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Author names: Pasiouras, F. , Tanna, S. and Gaganis, C.

Title: What drives acquisitions in the EU banking industry? The role of bank regulation and supervision framework, bank specific and market specific factors.

Article & version: Pre-print version

Original citation:

Pasiouras, F. , Tanna, S. and Gaganis, C. (2011) What drives acquisitions in the EU banking industry? The role of bank regulation and supervision framework, bank specific and market specific factors. *Financial Markets, Institutions & Instruments*, volume 20 (2): 29-77.

<http://dx.doi.org/10.1111/j.1468-0416.2011.00165.x>

Publisher statement:

This is the pre-peer reviewed version of the following article:

Pasiouras, F. , Tanna, S. and Gaganis, C. (2011) What drives acquisitions in the EU banking industry? The role of bank regulation and supervision framework, bank specific and market specific factors. *Financial Markets, Institutions & Instruments*, volume 20 (2): 29-77 , which has been published in final form at

<http://dx.doi.org/10.1111/j.1468-0416.2011.00165.x>

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Available in the CURVE Research Collection: August 2011

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What drives acquisitions in the EU banking industry? The role of bank regulation and supervision framework, bank specific and market specific factors

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Abstract

We investigate the determinants of commercial bank acquisitions in the former fifteen countries of the European Union by evaluating the impact of bank-specific measures, such as size, growth and efficiency of banks, and external influences reflecting industry level differences in the regulatory and supervision framework, market environment and economic conditions. Our empirical analysis involves multinomial logit estimation at various levels in order to identify those characteristics that most consistently predict targets and acquirers from a sample of over 1400 commercial banks. The overall results indicate that, relative to banks that were not involved in the acquisitions, (i) targets and acquirers were significantly larger, less well capitalized and less cost efficient, (ii) targets were less profitable with lower growth prospects, and acquirers more profitable with higher growth prospects, (iii) external factors have affected targets and acquirers differently, and their effects have not been consistent or robust to sample size changes.

Keywords: Acquisitions, Banks, Logistic regression, Regulations, Supervision

JEL: G21, G28, G34

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We would like to thank participants at the 5th INFINITI Conference on International Finance (Dublin, 2007), and the 2010 EWG-EPA International Conference (Chania, 2010) for valuable comments that helped us to improve earlier versions of the manuscript.

I. INTRODUCTION

The EU banking industry has witnessed a large number of mergers and acquisitions (M&As) in recent years. The European Central Bank (2000), for example, records 2,153 M&As of credit institutions between 1995 and the first half of 2000, while Beitel and Schiereck (2001) point out that during the period 1998-2000 more M&As deals occurred in the EU banking industry than during the previous 14 years. In terms of volume, data from the Securities Data Company (SDC) M&A Database¹ indicate that the total value of European financial M&As increased from \$22,769.6 million in 1990 to \$147,025.6 in 1999, while over the same period, the average target value in Europe (\$467.7 millions) was higher than in the US (\$334 millions) and the main industrial countries on an aggregate basis (\$383.2 millions).

Theory suggests that M&As between banks can occur for several reasons. In general, the underlying motives can be classified as value-maximization (i.e. increase market power, replace inefficient management, achieve economies of scale and scope, decrease risk through geographic and product diversification) and non-value maximization ones (i.e. managerial motives, hubris, etc.). In addition to these firm level motives, banks' decision for M&As might be influenced by external factors such as industry level differences in the economic environment, laws, regulations, etc (Berger et al., 1999; Group of Ten, 2001).

While there are numerous empirical studies investigating the relationship between financial characteristics and acquisition likelihood of industrial (i.e. non-financial) firms (e.g. Levine and Aaronovitch, 1981; Harris et al., 1982; Hasbrouck, 1985; Ambrose and

¹ Produced by Thomson Financial Securities Services.

Megginson, 1992; Powell, 1997; Gonzalez et al., 1997; Ali-Yrkko et al., 2005), investigation of such characteristics for the banking industry has been limited (Cyree et al., 2000; Wheelock and Wilson, 2000). Furthermore, previous studies on bank acquisitions have traditionally focused on examining the financial characteristics of US banks (Hannan and Rhoades, 1987; Meric et al., 1991; Moore, 1996; Wheelock and Wilson, 2000, 2004; Hannan and Pilloff, 2009), while there have been relatively few studies for the EU countries. Hernando et al (2009) and Kohler (2009) are the most recent focussing on domestic and cross-border bank acquisitions in the EU-25 countries, while Lanine and Vander Vennet (2007) examine the characteristics of cross-border acquisitions of Central and Eastern European banks by Western European banks.² In addition, a limited number of studies have focussed on specific countries of the EU (e.g. Focarelli et al, 2002; Pasiouras and Zopounidis, 2008; Pasiouras and Gaganis, 2009).

