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The determinants of bank M&As: Evidence from EU in post crisis era

Abstract:

We analyze the takeover premiums paid for a sample of European bank M&As between 2010 and 2020. We find that acquirors pay higher premiums for targets that are more profitable, better capitalized, have more opportunities to grow and located in different country. Also, we find no evidence that the strength of bank regulation and supervision regimes in Europe for that sample period have measurable effects on takeover pricing. This is consistent with the measures taken as a response to global financial crisis for a better coordination in regulation amongst member countries. We, also, find that acquirors price deposit insurance schemes and governance of each country. Specifically, they are willing to pay higher premium the more generous the deposits insurance scheme is and the worse the quality of governance.

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1. Introduction

Analyzing the causes behind the Global Financial crisis (GFC) of 2008, it is clear that financial regulation partly contributed to the emergence of it. According to Levine (2012), there was a systemic failure of governance of financial regulation. Policymakers did not adopt the existing policies to the new circumstances and this had as a result to increase the fragility of financial system. Such policies created strong incentives for financial institutions to take excessive risk and allocate capital in an unproductive way implying the existence of regulatory arbitrage. That is, financial institutions capitalized on loopholes in financial regulatory system in order to evade unfavorable regulations. Regulatory arbitrage can be achieved by a variety of tactics, such as restructuring transactions, financial engineering and geographic relocation. In case of financial crisis, financial institutions found loopholes in capital requirements and in misperception of risk of relatively new financial innovations (such as CDS and MBS) (Acharya et al. (2009)).

After GFC, knowing the dangers that regulatory arbitrage entails, there have been tries globally but especially in EU (European Union) to eliminate regulatory arbitrage incentives of financial institutions by harmonizing the regulatory differences amongst member countries. That is why, EU established, in 2012, the Banking Union which resulted the transfer of responsibility of banking policy from national level to EU level. In 2014, the Single Supervisory Mechanism (SSM), the first pillar of the banking union, was put into force and granted European Central Bank (ECB) a supervisory role over banks in EU. The second pillar of Banking Union is the Single Resolution Mechanism (SRM) which is responsible for the smooth resolution of a bank in a way that does not harm the broader economy and cause financial instability. The third pillar is for a common deposit insurance scheme between member countries, known as the European Deposit Insurance scheme. Although it was proposed by European Commission, it was never been adopted. Except from a strong push in coordination of regulation, there was also a strong push to stronger capital requirements with the implementation of Basel 3 in 2010. Basel 3 had as an aim to increase capital requirements and consider liquidity risk introducing two liquidity measures: Liquidity Coverage Ratio (LCR) and Net Stable Funding Ratio (NSFR). One of the most important implementations of Basel 3 was the leverage ratio which was based in total assets and not risk-weighted assets taking away the discretion from banks in how they used risk weights to determine capital requirements.

Even though all these major changes had as a result a better regulatory coordination within EU, there were still some noted differences in bank regulation and supervision, in deposit insurance schemes and in governance of each member country that remained unchanged. These differences could arise regulatory arbitrage incentives for banks.

This paper tries to capture the motives of EU bank M&As activity, one of many ways that banks can engage to regulatory arbitrage. Previous studies focused on years before the GFC within EU have found strong evidence of regulatory arbitrage on banks

M&As activity. Our sample period is from 2010 to 2020, the years after the GFC. It is interesting to test, after all the changes that have been made to capital requirements and coordination of regulation within EU, if regulatory arbitrage incentives continue to exist on bank M&As. More specifically, we analyze the takeover premiums paid in both domestic and cross-border deals including regulatory variables of target country and controlling for deal characteristics and target banks characteristics.

We find that acquiring banks price profitability, capitalization and growth opportunities on targets. Moreover, they value targets that are located in different country consistent with the theory of geographical diversification. The results for regulatory variables indicate that acquiring banks value more generous deposit insurance schemes and worse quality of governance. These findings are in line with regulatory arbitrage. Lastly, our analysis points that the strength of bank regulation and supervision regimes do not have measurable effects on takeover pricing.

The rest of the paper is organized as follows. Section 2 reviews the literature, Section 3 presents the data, the variables used and the hypotheses, Section 4 includes the methodology, Section 5 presents the main results and Section 6 concludes.

2. Related literature

This section provides the related literature that examine bank takeover pricing both in US and EU. Except target and acquirer characteristics which are the traditional determinants of premiums, numerous studies investigate a variety of alternative variables that may have an impact on premiums such as geographic location, distance (acquirer-target), language, real GDP growth, governance, deposit insurance scheme, bank regulation and supervision. We first provide the related literature about bank takeover pricing in US and after the related literature about EU. Lastly, we focus on papers that examine the impact of regulatory variables on takeover premiums and the possibility that banks engage to regulatory arbitrage through M&As.

The academic literature has a rich variety of papers that analyze the takeover premiums paid in bank M&As. The most of these papers focus on US bank M&As activity. For example, **Cheng et al. (1989)** research the financial determinants of bank takeovers based on a sample of 136 US takeovers during 1981-1986 period. They conclude that higher earnings ratios, growth opportunities and bidder related variables play a significant role in merger premiums. **Palia et al. (1993)** analyze the managerial, regulatory and financial determinants of 137 US bank merger premiums for the period of 1984 to 1987. They find that both acquirer and target characteristics and the regulatory environment both in acquirer and target bank states are related with merger premiums. Also, the separation of ownership and control in acquirer and target banks has a significant effect on merger premiums. **Valkanov et al. (2007)** examine 105 US and European bank M&As between 1997 and 2003 and they conclude that capital is valuable in banks mergers. High excess capital targets create more value for shareholders. **Shawky et al. (1996)** investigate the premiums paid for a sample of

320 US bank acquisitions during 1982-1990. Their main results indicate that higher premiums are paid to smaller size targets, to targets with higher returns on equity and higher leverage and to targets in a different state than the bidder. **Brewer et al. (2000)** find strong evidence that target banks which are more profitable (higher Return on assets or/and Return on equity) and less capitalized with higher leverage ratio receive higher premiums. They abstract their conclusions from a dataset of 189 US takeovers during 1990 and 1998. **Adkisson et al. (1990)**, using a sample of 174 US takeovers for a time period of 1985-1986, focus on banks entry barriers and they show that there are higher premiums in states where interstate banking is allowed, consistent with “excess demand” theory (more potential bidders).

