank merger announcements in Europe and the US", *Journal of Banking and Finance*, 32, pp. 1333-1348.
- HAGENDORFF, J., and K. KEASEY (2009). "Post-merger strategy and performance: Evidence from the US and European banking industries", *Accounting & Finance*, 49 (4), pp. 725-751.
- HAKES, D. R., K. H. BROWN and A. RAPPAPORT (1997). "The Impact of State Deposit Caps on Bank Merger Premiums", *Southern Economic Journal*, 63 (3), pp. 652-662.
- HERNANDO, I., M. J. NIETO and L. D. WALL (2009). "Determinants of Domestic and Cross-Border Bank Acquisitions in the European Union", *Journal of Banking and Finance*, 33 (6), pp. 1022-1032.
- KANE, E. J. (2000). "Incentives for Banking Megamergers: What Motives Might Regulators Infer from Event-Study Evidence?", *Journal of Money, Credit and Banking*, 32, August, pp. 671-705.

- LA PORTA, R., F. LÓPEZ-DE-SILANES, A. SHLEIFER and R. VISHNY (1998). "Law and Finance", *Journal of Political Economy*, 106, pp. 1113-1155.
- LAEVEN, L., and R. LEVINE, R. (2007). "Is there a diversification discount in financial conglomerates?", *Journal of Financial Economics*, 85, pp. 331-367.
- NENOVA, T. (2006). *Takeover Laws and Financial Development*, World Bank Policy Research Working Paper, No. 4029.
- PALIA, D. (1993). "The Managerial, Regulatory, and Financial Determinants of Bank Merger Premiums", *The Journal of Industrial Economics*, 41 (1), pp. 91-102.
- ROGOWSKI, R. J., and D. G. SIMONSON (1989). "Bank Merger Pricing Premiums and Interstate Bidding", in *Bank Mergers: Current Issues and Perspectives*, edited by Benton E. Gup. Kluwer Academic Publishers Boston, pp. 87-104.
- ROSSI, S., and P. F. VOLPIN (2004). "Cross-Country Determinants of Mergers and Acquisitions", *Journal of Financial Economics*, 74 (2), pp. 277-304.
- SHAWKY, H. A., T. KILB and C. F. W. STAAS (1996). "Determinants of Bank Merger Premiums", *Journal of Economics and Finance*, 20 (1), pp. 117-131.
- STERN G. H., and R. J. FELDMAN (2004). *Too Big To Fail: The Hazards of Bank Bailouts*, Brookings Institution Press, Washington, DC.

Table 1. Bank merger premium studies

Paper	Sample	Time period	Premium measure
Adkisson and Fraser (1990)	174 U.S. takeovers	1985-1986	Book value
Beatty, Santomero and Smirlock	264 U.S. takeovers	1984-1985	Book value
Benston, Hunter and Wall (1995)	302 U.S. takeovers	1981-1986	Market value
Brewer, Jackson and Jagtiani, (2000)	189 U.S. takeovers	1990-1998	Book value
Brewer, Jackson and Jagtiani, (2007)	392 U.S. takeovers	1990-2004	Market value
Brewer and Jagtiani, (2007)	412 U.S. takeovers	1991-2004	Market value
Cheng, Gup and Wall (1989)	135 U.S. takeovers	1981-1986	Book value
Diaz and Azofra (2009)	147 EU takeovers	1994-2000	Book value
Palia (1993)	137 U.S. takeovers	1984-1987	Book value
Rogowski and Simonson	168 U.S. takeovers	1984-1987	Book value
Shawky, Kilb and Staas (1996)	320 U.S. takeovers	1982-1990	Book value

Table 2. Number of deals**Breakdown by country**

	Full sample	Deals with listed target	Cross-border deals
Austria	7	5	3
Belgium	3	1	2
Czech Republic	6	4	5
Denmark	7	5	3
Estonia	3	3	2
Finland	1		1
France	22	18	4
Germany	22	14	8
Greece	15	12	4
Hungary	3	1	2
Ireland	2	2	2
Italy	75	33	7
Latvia	3	2	3
Lithuania	5	5	2
Luxembourg	1	1	1
Malta	3	3	3
Netherlands	2		1
Poland	9	6	7
Portugal	9	7	1
Slovak Republic	4		4
Slovenia	4	4	3
Spain	23	13	4
Sweden	1		
United Kingdom	6	4	2

Breakdown by year

1997	16	12	1
1998	32	16	9
1999	34	27	9
2000	35	25	11
2001	23	14	8
2002	14	7	7
2003	23	10	6
2004	19	8	6
2005	10	5	5
2006	20	11	10
2007	10	8	2
Total	236	143	74