Evidence on the impact of external factors on M&As decisions also comes mostly from studies that examine industrial sectors, with the neoclassical and behavioural approaches being the most commonly cited explanations. From the previously mentioned studies in the banking sector, some have examined the impact of the economic environment using industry level characteristics such as market concentration, growth, profitability or size. However, the neoclassical theory, proposed by Gort (1969) and more recently supported by Mitchell and Mulherin (1996) among others, assumes that legal and regulatory factors might also have a role to play in the reallocation of corporate assets through M&A activity. Thus, for example, Rossi and Volpin (2004) examine the

² These three studies for the EU, as well as Hannan and Pilloff (2009) for the US, came to our light since we wrote the initial version of this paper. Hernando et al (2009) actually refer to evidence reported in this paper but, as they acknowledge, our paper differs from theirs by providing evidence for the EU-15 with a focus on the role of differences in regulations.

influence of differences in law and regulation in their study of the determinants of M&As across 49 major countries, and find that the volume of M&A activity is significantly larger in countries with better accounting standards and stronger shareholder protection.

In the bank M&As literature, the study of the impact of regulations and supervision approaches has also been investigated as forces hindering cross-border deals. Focarelli and Pozzolo (2001), using data on 2,449 banks from 29 OECD countries, point out that cross-border M&As among banks are less frequent than in other sectors of the economy, and find that the difference depends partly on the level of regulatory restrictions. In another study, Focarelli and Pozzolo (2005) examine where banks expand their cross-border shareholdings and find that potential profit opportunities and regulatory environments are the most important determinants. Buch and DeLong (2004a) provide further evidence on why cross-border mergers are rare compared to domestic mergers using a large sample of over 3000 international bank M&As. Treating the number of cross-border bank mergers for each country pair as the dependent variable in Tobit regressions, they find that information costs and regulations significantly influence cross-border merger activity. In their later study of cross-border bank mergers for the OECD countries, Buch and DeLong (2004b) reveal that a fairly priced deposit insurance scheme in the acquirer's country tends not only to increase the number of cross-border deals but also reduce the risk in both the home and world markets. More recently, Kohler (2009) examines the impact of merger control as a potential deterrent to EU bank acquisitions and finds that the transparency of the merger approval process serves to influence the likelihood of cross-border acquisitions, although domestic deals are unaffected by this.

Studies for the US banking industry are by their very nature limited to domestic M&As, although Wheelock and Wilson (2004) examine the impact of state branching laws and regulator evaluations of banks safety and soundness, focusing principally on acquirers. Their results also indicate that the regulatory approval process serves as a real constraint on bank merger activity, although changes in branching restriction are not statistically significant.

This paper adds to the recent literature by investigating the acquisition likelihood characteristics for the EU banking industry. As noted above, relative to the US, the literature investigating the characteristics of bank acquisition likelihood in the EU has been limited, and we attempt to provide further evidence by concentrating on the period 1997-2002, when M&A activity in the EU banking industry was intense.³ Our dataset consists of industry level data on the first 15 EU countries (EU15), and financial data for over 1,400 commercial banks operating in EU15, these being distinguished as acquirers, targets and non-involved banks. This unique dataset therefore enables us to analyze the ex-ante characteristics of both acquired and acquiring banks relative to non-acquired peers.⁴ In doing so, we concentrate on evaluating the relative influence of bank level characteristics and industry level differences in the banks' operating environment and economic conditions, as well as in their regulatory and supervision frameworks.

³ We concentrate on this period because it witnessed a reduction of nearly 23% in the number of banks in the EU and this decrease was due largely to domestic bank M&As as banking groups consolidated their position within countries to create national champions (ECB, 2004; Campa and Hernando, 2006). Hence, our sample includes mainly domestic deals, as cross-border integration in banking remained limited until recently (ECB, 2008). See Hernando et al (2009), Lanine and Vander Vennett (2007) and Kohler (2008) for recent evidence relating to cross-border bank M&As within the EU.

⁴ In this sense, we analyse both the pull and push factors affecting the probability of acquisition. Note that the terms acquirer (or bidder), target and non-involved could alternatively be interpreted as acquiring, acquired and non-acquired banks respectively, and will be used interchangeably in this paper.

The distinguishing aspect of our study is the examination of a broad range of policy influences that proxy for bank regulations and supervision standards, such as the level of accounting and information disclosure requirements, the degree of official disciplinary power, deposit insurance schemes, capital adequacy requirements, restrictions on bank activities and diversification guidelines. We obtain this information from the World Bank database, developed by Barth et al. (2001), and presume that these policy variables have either a direct impact on M&As or an indirect impact, for example, by limiting the investment opportunities of banks or influencing their risk-taking behaviour.⁵

As noted above, Focarelli and Pozzolo (2001, 2005) and Buch and De Long (2004a,b) consider the impact of the regulatory environment on cross border deals. In contrast, we consider the impact of country-specific differences in the regulatory environment on commercial bank M&As in the EU single market, where such deals have been largely domestic. Although this makes our study somewhat related to the studies of Rossi and Volpin (2004) and Wheelock and Wilson (2004), it should be noted that the former uses, in the main, the volume of merger activity as a dependent variable⁶ and does not focus on the banking industry, while the latter concentrates on investigating characteristics of US bank acquirers that originate from the CAMEL approach with a limited set of further attributes to represent market environment and regulations.