Even though the relative literature is quite small for EU bank M&As activity, there are some important papers worth mentioning. For example, **Diaz et al. (2009)** use a sample of 81 European banking mergers and acquisitions from 1994 to 2000 to show that the main drivers of takeover premiums are the target bank characteristics such as the percentage of equity, the percentage of loans and the financial profitability. They do not find a relationship between takeover premiums and geographical or product diversification. **Hernando et al. (2009)** use a sample of 157 European deals (both domestic and cross-border deals) for the period between 1997 and 2004. Their findings are in line with those of studies that examine US bank M&As and depend highly on the type of deal (domestic or cross-border). For example, their main results suggest that high cost to income banks are more likely to be targets by banks located in the same country but there is no such evidence in cross-border deals. Furthermore, large banks are more likely to be acquired by other banks in the same country. Banks in more concentrated markets are less likely to be acquired in domestic deals while the opposite is true for cross-border deals. **Schaeck et al. (2010)**, using information on bank M&As from 1997 to 2008 for nine EU economies, find that there is a positive relation between merger premiums, large M&As and the possibility of becoming “Too Big to Fail”. However, they find no strong evidence that M&As activity is positively related to the increase of systemic risk.

Lastly, as regulatory arbitrage was one of the main causes of the GFC, there are several papers that try to prove the existence of regulatory arbitrage incentives in bank M&As the years before the crisis. These papers focus not only in EU but also in the whole globe, as GFC was a global phenomenon. **Carbo-Valverde et al (2010)** show that differences in the size and character of safety-net benefits that are available to bank in individual EU countries help to account for cross border merger activity. This means that banks are responding to opportunities for shifting risk onto EU safety nets through cross border mergers in line with a harmful form of regulatory arbitrage. **Karolyi et al (2015)** find evidence of a benign form of regulatory arbitrage using a sample of 916 cross border mergers from 78 countries in the period of 1995-2012. The benign form of regulatory arbitrage is consistent with the idea that banks pursue to maximize their shareholder value and improve their capital allocation in other countries as in their home country are constrained to chase profitable investment opportunities due to heavy regulations. **Dong et al (2011)** analyze the effects of bank

regulation on bank's cross-border M&As around the world between 1990 and 2007. Firstly, they find that banks in countries with less stringent capital requirement, less stringent official supervisory power, more independent supervisory authority, and lower standard disclosure policy tend to be more attractive targets in international banking M&A activities while banks in heavily regulated countries are more likely to expand abroad. Secondly, they find that the takeover premium is increasing in countries with less stringent capital requirement, more independence of supervisory authority, and lower disclosure standard. **Hagendorff et al (2012)** analyze the takeover premiums paid for a sample of domestic and cross-border bank takeovers in the European Union between 1997 and 2007. They find that acquiring banks value profitable, high-growth and low risk targets. Furthermore, they find that stricter bank regulatory regimes and stronger deposit insurance schemes lower the takeover premiums paid by acquiring banks. This result is mainly driven by domestic deals and not by cross border deals. In other words, and contrary to other studies, they find no evidence of regulatory arbitrage in cross-border deals in their sample.

This paper contributes to the related literature of bank takeover pricing and specifically shed some light for the determinants of premiums paid within EU. The related literature is quite poor when it comes for the EU compare to the large number of studies undergone for US in this field. Moreover, this paper contributes to the studies that investigate regulatory arbitrage in bank M&As. Our paper is not quite different in terms of methodology from aforementioned papers in this section that study regulatory arbitrage by analyzing takeover premiums. What it makes this paper unique though, is the sample period used. Previous studies focus on the years before the GFC while our paper focus on the years after. That is because one of the main causes of this paper is to test the effectiveness of regulation coordination and stricter capital requirements which were applied as a response to the GFC.

3.Data and Variables

We use a sample of 79 bank M&As which is consisted of 62 domestic deals and 17 cross-border deals. The sample of bank M&As within the EU-28 (including Croatia from 2013 and United Kingdom as BREXIT completed in 2020) for the period of 2010-2019 (10-year period) can be found in ThomsonOne financials M&As database. We include deals where acquirors and targets are mainly commercial banks and deals that are announced and completed in this period. The sample banks are not subsidiaries of financial institutions chartered outside of EU. We exclude share repurchases and M&As that there is no public information available. ThomsonOne database provides information about the deal characteristics (target and acquiror country, transaction/deal value, premium offered, announced date) and target characteristics (total assets, book value, net assets and net income). The missing information from ThomsonOne about target characteristics can also be found at Orbis Bank Focus. This database contains annually and quarterly report data for financial institutions worldwide.

In our analysis we examine the takeover premiums paid from acquirors to targets. In order to find out the takeover premiums paid we have to use a pre-merger measure of target's value. Such measures can be book value or market value. The majority of studies that analyze takeover premiums use book value (**Hagendorff et al (2012)**, **Adkisson et al. (1990)**, **Cheng et al. (1989)**, **Palia (1993)**, **Diaz et al. (2009)** etc) while there are two papers that use market value (**Brewer et al. (2007)** and **Benston et al. (1995)**). In our paper we use book value as we believe it is closer to the real economic value of banks. One argument in favor of book value is that banks usually keep in their balance sheets short term assets. On the contrary, market value comes with some serious disadvantages. The main one is that market value is affected by market sentiment and as a result the valuation may not reflect the real economic value of target.

The main independent variables, we contain in our analysis, can be classified in three categories: deal characteristics, target characteristics and regulatory variables.