Table 3. Bank regulatory indices

	Regulatory strength	Deposit insurance	Shareholder protection (country avg -1997-2007)
Austria	9	1	19.3
Belgium	9	1	8.0
Czech Republic	7	1	2.9
Denmark	6	1	19.8
Estonia	8	1	.
Finland	8	2	31.0
France	4	2	24.6
Germany	4	2	20.0
Greece	4	1	12.8
Hungary	9	1	13.3
Ireland	9	1	36.6
Italy	5	1	9.0
Latvia	5	1	21.5
Lithuania	3	1	23.1
Luxembourg	7	0	17.8
Malta	8	1	.
Netherlands	5	0	21.2
Poland	8	1	12.2
Portugal	6	2	21.2
Slovak Republic	7	1	0.9
Slovenia	9	0	.
Spain	7	1	32.0
Sweden	3	2	25.8
United Kingdom	9	0	42.4
<i>Sample Median</i>	7	1	19.975

Table 4. Bank acquisition premiums (BVPREM), by control thresholds

		Mean	Median	N. obs.
Control (threshold: 10%)	No	138.8	92.3	91
	Yes	162.0	122.6	145
	Difference	-23.1	-30.3 *	
Control (threshold: 20%)	No	141.9	91.9	83
	Yes	159.1	122.6	153
	Difference	-17.3	-30.7 **	
Control (threshold: 30%)	No	135.6	88.5	88
	Yes	163.4	125.7	148
	Difference	-27.8	-37.3 **	
Control (threshold: 40%)	No	149.1	92.9	93
	Yes	155.6	123.1	143
	Difference	-6.6	-30.2 **	
Control (threshold: 50%)	No	161.9	92.6	92
	Yes	147.4	122.6	144
	Difference	14.6	-30.0 **	
Control (threshold: MBR)	No	142.5	92.6	90
	Yes	159.6	122.6	146
	Difference	-17.1	-30.0 **	

* significant at 10%; ** significant at 5%; *** significant at 1%

Table 5. Bank acquisition premiums (BVPREM), by deal characteristics

		Mean	Median	N. obs.
Shareholder protection	Below median	183.1	131.8	137
	Above median	111.5	76.2	99
	Difference	71.6 ***	55.5 ***	
Regulatory strength	Below median	168.0	111.0	161
	Above median	120.9	85.1	75
	Difference	47.1 *	25.9	
Deposit insurance	0 or 1	151.7	118.6	181
	2	157.6	76.2	55
	Difference	-6.0	42.3	
Geographical scope	Domestic	147.5	109.6	162
	Cross border	165.2	100.2	74
	Difference	-17.7	9.4	
Listed	No	148.8	122.0	93
	Yes	155.8	98.3	143
	Difference	-7.1	23.8	

* significant at 10%; ** significant at 5%; *** significant at 1%

Table 6. Determinants of the premiums paid: Financial variables

Variable	Full sample	Listed	Ho: Full sample=listed (p-value)
CONTROL	22.219	28.49	(0.57)
CROSSB	-39.993*	-6.66	(0.80)
HHI	0.027	0.027	(0.20)
LISTED	-29.872	-	-
ROE	2.127***	7.705***	(0.02)
RISK	-1.990***	-1.752***	(0.60)
LEV	-4.567***	-4.669**	(0.62)
COVROE	0.825**	1.590**	(0.60)
ASSETDIV	6.278	93.949	(0.17)
RELSIZE	9.911	17.72	(0.99)
TAGRWTH	2.915*	-3.452	(0.00)
TAGRWTHSQ	-0.044	0.034	(0.01)
TGDPGROWTH	-0.567	-4.869	(0.96)
COMMERCIAL	7.074	35.346	(0.40)
HOLDING	-85.467	-11.958	(0.04)
INVESTMENT	-62.223	-70.311	(1.00)
INTERCEPT	143.755**	29.195	(0.02)
N	175	103	
r ² _a	0.068	0.179	
rmse	140.623	134.375	

* significant at 10%; ** significant at 5%; *** significant at 1%

Notes: Dependent variable is the premium of the purchase price over the book value in percentages. The full sample column contains all observations in the sample; the listed column contains those where the target is listed on a stock exchange. The independent variables are: CONTROL = binary variable equal to 1 if the deal involves a change in shareholder control of the target bank, CROSSB = binary variable equal to 1 if the bidder and target are chartered in different countries, HHI = Hirschman-Herfindahl index where the market is defined as the country in which the bank is headquartered, LISTED = binary variable equal to 1 if the target is listed on a stock exchange, ROE = return on equity, RISK = standard deviation of return on equity, LEV = equity divided by total assets, COVROE = covariance of ROE for bidder and target banks in the pre-merger years, ASSETDIV = absolute value of (1-|(net loans-other earning assets)/total earning assets) (from Laeven and Levine (2007)), RELSIZE = sum of bidder and target assets divided by bidder total assets, TAGRWTH = growth rate in target assets measure over the prior three years, TAGRWTHSQ = TAGRWTH squared. The third column reports p-values of difference in coefficients tests.