⁵ Many studies argue that regulations such as capital requirements, deposit insurance scheme, restrictions on bank activities, disciplinary power of the authorities can have an impact on the risk taking behavior of banks (e.g. Besanko and Kanatas, 1996; Demirguc-Kunt and Kane, 2002; Hovakimian et al, 2003; Fernandez and Gonzalez, 2005; Gonzalez, 2005; Pennacchi, 2006). Amihud et al. (2002) and Buch and DeLong (2004b) point out that one way to take advantage of such regulations is to acquire a risky bank.

⁶ With the exception of recent studies (e.g. Lanine and Vander Vennett 2007; Hernando et al, 2009; Koehler, 2008), most previous studies that examined cross-border mergers focussed on the number of mergers (i.e. activity) rather than on the probability of individual banks to engage in M&As.

Using multinomial logit estimation to determine the impact of the above factors on the probability of acquisition, we show, with a fair degree of consistency across various levels of estimation, that both targets and acquirers were significantly larger, less well capitalized and less efficient in terms of expenses management, relative to their non-acquired peers. Furthermore, targets were less profitable with lower liquidity and lower growth in total assets; whereas acquirers tended to be relatively more profitable banks with higher growth prospects. These bank-specific influences are invariant to robustness tests conducted by disaggregating the sample according to bank size, location of operation and different time periods. But the impact of the regulatory and market environments are not robust to these sample splits and therefore depends crucially on whether the banks involved in acquisitions were large or small, and specifically where they operated. Besides, some regulatory influences were not uniform on targets and acquirers. Nevertheless, we find supporting evidence to suggest that banks that operated in countries with higher disciplining power of the authorities were less likely to engage in acquisitions, as targets or acquirers. Similarly, banks were more inclined to engage in acquisitions in market environments favouring higher profitability, higher liquidity, lower concentration and lower industry size, although these influences were not robustly significant. Furthermore, regulatory factors were found to have a greater influence on banks acquisitions in the principal banking sectors (i.e. the five largest countries of the EU) than in the rest of the EU-15 where market influences were more prevalent.

The rest of this paper is organized as follows. Section II presents a review of prior literature related to our study. Section III outlines the data and methodology, while

Section IV discusses the empirical results. Finally, Section V outlines some concluding remarks.

II. BACKGROUND DISCUSSION

In this section we provide a comprehensive review of the relevant literature in order to justify the importance of using appropriate controls for bank regulation and supervision standards, and market-related economic conditions associated with M&As decisions in the banking industry, in addition to relevant bank specific characteristics. The discussion is split into three sub-sections, referring to each of the three broad categories in turn.

Bank M&As and bank specific characteristics

The causes of M&As have long been debated in the literature. Following the neoclassical perspective, all firm decisions including acquisitions are made with the objective of maximizing shareholders wealth. M&As in this context serve as a means to increase market power, replace inefficient management, achieve economies of scale and scope, decrease risk through geographic and product diversification, among others. However, an influential view in the literature is that M&As are driven by agency conflicts of interest between managers and shareholders. According to this view, many acquisitions are undertaken by managers in order to enhance their salary and prestige, diversify personal risk or secure their job through empire-building, at the expense of shareholders. Another interesting hypothesis, proposed by Roll (1986), suggests that managers commit errors of over-optimism (hubris) in evaluating M&As opportunities due to excessive prediction or

faith on their own abilities, and engage in M&As even when there is no synergy. The empirical evidence is inconclusive and indicates that various bank specific and market environmental factors can influence M&As in the banking industry. Hence, while the discussion below is devoted to financial and environmental characteristics, non-financial attributes relating to managerial incentives and ownership control may be important too (Hadlock et al., 1999; Brook et al., 2000; Bliss and Rosen, 2001; Hughes et al., 2003).⁷

Capital Strength

Harper (2000) argues that “*The key factor driving mergers and acquisitions in financial systems is the industry’s need to rationalize its use of capital*” (p. 68). This argument is based on the belief that nowadays risks are traded on markets rather than absorbed through capital held on a balance sheet. Hence, in order to remain competitive banks face the need either to release surplus capital or to raise the rate of return to the capital they retain. This can be achieved through M&As.