We first analyze the variables related to deal characteristics. Because our sample includes both domestic and cross-border deals, we add a variable to distinguish this characteristic. Previous studies give us mixed signals about this variable as it can take both a positive and a negative sign. A negative sign on cross-border variable indicates that foreign targets are more difficult to integrate as there are obstacles related to the language, culture, distance or regulation. On the other hand, a positive sign indicates the opportunities that arise for acquirors to enter a new market and achieve geographical diversification. Consistent with the first theory, **Hagendorff et al. (2012)** find a negative coefficient on cross-border variable. Another variable related to deal characteristics that we include to our analysis is the control variable. In particular, this variable shows us if acquirors gain the power of control over their targets through the deal. For example, **Bris (2002)** find that the premium paid is affected by the share percentage of the target institution that the acquiror owns before M&A takes place. As a result, we expect a positive sign on this variable.

Then we analyze the variables related to target characteristics. Almost all the empirical studies that examine the valuation of M&As contain a variable which measures the profitability of the target. In this study we use ROE and we expect that a higher ROE will result in higher premium. Evidence found shows a positive relationship between premiums and profitability, and especially between premiums and ROE (**Beatty et al. (1987)**, **Cheng et al. (1989)**, **Shawky et al. (1996)** and **Brewer et al. (2000)**). Another variable that can be considered a source of profitability or potential growth of profitability is market concentration. Although most of prior studies (**Diaz et al. (2009)**, **Rogowski et al. (1989)** and **Hakes et al. (1997)**) find market concentration coefficient insignificant, we include this variable in our analysis and assume a positive relationship between market concentration and takeover premium. We, also, include target's growth opportunities and we expect higher growth opportunities of target to increase the premiums paid. For example, **Cheng et al. (1989)** obtain a positive coefficient on core deposit growth and on asset growth. Moreover, we add a size variable of targets.

The related literature gives us mixed results about the size variable as it can take both positive and negative sign. However, the economic theory can explain both cases. A positive sign on size means that large targets offer economies of scale and offer the organization the chance to be considered Too-Big-To-Fail. On the other hand, a negative sign on size means that small targets are supposed to integrate much easier to the acquiror and this means lower costs. Consistent with the first theory, **Rogowski et al. (1989)** obtain a positive coefficient on size. However, **Cheng et al (1989)**, **Hakes et al. (1997)** and **Palia (1993)** find significant negative coefficients on size while **Diaz et al. (2009)** find the estimated coefficient on relative asset size insignificant. Lastly, we include a variable related to leverage ratio, the equity-to-total-assets ratio which accords with the bank supervisory use of term and it is the minimum percentage of equity that banks must maintain to reduce risk. A very high equity-to-total-assets ratio is an indicator that the target bank does not use its resources efficiently and it is risk averse. That is why previous studies (**Hannan et al. (1987)**, **Rogowski et al. (1989)**, **Hakes et al. (1997)**) find a negative relationship between capital ratios and premiums paid while **Palia (1993)** find no significance on this variable.

Lastly, we include in our analysis three regulatory variables for each target country in our sample: Bank regulation and supervision, deposit insurance scheme and governance.

Bank regulation and supervision variable is related to capital requirements, supervision, monitoring power, disclosure requirements and activity restrictions of banks. **Karolyi et al (2015)** prove that acquirors are typically from countries with stronger supervision, more restrictions on bank activities, stricter capital requirements, and stronger private monitoring, all of which is in line with regulatory arbitrage. Also, **Hagendorff et al (2012)** find that stricter regulatory regimes lower takeover premiums while **Palia et al. (1993)** find that both the regulatory environment of target and acquiror is related with the merger premiums. However, these studies focus on periods before 2010 and so before the implementation of measures for the coordination of regulation between countries and measures for stricter capital requirements within EU. This drive our first hypothesis: We assume that the most regulatory differences on bank regulation and supervision between countries in EU had been eliminated and as a result this variable will have a minor or no effect on premiums.

H1: We expect that bank regulation and supervision variable will have no positive or negative impact on banks takeover pricing because EU had made major steps after 2010 to eliminate regulatory loopholes on this field as a response to GFC.

All the information about bank regulation and supervision is abstracted from the bank regulation and supervision database of **Barth et al. (2011,2019)** which is available at World Bank. Because this database is not available on an annual basis, we use the information of data as of 2011 for the period of 2010 to 2013 and the data as of 2016 (2019 was the year the database released but the information was about the end of 2016) for the period of 2014 to 2019.

On the contrary of bank regulation and supervision variable, deposit insurance scheme and governance variables were remarkably different in each country and they continue to be.

Deposit insurance schemes exist to prevent bank runs but they can also create moral hazard problems. As banks are protected from the deposit insurance schemes, they attract deposits that no longer reflect the risk of their asset portfolio. This encourages banks to take on high risk projects and enjoy higher returns. **Carbo-Valverde et al. (2008)** provides evidence of differences in the effectiveness of safety-net management in European Union countries and **Carbo-Valverde et al. (2010)** show that these differences help to account for cross border merger activity driven by risk shifting opportunities. So, it is conceivable for acquirors to pay higher premiums for more generous deposit insurance schemes.

H2: Acquirors pay higher premiums on targets that are located in more generous deposit insurance schemes since they can enjoy higher safety net subsidies and can take excessive risk.

The data for the deposit insurance schemes for each country can be found at bank regulation and supervision survey of **Barth et al. (2011,2019)** provided by World Bank. Additional information for deposit insurance schemes as the end of 2013 can be found at the exclusive deposit insurance dataset of World Bank based on the original work of **Demirguc-Kunt et al (2005)**. Because the data we have for deposit insurance schemes is not annual, we use the data as the end of 2011 for the period of 2010 to 2012, the data as the end of 2013 for the period of 2013 to 2015 and the data as the end of 2016 for the period of 2016-2019.

The governance variable is related to the quality of governance in each country. **Dong et al. (2011)** find this variable negative and significant indicating that banks do not arbitrage only in bank regulations but also in the quality of governance too. Banks price the private benefits of control that come with a bad governance.

H3: Banks not only arbitrage in bank regulations but also in the quality of governance system.