Table 7. Determinants of the premiums paid: Financial and regulatory variables

Variable	Full sample	Listed	Ho: Full sample=listed (p-value)
CONTROL	29.95	54.589*	(0.89)
CROSSB	-32.747	25.697	(0.69)
HHI	0.028	0.045	(0.14)
LISTED	-27.594	-	-
ROE	2.090***	9.093***	(0.01)
RISK	-1.841***	-1.772**	(0.44)
LEV	-5.613***	-6.532***	(0.64)
COVROE	0.942**	1.936**	(0.54)
ASSETDIV	25.794	91.622	(0.32)
RELSIZE	13.068	13.335	(0.91)
TAGRWTH	3.908**	-2.819	(0.02)
TAGRWTHSQ	-0.083***	-0.031	(0.30)
TGDPGROWTH	4.043	4.67	(0.52)
SHPROTECT	-1.143	-1.819	(0.73)
DEP_INS	-41.910*	-45.479*	(0.98)
REG_STRENGTH	-14.47	-30.279**	(0.41)
COMMERCIAL	0.466	29.402	(0.63)
HOLDING	-104.697	-2.958	(0.06)
INVESTMENT	-63.964	-101.188	(0.69)
INTERCEPT	279.197***	246.200**	(0.03)
N	168	96	
r2_a	0.104	0.299	
rmse	135.779	121.139	

* significant at 10%; ** significant at 5%; *** significant at 1%

Notes: Dependent variable is the premium of the purchase price over the book value in percentages. The full sample column contains all observations in the sample; the listed column contains those where the target is listed on a stock exchange. The independent variables are: CONTROL = binary variable equal to 1 if the deal involves a change in shareholder control of the target bank, CROSSB = binary variable equal to 1 if the bidder and target are chartered in different countries, HHI = Hirschman-Herfindahl index where the market is defined as the country in which the bank is headquartered, LISTED = binary variable equal to 1 if the target is listed on a stock exchange, ROE = return on equity, RISK = standard deviation of return on equity, LEV = equity divided by total assets, COVROE = covariance of ROE for bidder and target banks in the pre-merger years, ASSETDIV = absolute value of (1-|(net loans-other earning assets)/total earning assets) (from Laeven and Levine (2007)), RELSIZE = sum of bidder and target assets divided by bidder total assets, TAGRWTH = growth rate in target assets measure over the prior three years, TAGRWTHSQ = TAGRWTH squared. The third column reports p-values of difference in coefficients tests.

Table 8. Determinants of the premiums paid: Financial and regulatory variables - Interactions

Variable	Full sample	Listed	Ho: Full sample=listed (p-value)
CONTROL	30.92	51.933*	(0.81)
CROSSB	-265.905	-298.088*	(0.83)
HHI	0.029	0.051	(0.14)
LISTED	-27.271	-	-
ROE	1.950**	8.452***	(0.01)
RISK	-1.886***	-2.021***	(0.15)
LEV	-5.833***	-7.089***	(0.76)
COVROE	0.825*	1.935**	(0.61)
ASSETDIV	17.121	76.99	(0.37)
RELSIZE	13.095	16.189	(0.93)
TAGRWTH	3.047*	-3.91	(0.02)
TAGRWTHSQ	-0.060**	0.002	(0.25)
TGDPGROWTH	4.824	8.666	(0.33)
SHPROTECT	0.718	0.813	(0.65)
SHPROTECT*CROSSB	-2.368	-4.232	(0.26)
DEP_INS	-76.526*	-95.661**	(0.94)
DEP_INS*CROSSB	61.301	99.777*	(0.86)
REG_STRENGTH	-36.889*	-61.154**	(0.36)
REG_STRENGTH*CROSSB	35.247	47.712*	(0.55)
COMMERCIAL	9.814	21.158	(0.76)
HOLDING	-90.635	-22.207	(0.22)
INVESTMENT	-49.647	-100.697	(0.70)
INTERCEPT	405.083***	437.918***	(0.06)
N	168	96	
r2_a	0.105	0.308	
rmse	135.672	120.359	
p-values (Reg.var+interaction)			
t_sharehol~v	0.30	0.15	
t_di	0.57	0.92	
t_regul_st~h	0.88	0.34	

* significant at 10%; ** significant at 5%; *** significant at 1%

Notes: Dependent variable is the premium of the purchase price over the book value in percentages. The full sample column contains all observations in the sample; the listed column contains those where the target is listed on a stock exchange. The independent variables are: CONTROL = binary variable equal to 1 if the deal involves a change in shareholder control of the target bank, CROSSB = binary variable equal to 1 if the bidder and target are chartered in different countries, HHI = Hirschman-Herfindahl index where the market is defined as the country in which the bank is headquartered, LISTED = binary variable equal to 1 if the target is listed on a stock exchange, ROE = return on equity, RISK = standard deviation of return on equity, LEV = equity divided by total assets, COVROE = covariance of ROE for bidder and target banks in the pre-merger years, ASSETDIV = absolute value of (1-|(net loans-other earning assets)/total earning assets) (from Laeven and Levine (2007)), RELSIZE = sum of bidder and target assets divided by bidder total assets, TAGRWTH = growth rate in target assets measure over the prior three years, TAGRWTHSQ = TAGRWTH squared. The third column reports p-values of difference in coefficients tests.

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