Most of the studies report a negative relationship between capital ratios and the likelihood of being acquired although not statistically significant in all cases (e.g. Hannan and Rhoades, 1987; Moore, 1996; Wheelock and Wilson, 2000; Lanine and Vander Vennet, 2007). There are several explanations for this. First, lack of financial strength tends to attract well capitalised buyers that can infuse capital into the acquired banks. Specifically, banks that are generally close to failure are encouraged by the authorities to

⁷ Lack of appropriate data precludes investigation of these issues given our comprehensive sample of public and private banks. However, agency cost influences have been linked to industries where hostile or diversifying acquisitions are more prevalent, as diversification benefits managers due to the diversification discount (Morck et al, 1990), but these types of acquisitions are rare in banking owing to regulatory hurdles.

be taken over by well capitalized banks. Second, better capitalised banks would be less attractive to potential buyers if capitalization is seen to indicate managerial efficiency. Third, buyers are attracted by less well capitalised banks with skilful managers who show ability to operate successfully with high leverage. Related to the third argument, Hannan and Piloff (2009) suggest that buyers prefer poor capitalized targets because it enables them to maximize the magnitude of post-merger performance gains relative to the cost of achieving these gains.

Banks may also engage in M&As to meet higher capital regulatory requirements, suggesting a positive link between capitalization and acquisition likelihood. Valkanov and Kleimeir (2007) examine a sample of US and European bank mergers and find that US targets are better capitalized than acquirers and non-acquired peers and that US banks maintain higher capital levels than European banks. They suggest that US banks strategically raised their capital levels through mergers to avoid regulatory scrutiny. Alternatively, as suggested by Hernando et al. (2009), if capitalization signifies the inability of a bank to diversify assets, more capitalized banks would be worth more to better diversified acquirers, thus enhancing the likelihood of being acquired. Hernando et al. (2009) discuss these hypotheses about positive and negative links between acquisition and capitalization but find the effect of the latter insignificant in both domestic and cross-border samples.

Performance

According to the *inefficient management hypothesis*, acquisitions serve to drive out bad management that is not working in shareholder interests. Thus, as discussed by Hannan and Rhoades (1987), poorly managed banks are likely targets for acquirers who think that

they can manage more efficiently the assets of the acquired bank and increase profits and value. This outcome is more likely in domestic (or in-market) than in cross-border (out-of market) M&As, because a local acquirer may be in a better position to turn around the fortunes of the target bank (Hernando et al, 2009).

However, the empirical results are mixed. Moore (1996), Focarelli et al. (2002), Wheelock and Wilson (2000), Pasiouras and Gaganis (2009), Hannan and Pilloff (2009) and Hernando et al (2009) find evidence of a negative association between target performance (measured in terms of either return on assets (profitability), expense ratios such as cost-to income, or both) and acquisition likelihood. In contrast, Hannan and Rhoades (1987), Pasiouras and Zopounidis (2008) and Lanine and Vander Vennet (2007) find no evidence of such association, whereas Kohler (2009) finds the effect of targets' return on assets significant in cross-border deals only, indicating that profitability does not seem to influence the probability of being acquired in domestic M&As.⁸

Size

Size may influence M&As in several ways. First, large banks are more expensive to be acquired. Second, larger banks have greater recourse to fight hostile acquisitions, as well as resources to acquire other banks. Third, a larger acquired bank is likely to be more difficult to be absorbed in the existing organization of the acquiring bank. These considerations suggest that the coefficient of size (as measured by total assets) on acquisitions should be negative. On the other hand, an acquirer seeking economies of scale or market power may find larger bank targets more attractive.

⁸ However, using the cost-to-income ratio instead of the return on assets, Kohler (2008) claims to find the effect significant in both domestic and cross-border cases.

Hannan and Rhoades (1987) and Moore (1996) find the effect of size insignificant. Wheelock and Wilson (2000), however, report that smaller banks are more likely to be acquired than larger ones, while Wheelock and Wilson (2004) find that the acquirers' probability of engaging in mergers increases with bank size. Focarelli et al. (2002) report a negative and statistically significant effect of size on acquisitions for Italy, while Pasiouras and Zopounidis (2008) find a negative, though not robustly significant, effect for Greece (depending on the measure of size). In contrast, Hannan and Pilloff (2009) report a positive impact of size in their full sample, but a negative effect on a sub-sample focusing on smaller acquirers. Lanine and Vander Venet (2007) and Kohler (2009) report a positive and significant impact of size in all their samples, although Hernando et al (2009) find a similar result only for domestic deals.

Growth

Bank growth can affect bank acquisition in two opposing ways. On the one hand, as Kocagil et al. (2002) point out, empirical evidence suggests that some banks with relatively high growth rates experience problems because their management and/or structure is not able to deal with and sustain exceptional growth. Hence, acquirers may purchase a bank with good growth prospects, but with limited financial or managerial capacity may fail to capitalize on potential growth. On the other hand, Moore (1996) argues that a slow growing bank may attract a buyer seeking to accelerate its growth rate and thereby increase its market value.