All the information about the quality of governance in each country can be abstracted from the six World Governance Indicators (WGI) that **Kaufmann et al. (2010)** produced. This database is provided by World Bank too.

More information about the construction of regulatory variables is provided in the next section.

4.Methodology

We use an OLS regression to analyze the factors of banks takeover pricing. We run two regressions: in the first one we include only target and deal characteristics and in the

second one we also include regulatory variables. Specifically, the main regression has the following form:

$$\text{TakPrem}_i = a + b_1 * \text{DC}_i + b_2 * \text{TC}_i + b_3 * \text{Regulat}_i + \varepsilon_i$$

The dependent variable is the takeover premium paid in deal *i* (one-dimension model). It is expressed as the purchase price paid by acquiror scaled by the pre-deal book value of target bank's equity. We, also, include negative takeover premiums when the purchase price paid by acquiror is smaller than the book value of the bank.

More specifically, the takeover premium is computed as follows:

$$\text{TakPrem} = \left(\frac{\text{DEAL VALUE} - S * \text{BOOK VALUE}}{S * \text{BOOK VALUE}} \right) * 100$$

Where DEAL VALUE is the purchase price paid by acquirors, BOOK VALUE is the last available book value of target bank's equity before the announcement day and S is the stake of shares acquired.

The DC is a vector of deal characteristics of deal *i* and include the following variables: 1) **CROSSB**, which is a dummy variable equal to 1 if it is a cross border deal and zero if it is a domestic, 2) **CONTROL**, which is also a dummy variable, equal to 1 if before the deal the acquiror owned less than 50% of the target and after the deal the acquiror owned more than (or equal to) 50% of the target (otherwise the variable takes the value of zero).

The TC is a vector of target bank characteristics of deal *i*. The target's characteristics used in the model are: **ROE** (=net income/equity) as a proxy for the target's profitability/efficiency (the fiscal year before the announcement day of the deal), **CAP**(=Capitalization) is the equity-to-total assets ratio (the fiscal year before the announcement day of the deal), **SIZE** measured by total assets (the fiscal year before the announcement day), **MARKETCONC** (=market concentration) is the market power and it is measured by HHI index (based on total assets) of the target country and **TARGROWTH** is the target's growth opportunities proxied by the annual real GDP growth of target's country.

The Regulat is a vector of regulatory variables of target's country of deal *i*. These variables are: 1) Bank regulation & supervision index 2) Governance index and 3) Deposit insurance Scheme index.

Similarly, with **Buch et al. (2008)**, we construct a bank regulation & supervision strength index that takes into account the activities restrictions, supervision, monitoring power, capital and disclosure requirements of banks in each country. Specifically, the index is constructed from 13 factors (Yes=1, No=0): 1) whether banks can engage in securities, 2) insurance and 3) real estate activities, 4) whether banks can own voting shares in nonfinancial firms (the first four factors are related to the activities restrictions), 5) whether the supervisor agency require banks to constitute provisions to cover actual or potential losses, 6) require banks to reduce or suspend dividends to shareholders, 7) require banks to reduce or suspend bonuses and other

remuneration to bank directors and managers, 8) has the power to declare insolvency, 9) supersede shareholders' rights (these factors are related to the supervisory power), 10) whether an audit by a professional external auditor required for all commercial banks, 11) whether bank directors are legally liable if information disclosed is erroneous or misleading, 12) whether banks are required to disclose to public off-balance sheet items or 13) governance and risk management framework (these components are referring to disclosure requirements and private monitoring). Regarding the capital requirements it seems that by the start of 2010: 1) all countries in our sample have adopted Basel guidelines, 2) the minimum capital-asset ratio requirement covers credit, market and operational risks, 3) all countries require banks to perform an internal assessment of their capital adequacy against their economic capital and 4) this assessment is reviewed by regulatory and supervisory agencies. As a result, we do not include capital requirements to our index as there are no significant differences amongst the countries in our sample for this period. The bank regulation and supervision strength index ranges from 0 to 13 with higher values indicating stronger regulatory regimes.

The Governance index is an index constructed from the average of the six World Governance Indicators (WGI). All six governance indicators range from -2.5 to 2.5 with higher values indicating better government outcomes. Particularly, Voice and accountability indicator measures perceptions of the extent to which a country's citizens are able to participate in selecting their government, as well as freedom of expression, freedom of association, and a free media. Political stability indicator measures perceptions of the likelihood of political instability and/or politically-motivated violence, including terrorism. Government Effectiveness captures perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies. Rule of Law captures perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence. Control of Corruption captures perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests. Regulatory Quality captures perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development.

We construct a deposit insurance index that measures the degree to which moral hazard exists following **Demirguc-Kunt et al (2002)**. At the start of 2010, all the EU countries from our sample had already adopted an explicit deposit insurance protection system and as a result we do not take this into consideration. We construct our index based on the following criteria: whether the insurance premium is based on risk (No=1, Yes=0), whether the deposit guarantee scheme is prefunded (Yes=1, No=0), whether co-insurance is required (No=1, Yes=0) and the coverage offered to

depositors (percentage of total deposits covered by the scheme, 1=above median of sample and zero below). Our deposit index varies from 0 to 4 with higher values indicating more generous deposit insurance schemes and higher degree of moral hazard.

5. Main results

5.1 First Regression

The results from the first regression are illustrated in Table 1.

In columns from 1 to 7 we regress the dependent variable, which is the takeover premium, with each independent variable separately. The variables that seem to play an important role in forging of takeover premiums are CROSSB, ROE and CAP. CROSSB and ROE variables are statistically significant at 5% level while CAP is statistically significant at 1% level. All these variables have positive coefficients with CROSSB variable to have the biggest coefficient calculated at 28.6425. The coefficients of the other two variables, ROE and CAP, are at 0.20861 and 2.389884 respectively.