Hannan and Rhoades (1987) find growth to be positively related to in-market acquisitions and negatively related to out-of-market acquisitions, albeit insignificant in

both cases. However, Moore (1996) and Pasiouras and Zopounidis (2008) find asset growth to be negatively related to acquisition likelihood. Pasiouras and Gaganis (2009) also find growth to be negatively related to the acquisition likelihood but statistically significant only in the case of Germany and Spain. Wheelock and Wilson (2004) report that acquirers tended to have a recent history of rapid growth. Among the more recent studies, Hannan and Piloff (2009) and Koehler (2009) do not include asset growth in their regressions, while Hernando et al (2009) find its effect insignificant on acquisitions.

Loan activity

The importance of loans for EU banks becomes apparent when reviewing data from the European Central Bank (2004) on the stability of the EU banking sector, which indicates that the share of customers' loans in total assets was 50.57% in 2003. Therefore loan activity may be another factor influencing the decision to acquire a bank. Hannan and Rhoades (1987) argue that, on the one hand, a high level of loans would seem to indicate aggressive behaviour by the target bank and a strong market penetration with important established customer relationships that would make it an attractive target; whereas, on the other hand, a low level of loan activity may indicate a bank with conservative or complacent management, which an aggressive acquiring bank could turn around to increase returns.

Hannan and Rhoades (1987) find a negative effect of loan activity on acquisition likelihood (although not significant). Moore (1996) also finds a negative (and significant) effect in both in-market and out-of-market acquisitions. The results of Wheelock and Wilson (2000, 2004) are generally mixed depending on the measure of asset quality used.

Pasiouras and Zopounidis (2008) also find this effect to be negatively related to the probability of acquisition, although not statistically significant in all cases, while Pasiouras and Gaganis (2009) report mixed results across the five large EU countries. Finally, none of the recent studies include a measure of loan activity, although Hannan and Piloff (2009) consider two measures of the composition of the target's clientele, proxied by the extent to which their loans (and deposits) are local in nature, and find the effect of the loans ratio to be positive and significant only in the case of large acquirers, while that of deposits positive and significant in all but one specification.

Liquidity

The liquidity position of a bank is another factor that may influence its attractiveness as an acquisition target. However, it is difficult to determine a priori what the effect of liquidity and the direction of its influence will be. Without the necessary liquidity and funding to meet obligations, a bank may fail unless external support is given (Golin, 2001). Hence, banks might be acquired because they have moved into liquidity difficulties, indicating that low liquidity increases acquisition likelihood. On the other hand, excess liquidity may signal a lack of investment opportunities or a poor allocation of assets, making banks attractive targets because of their good liquidity position (i.e. the size of liquid assets influences acquisition).

Among the studies that include this variable, Wheelock and Wilson (2000) find that low liquidity makes banks less attractive targets, thus providing support to the first argument, while Pasiouras and Zopounidis (2008) report a negative relationship between liquidity and acquisition likelihood although not statistically significant.

Bank M&As and regulations and supervision

Capital requirements

In their assessment of the likely impact of Basel II capital requirements on bank M&As, Hannan and Pilloff (2004) propose that regulatory capital can affect acquisition activity in one of two ways. Under the *excess regulatory capital hypothesis*, merger activity would increase as a result of the excess regulatory capital that would be created by the lower capital requirements stemming from the adoption of advanced internal ratings-based (A-IRB) approach to regulatory capital requirements⁹. Under the *relative capital advantage hypothesis*, as a result of differences in the capital standards applied to A-IRB banks and other banking organizations not using the A-IRB approach, A-IRB banks would acquire banks not subject to A-IRB standards because acquired banks would be worth more to A-IRB banks than to current owners. They use data from US banks to test the *excess regulatory capital hypothesis* but do not find convincing evidence to suggest that past changes in excess regulatory capital or past changes in capital standards had substantial effects on merger activity. However, Valkanov and Kleimeier (2007) find evidence to support the *excess regulatory capital hypothesis*. Following an event study methodology, they find that more value is created for targets with high excess capital and in M&As involving targets with considerably higher excess-capital ratios than their acquirers.

⁹ This can occur for two reasons. First, while regulators may prevent banks with no excess regulatory capital to engage in M&As as the combined entity might violate minimum capital adequacy standards, banks with levels of regulatory capital above the required minimum are less likely to violate minimum standards, increasing the probability to acquire other banks. Second, with an increase in excess regulatory capital, banks should increase their return on equity either by increasing the amount of earning assets against which a given amount of capital is held or by reducing capital held against a given amount of earning assets. This could result in an increase of banks valuation, leading to an increase in acquisition activity.

Capital requirements can also have indirect effects on M&As through their impact on the risk-taking behaviour of banks. The main argument in support of capital requirements is that capital serves as the last line of defence against the risk of bank's insolvency, as any losses a bank suffers could be potentially written off against capital. Even in the case where insolvency becomes unavoidable, capital protects to some degree depositors, creditors and investors (Le Bras and Andrews, 2004). However, another strand of the literature indicates that capital requirements may increase risk-taking behaviour (e.g. Koehn and Santomero, 1980; Besanko and Kanatas, 1996; Blum, 1999; Calem and Rob, 1999). Other studies provide mixed results. Kendall (1992) suggests that higher capital requirements may cause riskier bank behaviour at some points in time, but do not imply a trend towards a riskier banking system. Beatty and Gron (2001) indicate that capital regulatory variables have significant effects for low-capital banks but not necessarily for other banks.

Restrictions on bank activities

Barth et al. (2004) outline several theoretical reasons for restricting bank activities as well as alternative reasons for allowing banks to participate in a broad range of activities. For example, they mention that to the extent that moral hazard encourages riskier behaviour, banks will have opportunities to increase risk if allowed to engage in a broader range of activities (Boyd et al., 1998). Furthermore, large financial conglomerates may reduce competition and efficiency. On the other hand, fewer regulatory restrictions permit the utilization of economies of scale and scope (Claessens and Klingebiel, 2000), while they

might also increase the franchise value of banks and result in more prudent behaviour. Finally, broad activities may enable banks to diversify income streams.

Hence, higher restrictions on bank activities that will affect banks' opportunities to diversify risks, and limit the potential for economies of scope and scale, might influence their investment decision by motivating them to engage in M&As as an alternative way to achieve their desired outcomes.

Diversification and liquidity related regulations

As Liang and Rhoades (1991) mention, a predicted benefit of mergers, particularly conglomerate mergers, is that diversification across different markets will reduce a firm's risk. For example, Liang and Rhoades (1988) point out that geographic diversification potentially permits banks to reduce their insolvency risk primarily through reduction in credit and liquidity risk. However, banks might achieve diversification by following alternative strategies such as making loans abroad or investing in various liquid assets. Hence, regulations that encourage or restrict banks with respect to liquidity as well as asset geographical diversification might also have an impact on M&As.

Deposit insurance

The literature suggests that the deposit insurance scheme of a country can have an impact on the risk behaviour of banks and their investment decisions. For example, Krugman (1998) suggests that banks that are over-guaranteed and under-regulated tend to over-invest. Other studies indicate that deposit insurance schemes may encourage excessive risk-taking behaviour (Merton, 1977; Bhattacharya and Thakor, 1993; Bhattacharya et al.,

1998; Hendrickson and Nichols, 2001; Demirguc-Kunt and Kane, 2002). The deposit insurance scheme might also have an effect on the stability of the banking systems as a whole (Demirguc-Kunt and Detragiache, 2002; Barth et al., 2004). However, Kane (2000), Cull et al. (2005), Demirguc-Kunt and Detragiache (2002), Demirguc-Kunt and Kane (2002), and Laeven (2002) conclude that a sound legal system with proper enforcement of rules reduces the adverse effects of deposit insurance on bank risk-taking, while Gonzalez (2005) finds that deposit insurance has a positive influence on bank charter value, mitigating the risk-shifting incentives it creates. Finally, as noted earlier, Buch and Delong (2004b) find that fairly priced deposit insurance in the acquirer's country tends to increase the number of mergers banks participate in.

Disclosure requirements

Rossi and Volpin (2004) argue that accounting and information disclosure requirements may affect M&As because good disclosure is a necessary condition for identifying potential targets. They also argue that accounting standards reveal corporate governance as they decrease the scope for expropriation by making corporate accounts more transparent. Their empirical results indicate that the volume of M&A activity is significantly larger in countries with better accounting standards, hence providing support to their argument.

Disclosure requirements may also have an impact on the risk-taking behaviour of banks, and consequently on their investment behaviour (e.g. M&As). For example, Fernandez and Gonzalez (2005), Demirguc-Kunt et al. (2008), and Agoraki et al. (2010)

find evidence that accounting and auditing requirements can improve the soundness of banks and decrease their risk-taking.

Disciplinary power of supervisory agency

Buch and DeLong (2004b) point out that weak supervision could alter banks' decision making by fascinating them to engage in risky activities while ignoring activities that make good business sense. Obviously, one way to take advantage of a weak supervision system is to acquire a risky bank. Looking at cross-border M&As, Buch and Delong (2004a) point out that a tough supervisory system in the target country increases the number of bank mergers, while greater toughness of the acquiring country's authorities discourage mergers.

The disciplinary power of supervisor agencies might also have an indirect impact on M&As, through its influence on banks' performance and development. While the results of Barth et al. (2004) indicate that there is not a strong association between bank development and performance and official supervisory power, Fernandez and Gonzalez (2005) report that in countries with low accounting and auditing requirements a more stringent disciplinary capacity of supervisors over management action appears to be useful in risk reduction.