In column 8, we include all deal and target variables together in the same regression. The results remain the same: CROSSB, ROE and CAP are the variables that explain the takeover premiums. However, the significance level and the size of the coefficients are different. The CROSSB variable is statistically significant at 10% level and its coefficient is measured at 21.6457 approximately. The ROE variable is statistically significant at 5% level and its coefficient is calculated at 0.1973 and the CAP variable is statistically significant at 1% level and the size of its coefficient is at 2.3111. The R-squared is 0.2801 which means that this model explain 28% of the behavior of the dependent variable. So, there are other variables that help to explain better the behavior of takeover premiums.

The model in column 9 controls for time-fixed effects in order to eliminate bias from unobservable variables that change over time but they remain constant across entities. TARGROWTH variable becomes statistically significant at 5% level and have a positive coefficient at 4.6163. That means that if TARGROWTH variable is increased by 1% then the takeover premium will be increased by 4.61% approximately. Also, CAP variable remains statistically significant at 1% level and its coefficient is calculated at 2.295. CROSSB and ROE variables when we control for time-fixed effects become insignificant.

In column 10, the model control for both time-fixed effects and country fixed effects. The variable that is statistically significant is CAP at 1% level and its coefficient is measured at 2.4533. The other variables are statistically insignificant and so they are not worth mention.

Overall, from our first regression we interpret some interesting results. We find that takeover premiums paid are higher the more profitable and better capitalized the target is and when the deal is cross-border. Moreover, when we control for time-fixed effects, we find that acquirors price the growth opportunities of the target. Premiums

are higher for targets that have more opportunities to grow. These results are in line with those of the related literature except the equity-to-total-assets ratio (=CAP) variable which, in previous studies, is found to have a negative relationship with takeover premiums. An explanation for a positive and statistically significant coefficient may be that the related literature focus on periods before 2010 and so before the implementation of Basel 3 which introduced a minimum leverage ratio. So, Basel 3 made equity-to-total-assets ratio a requirement for banks to hold. As a result, a higher equity-to-total-assets ratio which from 2010 is a regulatory capital may be priced higher as it creates more value for shareholders (**Valkanov et al. (2007)**)

5.2 Second Regression

The results from the second regression are presented in Table 2.

In model 1 (column 1), we regress the takeover premium, which is the dependent variable, with the independent variables used in first regression but now including regulatory variables too. The results indicate that the variables that explain the behavior of takeover premiums are ROE, CAP and GOVERNANCE. Similar to what we found in the first regression, ROE and CAP are statistically significant at 5% and 1% level respectively while they both have positive coefficients. Specifically, their coefficients are calculated at 0.215 for ROE and 2.546 for CAP. From the regulatory variables used, GOVERNANCE is the only variable that it is statistically significant at 10% level. It has a negative coefficient at -20.392 meaning that the worse the quality of governance is, the higher the premiums paid from acquirors. This is in line with our hypothesis, that banks try to arbitrage in the quality of governance too. Interestingly, BANKREGULSUPER variable has a positive coefficient but it is statistically insignificant. Lastly, the DEPOSITINSURANCE variable has a small negative coefficient but it is statistically insignificant too. The R-Squared of this model is 0.344, significant bigger than the R-squared of first regression in which only deal and target characteristics were used (the R-squared of first regression was 0.2801). That means that regulatory variables helped to explain better the behavior of takeover premiums. Specifically, the model explains 34.4% of the behavior of takeover premiums.

In model 2 (column 2), we run the same regression but we control for time-fixed effects. In this model, the variables that seem to explain better the behavior of takeover premiums are CAP, TARGROWTH, BANKREGULSUPER and GOVERNANCE. Specifically, ROE variable becomes statistically insignificant while TARGROWTH variable becomes statistically significant at 5% level with a positive coefficient at 5.297. The results are same for CAP variable which is statistically significant at 1% level with a positive coefficient at 2.429. From the regulatory variables used, GOVERNANCE variable remains statistically significant but at 5% level with a quite large negative coefficient at -27.232. Furthermore, in this model, BANKREGULSUPER variable is statistically significant at 10% and has a positive coefficient calculated at 8.009. This indicates that higher premiums are paid for targets which are located in more stricter bank regulation and supervision regimes. This finding is in contrast with regulatory arbitrage incentives and maybe the result is driven exclusively by cross-border deals.

More particularly, in cross-border mergers, **Buch et al. (2004)** find that acquirors price strict bank regulation and supervision regimes as a result of trust due to the increased transparency of disclosure procedures. That is why, in our next model, we include interaction terms to our regulatory variables to distinguish the effect in cross-border and domestic deals.

In model 3 (column 3), we include a specification which allows for a differential effect of the regulatory variables depending on whether the deal is domestic or cross-border. The interaction terms we include are CROSSB*DEPOSITINSURANCE, CROSSB*BANKREGULSUPER and CROSSB*GOVERNANCE. Their coefficients are 25.064, 5.166 and 19.202 respectively indicating that acquirors in cross-border mergers price the generous deposit insurance schemes, the strict bank regulation and supervision regimes and the quality of governance. However, our findings show that none of these variables are statistically significant and so they cannot explain the behavior of takeover premiums. Similarly, with previous models, the variables that help to explain the behavior of takeover premiums are ROE, CAP and GOVERNANCE. ROE is statistically significant at 5% level and its coefficient is positive at 0.194, CAP is statistically significant at 1% level and its coefficient is positive at 2.363 and GOVERNANCE is statistically significant at 10% level and its coefficient is negative at -23.163.

In model 4 (column 4), we run the same regression as in model 3, but we control for time-fixed effects. The results are in line with the previous models that take account time-fixed effects. In particular, TARGROWTH variable becomes statistically significant at 5% level and has a positive coefficient at 6.464. CAP and GOVERNANCE remain statistically significant at 1% and 5% level respectively and their coefficients are calculated at 2.1 for CAP and at -33.351 for GOVERNANCE. The interaction terms for the regulatory variables remain statistically insignificant.

In model 5 (column 5), we control for country fixed effects. The results are quite different in contrast to previous models. The variables that explain takeover premiums are CROSSB and CAP. Specifically, CROSSB variable becomes statistically significant at 1% level with a large negative coefficient at -327.6242 and CAP variable is statistically significant at 5% level with a positive coefficient at 1.647. Furthermore, the interaction terms for regulatory variables, CROSSB*DEPOSITINSURANCE and CROSSB*GOVERNANCE become statistically significant in this model. In particular, CROSSB*DEPOSITINSURANCE is statistically significant at 5% level and its coefficient is calculated at 48.615 while CROSSB*GOVERNANCE is statistically significant at 5% level and its coefficient is measured at 147.93. That means that in cross-border mergers, acquirors pay higher premiums for more generous deposit insurance schemes and for better quality of governance. The positive coefficient at CROSSB*DEPOSITINSURANCE is in line with regulatory arbitrage incentives as more generous deposit insurance schemes indicate higher degrees of moral hazard and more safety net subsidies for banks. On the contrary, the CROSSB*BANKREGULSUPER interaction term has a positive coefficient at 4.658 but it is statistically insignificant indicating that this

variable cannot explain takeover premiums and that acquirors do not price bank regulation and supervision regimes. In other words, the measures, that have been taken after the GFC for the coordination of bank regulation amongst the countries in EU, were effective and the differences on this field were insignificant for acquirors to price.

Overall, the results of the second regression give us further insights about the banks takeover pricing of regulatory variables both in domestic and in cross-border deals. Specifically, for the whole sample, the only variable that has an impact on takeover premiums is the index for the quality of governance. The results indicate that acquirors pay higher premiums for a worse quality of governance. This is in line with our third hypothesis that banks arbitrage in the quality of governance and that enjoy private benefits of control that result from it. This result holds in all models except the last one (model 5) which controls for country fixed effects. In the last model the variable is statistically insignificant while the interaction term for cross-border deals becomes statistically significant and positive indicating that acquirors price a good quality of governance only in cross-border deals. The index for bank regulation and supervision is not only statistically insignificant but it has a positive coefficient in all models. These findings are in contrast with regulatory arbitrage incentives and confirm our first hypothesis: policymakers did a good job eliminating the regulatory loopholes after the GFC. The index for deposit insurance schemes is statistically insignificant in all models showing that acquirors do not take it into account for pricing the targets. The only exception is in model 5 where the interaction term for cross-border deals is statistically significant and positive. That means that in cross-border deals acquirors pay higher premiums for targets that are located in more generous deposit insurance schemes. This result is in line with regulatory arbitrage and, so, with our second hypothesis: acquirors try to take advantage of generous deposit insurance schemes and of safety net subsidies they provide in order to engage in risk shifting.

6. Conclusion

This paper investigates the determinants of bank M&As within EU from 2010 to 2020, the years following the global financial crisis. By analyzing the takeover premiums paid we try to capture the motives of acquirors behind bank M&A activity. In particular, we focus on whether regulatory arbitrage is a driving force for bank M&As. We test three hypotheses related to regulatory arbitrage: 1) Bank regulation and supervision regimes of each country member in EU have insignificant differences with each other and so acquirors cannot engage in regulatory arbitrage. As a result, acquirors do not price them. This hypothesis is based on the changes that have been made after the end of the global financial crisis to harmonize the regulatory differences amongst countries and eliminate regulatory arbitrage, 2) Acquirors value more generous deposit insurance schemes as they can take advantage of safety net subsidies provided and accomplish risk shifting. This hypothesis is based on the fact that the global financial crisis did not bring any changes on this field and that the tries for a

European Deposit insurance scheme did not fertilized. As a result, major differences in deposit insurance schemes between member countries can be identified and exploited by acquirors, 3) Acquirors can arbitrage in the quality of governance too. As deposit insurance schemes, the governance is significantly different in each member country creating unique opportunities for acquirors. A worse quality of governance offers banks more private benefits of control.

Our results for deal and target characteristics indicate that acquiror banks pay higher premiums for target banks that are more profitable, better capitalized and located in different country from acquiror. Furthermore, when we control for time-fixed effects, the target's growth opportunities are valued too. These findings are in line with those of the related literature. The only exception is the capitalization rate we use, which is the equity-to-total-assets ratio. Previous studies show that this ratio lowers the premiums paid the higher it is because a large equity-to-total-assets ratio indicates that the target is risk averse and, so, it has lower returns. However, our findings point on the opposite direction: the target banks with high equity-to-total-assets ratio are attractive for acquirors. This can be explained by the post-acquisition possibility of acquirors to reduce the capital of target bank and increase the returns of shareholders. Moreover, we cannot neglect the fact that previous studies focus on periods before the implementation of Basel 3 which introduced a minimum leverage ratio and made equity-to-total-assets ratio a regulatory capital requirement.

Lastly, the results for regulatory variables give us useful insights for the regulatory arbitrage incentives of acquirors in the post crisis era. Specifically, our analysis indicates that acquirors do not price bank regulation and supervision regimes. It seems that lessons learned from the financial crisis of 2008 and that policymakers did a good job at eliminating regulatory loopholes. As a result, the remained differences were not worth pricing by acquirors who did not capitalize on them. However, the results for deposit insurance schemes and governance are quite different. We found that acquirors arbitrage on deposit insurance schemes as they pay higher premiums for more generous ones in which moral hazard exists. This result is mainly driven by cross-border deals. Same results are found for governance for which acquirors pay more the worse the quality is. Acquirors price the private benefits of control that come with a bad governance and a lax control of corruption.

Overall, even though, the measures taken for the coordination of bank regulation and supervision as a response to global financial crisis seems to be effective, a lot more have to be done for the coordination of deposit insurance schemes and governance of each member country in order to eliminate regulatory arbitrage completely and establish a stable financial system.