Overall country's legal environment and openness

Banks will obviously be affected by the overall environment of the country in which they operate, with a number of aspects relating to the environment having an impact on their investment decisions. For example, La Porta et al. (1998) and Levine (1998) among

others mention the effects of differences in the legal environments on the financial system. Rossi and Volpin (2004) show evidence of more M&A activity in countries with better investor protection. Furthermore, Francis et al. (2008) find some evidence that the abnormal returns of U.S. acquirers involved in cross-border M&As depend on economic freedom. Other studies show that the influence of regulations on banking is conditional on the political and economic environment. For example, Hovakimian et al. (2003) find that the introduction of explicit deposit insurance has adverse effects in environments that are low in political and economic freedom and high in corruption. Similarly, Barth et al. (2004) show that better-developed private property rights and greater political openness mitigate the negative association of moral hazard and bank fragility. Finally, Fernandez and Gonzalez (2005) also report that banks in a poor legal system with improper enforcement of rules carry a higher risk.

Bank M&As and market characteristics

The neoclassical theory argues that apart from regulations there are several additional industry characteristics such as technological changes and capacity utilization that are strongly associated with M&As (Gort, 1969; Mitchell and Mulherin, 1996; Andrade and Stafford, 2004; Jovanovic and Rousseau, 2002). Another influential view in the literature, known as the behavioural approach, argues that M&As are being driven by stock market conditions (Nelson, 1959; Stein, 1988, 1989, 1996; Baker and Wurgler, 2000; 2004; Jenter, 2005). Henceforth, various market related factors could potentially be considered, such as liquidity, profitability, growth, concentration, the level of economic development,

the size of the financial system and financial deepening. Some of these influences have been included as control variables in past studies.

Market Liquidity

Shleifer and Vishny (1992) show that in order for transactions to occur, buyers who intend to employ the assets in their first-best use must be relatively unconstrained. Schlingemann et al. (2002) reveal that industry-specific asset liquidity is important in determining which assets will be divested. Harford (2005) supports the neoclassical explanation that mergers occur in response to industry level economic, regulatory and technological shocks that require large-scale reallocation of assets, but suggests that shocks are not enough on their own, as capital liquidity is also required.

Market Profitability

The level or change in the profitability of the banking industry may also lead to higher acquisition activity as a result of attempts by banks to restructure or take advantage of investment opportunities that arise. Christensen and Montgomery (1981) show that firms in profitable industries tend to make more related acquisitions, while those from less profitable industries tend to be involved in unrelated acquisitions in order to improve their profit potential. Harford (2005) documents the existence of abnormally high changes in profitability prior to merger waves. However, Buch and Delong (2004a) find that the relative profitability of banking systems has little explanatory power for cross-

border merger activity, while Pasiouras and Zopounidis (2008) report a negative but insignificant effect of market profitability on bank M&As in Greece.

Market Growth

The growth of the market might also affect acquisition activity in two opposing ways. Firms might be attracted to engage in acquisitions within industries that have high growth rates, while in contrast low growth may indicate the need for restructuring in the industry, hence also leading to increased acquisition activity. Harford (2005) reports abnormally high growth measures (e.g. employees, sales) prior to waves, providing support to earlier studies claiming that firms are attracted to make acquisitions within industries with high growth rates (Christensen and Montgomery, 1981; Schoenberg and Reeves, 1999). However, evidence from the US and Greek banking sectors suggest that market growth is not a significant determinant of acquisition likelihood (Hannan and Rhoades, 1987; Pasiouras and Zopounidis, 2008). Kohler (2009) includes population as an indicator of market potential but finds its effect mostly insignificant on the probability of being acquired, specifically on domestic acquisitions within EU-25.

Concentration

Partly associated with the influence of regulations is market concentration, as anti-trust authorities try to prevent M&As if increases in concentration are expected to result in excessive increases in market power. According to Hannan and Piloff (2009), the likely impact of market concentration on acquisition likelihood depends on the degree to which the acquirer can exploit market power more efficiently than the target. They find the

effect of market concentration to be insignificant in most of the cases, while Hannan and Rhoades (1987) find the effect negative and significant in explaining the likelihood of in-market acquisitions. Moore (1996) finds a positive and significant relationship between the probability of acquisition and market concentration for out-market acquisitions, but not for in-market acquisitions. Kohler (2009) finds the effect of market concentration positive and highly significant for both domestic and cross-border targets. On the other hand, Wheelock and Wilson (2004) and Pasiouras and Zopounidis (2008) report a negative relationship, while the results of Pasiouras and Gaganis (2009) are mixed. However, Hernando et al (2009) find that the effect of market concentration negative for domestic targets and positive for cross-border targets, although the overall effect in their combined sample is insignificant. They conclude that while domestic takeovers are less likely in more concentrated markets, the possibility of high rents and weak anti-trust concerns of national authorities with regard to foreign acquirers make it more likely that concentration has a positive effect on the probability of being acquired in cross-border takeovers.