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Tables

Table 1.1 Summary statistics on main variables for whole sample

VARIABLE	MEAN	STD. DEV.	MIN	MAX
TAKPREM	-1.281306	47.04101	-98.7748	199.6809
CROSSB	Number of Cross-border deals=17 and number of domestic deals=67			
CONTROL	Number of control deals=45 and number of non-control deals=34			
ROE	-16.74672	57.41431	-322.1166	17.97821
SIZE	33223.37	59694.88	17.92	295054.4
CAP	8.102346	8.536827	0.020059	74.62612
TARGROWTH	0.2797468	3.058673	-10.1	4.8
MARKETCONC	0.0749519	0.0515834	0.0206	0.341
DEPOSITINSURANCE	2.632911	0.9497262	1	4
BANKREGULSUPER	9.031646	1.311541	6	11
GOVERNANCE	1.165084	0.4549355	0.353	1.864

Table 1.2 Summary statistics on main variables for domestic and cross-border sample

VARIABLE	DOMESTIC DEALS				CROSS-BORDER DEALS			
	MEAN	STD. DEV.	MIN	MAX	MEAN	STD. DEV.	MIN	MAX
TAKPREM	-7.444883	41.53401	-98.7748	172.4685	21.19762	59.38634	-31.65462	199.6809
CONTROL	Number of control deals=38 and number of non-control deals=24				Number of control deals=7 and number of non-control deals=10			
ROE	-19.51645	62.72322	-322.1166	14.26562	-6.645334	30.53974	-88.15985	17.97821
SIZE	34645.06	66158.02	87.337	295054.4	28038.39	25469.48	17.92	93371.65
CAP	7.331236	4.201124	0.020059	18.63136	10.91463	16.65177	1.857946	74.62612
TARGROWTH	-0.0774194	3.041539	-10.1	4.8	1.582353	2.835762	-6.6	4.8
MARKETCONC	0.0696097	0.0507602	0.0206	0.341	0.0944353	0.051327	0.0266	0.2178
DEPOSITINSURANCE	2.612903	0.9976175	1	4	2.705882	0.7717436	1	4
BANKREGULSUPER	8.903226	1.197123	6	11	9.5	1.620185	6	11
GOVERNANCE	1.201656	0.4802033	0.353	1.864	1.0317	0.3251619	0.412	1.654

Table 2 The sample of 79 EU bank M&As by target country and year

Cross-border and Domestic deals by target country

Cross-border and Domestic deals by year

COUNTRY	TOTAL DEALS	CROSS-BORDER	DOMESTIC	YEAR	TOTAL DEALS	CROSS-BORDER	DOMESTIC
AUSTRIA	1	0	1	2010	13	2	11
CROATIA	2	1	1	2011	5	1	4
CYPRUS	2	1	1	2012	17	3	14
DENMARK	12	0	12	2013	7	1	6
FINLAND	1	0	1	2014	9	2	7
FRANCE	6	0	6	2015	7	2	5
GERMANY	14	1	13	2016	5	2	3
GREECE	1	0	1	2017	5	0	5
ITALY	11	0	11	2018	9	3	6
LUXEMBOURG	1	0	1	2019	2	1	1
NETHERLANDS	1	1	0	-	-	-	-
POLAND	8	5	3	-	-	-	-
PORTUGAL	7	5	2	-	-	-	-
SPAIN	9	1	8	-	-	-	-
UK	3	2	1	-	-	-	-
TOTAL	79	17	62	TOTAL	79	17	62

Main Analysis

Table 3-First regression

TAKPREM	1	2	3	4	5	6	7	8	9	10
CROSSB	28.6425** (12.544)	-	-	-	-	-	-	21.64572* (12.45412)	18.75061 (12.73421)	13.12489 (16.5125)
CONTROL	-	-	-	-	-	-	-	5.968802 (10.37605)	-	8.171293 (12.90228)
ROE	-	-	0.20861** (0.09)	-	-	-	-	0.1973602** (0.0894121)	0.0495448 (0.1049641)	0.0654983 (0.137542)
SIZE	-	-	-	-	-	-	-	0.0000276 (0.0000861)	0.0000634 (0.0000883)	0.0000447 (0.0000913)
CAP	-	-	-	-	2.389884*** (0.565829)	-	-	2.311186*** (0.5884642)	2.295042*** (.6159351)	2.45337*** (0.7280906)
TARGROWTH	-	-	-	-	-	2.053751 (1.736965)	-	-	4.616323** (2.500495)	-
MARKETCONC	-	-	-	-	-	-	27.36368 (103.8784)	51.83762 (98.69833)	66.23054 (110.4369)	-
Observations	79	79	79	79	79	79	79	79	79	79
R ²	0.0634	0.0080	0.0648	0.0009	0.1881	0.0178	0.0009	0.2801	0.3869	0.5219
Fixed-Time Effects	(No)	(No)	(No)	(No)	(No)	(No)	(No)	(No)	(Yes)	(Yes)
Fixed-Country Effects	(No)	(No)	(No)	(No)	(No)	(No)	(No)	(No)	(No)	(Yes)

NOTES: The table presents the results of the first OLS regressions which includes only target and deal characteristics variables. The dependent variable is the takeover premium as a percentage of the purchase price over the book value. The independent variables are: CROSSB= dummy variable equal to 1 if the acquiror and target are located in different countries, CONTROL= dummy variable equal to 1 if the deal gives the acquiror the power of control (threshold 50%), ROE= Return on Equity of target the fiscal year before the announcement date of the deal, SIZE= Total assets of target the fiscal year before the announcement day of the deal, CAP= Equity-to-Total assets of target the fiscal year before the announcement day of the deal, TARGROWTH= Real GDP growth of target's country the fiscal year before the announcement day of the deal, MARKETCONC= HHI index (based on total assets) measures the market concentration of banking sector in target's country the fiscal year before the announcement day of the deal. Note that: *, **, *** represent statistical significance at the 10%, 5% and 1% respectively and the numbers in the brackets are the standard errors.

Table 4-Second regression

TAKPREM	1	2	3	4	5
CROSSB	11.38516 (12.98356)	5.711216 (13.22909)	-126.0276 (101.5808)	-77.04892 (102.3644)	- 327.6242** * (117.5045)
CONTROL	8.696267 (10.59106)	4.450947 (11.00952)	8.123156 (10.76753)	0.7936319 (11.40168)	-4.623467 (11.77079)
ROE	0.215046** (0.0875287)	0.0573358 (0.099408)	0.1947643 ** (0.088241 9)	0.0344457 (0.1004945)	-0.0002357 (0.1131538)
SIZE	0.0000783 (0.0000874)	0.0001235 (0.0000873)	0.0000704 (0.000088 1)	0.0001138 (0.000088)	0.0000726 (0.0000848)
CAP	2.54647*** (0.5814884)	2.429003*** (0.5877883)	2.363841* ** (0.608193)	2.100779*** (0.6300142)	1.647934** (0.7007375)
TARGROWTH	-0.2424669 (1.717999)	5.297183** (2.542059)	0.2372732 (1.741188)	6.464811** (2.695157)	1.499813 (2.436547)
MARKETCONC	29.07318 (101.638)	54.34706 (113.6837)	85.6512 (107.362)	122.7931 (121.7725)	-1433.96 (896.771)
CROSSB*	-	-	25.06465 (16.44817)	14.57139 (17.19319)	48.61526** (19.85421)
DEPOSITINSURANCE	-0.8316941 (5.664366)	-2.873971 (6.163388)	-4.834344 (6.303084)	-4.775525 (6.589818)	-15.07151 (12.06031)
CROSSB*	-	-	5.166636 (8.147512)	-1.382892 (8.098114)	4.658596 (8.473027)
BANKREGULSUPER	6.573744 (4.015162)	8.009201* (4.755035)	5.140988 (4.921855)	7.537349 (5.540956)	0.0543466 (5.958665)
CROSSB*	-	-	19.20249 (36.21378)	51.95925 (41.61336)	147.9394** (56.36763)
GOVERNANCE	-20.39249* (11.44214)	-27.23206** (12.2443)	- 23.16349* (12.04175)	-33.35175** (13.1558)	33.73184 (56.35196)
Observations	79	79	79	79	79
R ²	0.3442	0.4780	0.3749	0.5032	0.6034
Fixed-Time Effects	(No)	(Yes)	(No)	(Yes)	(No)
Fixed-Country Effects	(No)	(No)	(No)	(No)	(Yes)

NOTES: The table presents the results of the main OLS regressions that include regulatory variables. The dependent variable is the takeover premium as a percentage of the purchase price over the book value. The independent variables are: CROSSB= dummy variable equal to 1 if the acquiror and target are located in different countries, CONTROL= dummy variable equal to 1 if the deal gives the acquiror the power of control (threshold 50%) and 0 if it does not, ROE= Return on Equity of target the fiscal year before the announcement date of the deal, SIZE= Total assets of target the fiscal year before the announcement day of the deal, CAP= Equity-to-Total assets of target the fiscal year before the announcement day of the deal, TARGROWTH= Real GDP growth of target's country the fiscal year before the announcement day of the deal, MARKETCONC= HHI index (based on total assets) measures the market concentration of banking sector in target's country the fiscal year before the announcement day of the deal, DEPOSITINSURANCE= Deposit insurance Index of target's country which measures the degree to which moral hazard

exists. It ranges from 0 to 4 with higher values indicating a larger degree of moral hazard, BANKREGULSUPER= Bank Regulation&Supervision Index of target's country based on 1) Activity Restriction, 2) Supervisory power and Private monitoring and 3) Disclosure Requirements. The index ranges from 0 to 13 with higher values indicating stricter Bank Regulation&Supervision. GOVERNANCE=Governance Index of target's country which measures the quality of governance, based on six factors: 1) Voice and accountability, 2) Political stability, 3) Rule of Law, 4) Control of Corruption, 5) Regulatory Quality, 6) Government Effectiveness. The index ranges from -2.5 to 2.5 with higher values indicating better government outcomes. Note that: *, **, *** represent statistical significance at the 10%, 5% and 1% respectively and the numbers in the brackets are the standard errors.

Appendix

VARIABLES	SHORT DESCRIPTION	SOURCE
TAKPREM	Takeover premium expressed as a percentage of the purchase price paid by acquirors scaled by the pre-deal book value of target bank's equity.	ThomsonOne financials M&As database
CROSSB	Dummy variable equal to 1 if the acquiror and target are located in different countries.	ThomsonOne financials M&As database
CONTROL	Dummy variable equal to 1 if the deal gives the acquiror the power of control (threshold 50%) and 0 if it does not.	Author's calculation using ThomsonOne financials M&As database
ROE	Return on Equity of target the fiscal year before the announcement date of the deal.	Author's calculation using ThomsonOne financials M&As database
SIZE	Total assets of target the fiscal year before the announcement day of the deal.	ThomsonOne financials M&As database & Orbis Bank Focus
CAP	Equity-to-Total assets of target the fiscal year before the announcement day of the deal.	Author's calculation using ThomsonOne financials M&As database
TARGROWTH	Real GDP growth of target's country the fiscal year before the announcement day of the deal.	IMF 2021 (International Monetary Fund)
MARKETCONC	HHI index (based on total assets) measures the market concentration of banking sector in target's country the fiscal year before the announcement day of the deal.	European Central Bank – Statistical Data Warehouse
DEPOSITINSURANCE	Deposit insurance Index of target's country which measures the degree to which moral hazard exists. It ranges from 0 to 4 with higher values	Barth et al (2011, 2019) & Demirgüç-Kunt (2013), Provided by World Bank

	indicating a larger degree of moral hazard.	
BANKREGULSUPER	Bank Regulation&Supervision Index of target's country based on 1) Activity Restriction, 2) Supervisory power and Private monitoring and 3) Disclosure Requirements. The index ranges from 0 to 13 with higher values indicating stricter Bank Regulation&Supervision.	Barth et al (2011, 2019), Provided by World Bank
GOVERNANCE	Governance Index of target's country which measures the quality of governance, based on six factors: 1) Voice and accountability, 2) Political stability, 3) Rule of Law, 4) Control of Corruption, 5) Regulatory Quality, 6) Government Effectiveness. The index ranges from -2.5 to 2.5 with higher values indicating better government outcomes.	Author's calculation using Kaufmann et al. (2010), Provided by World Bank