Economic Development

The investment decision of banks can also be influenced by the overall economic conditions in which they operate. At one hand, banks could be involved in M&As during periods of boom to enhance their power and take advantage of the profit opportunities that arise. On the other hand, banks could be involved in M&As during periods of recession to be restructured and to avoid financial distress. Alternatively, bank may expand into regions with lower per-capita income because of higher income potential or

economic convergence expected from further integration (Lanine and Vander Venne, 2007). Rossi and Volpin (2004) find the level of per capita GNP to be significant and positively related to the volume of M&As, but GDP growth to be negatively related and significant in four of their six specifications. Buch and DeLong (2004a) find the effect of GDP per capita of the acquirer country significantly positive, while that of the target country insignificant. Buch and DeLong (2004b) report that GDP has a positive and significant impact on the number of international bank mergers in either target or acquirers' country. Lanine and Vander Venne (2007) report an insignificant influence of per capita GDP growth (as with other macroeconomic influences) while Kohler (2009) finds the effect of target country's per capita GDP mostly negative and significant on the probability of being acquired.

Size of the Banking Industry

The size of the banking industry might have an impact on banks' interest margins and profits (Demirguc-Kunt and Huizinga, 1999, 2000), their opportunities to achieve economies of scale (Buch and DeLong, 2004a) and consequently their M&As decisions. Diaz et al. (2004) examine the change in profitability of EU banks that were involved in acquisitions and report that the size of the banking sector has a negative and significant impact on profitability. Buch and DeLong (2004a) find that the size of the target country's banking systems has a negative impact on the probability of the merger, suggesting that banks do not invest in markets that have established a relatively large banking sector. Furthermore, De Nicolo (2000) argues that insolvency risk is lower in more developed financial markets, because these markets provide more financial

instruments that are more liquid than in developing markets. This leads us to the hypothesis that banks could use these financial instruments for diversification purposes rather than being involved in M&As. On the other hand, Demirguc-Kunt and Huizinga (1999, 2000) suggest that the lower interest margins in larger banking sectors might be related to increased competition. Hence, banks in these sectors might see M&As as a way to increase their power and competitiveness.

Financial Deepening

As previously mentioned, the behavioural approach states that stock market conditions might affect M&As because of valuation waves. Central to this hypothesis is the argument that bull markets encourage managers of firms with overvalued stock to use their stock to acquire undervalued targets. Verter (2002) and Giovanni (2005) among others confirm that stock market valuations and the size of the stock market are correlated with merger activity. Rhodes-Kropf and Viswanathan (2004) argue that “*the naïve explanation that overvalued bidders wish to use stock is incomplete because targets should not be eager to accept stock*”. They show that potential market value deviations from fundamental values on both sides of the transaction can rationally lead to a correlation between stock merger activity and market valuation. Shleifer and Vishny (2003) propose an alternative theory of acquisitions, which in a sense is the opposite of Roll’s (1986) hubris hypothesis, by arguing that managers rationally respond to less than rational markets. Specifically they argue that since financial markets are inefficient, so some firms are valued incorrectly. Managers, on the other hand, who are completely rational, can understand stock market inefficiencies, and therefore take advantage through

M&As. Rhodes-Kropf et al. (2005) support the idea that misvaluation drives mergers. However, in contrast to these studies, Rossi and Volpin (2004) who examine domestic, foreign and hostile deals do not find any evidence to support that stock market return has an impact on M&As.

III. RESEARCH DESIGN

Data

The sample used in this study consists of annual observations on the universe of commercial banks operating in the EU-15 with available financial data in Bankscope between 1996 and 2002.¹⁰ This gave us a sample of 1,407 banks with 5,986 observations, distinguished according to status (i.e. target, acquirer, non-involved), country and year as shown in Table I.¹¹ The geographical coverage of banks is as follows: Austria (63), Belgium (52), Denmark (70), Finland (9), France (278), Germany (226), Greece (24), Ireland (35), Italy (159), Luxembourg (132), Netherlands (51), Portugal (34), Spain (106), Sweden (16), and UK (152).

[Insert Table I Around Here]

¹⁰ Only commercial banks were considered to avoid comparison problems among different type of banks (e.g. cooperative, savings, etc). Furthermore, as Demirguc-Kunt et al (2004) point out, since the WB regulatory data are for commercial banks, it is more appropriate to focus on commercial banks.

¹¹ Targets and acquirers were identified in Bankscope, Bankersalmanac and Zephyr databases. Considering that acquisitions can take time to complete, we assume, as in previous studies (e.g. Hannan and Rhoades, 1987; Wheelock and Wilson, 2004) that acquisitions completed during year t , reflect their characteristics during year $t-1$. Thus for an acquisition that occurred in 1997 we use observations on variables from 1996, and so on. The sample is unbalanced in the sense that a complete panel of data is not available for each bank in the sample. Hence, the total number of banks with observed data in each year is lower than 1,407.

Many previous studies have followed a matched paired technique (e.g. Powell, 1997; Ali-Yrkko et al., 2005), where a sample of non-acquired firms is usually drawn by matching against the sample of acquired firms on the basis of company size, industry sector, and/or year of acquisition. While the advantage of this sampling procedure is that it helps to reduce the cost of data collection, a matched sample is limited in permitting investigation of the effects of industry sector differences. We have therefore chosen an unmatched sample that allows us to appropriately condition for differences in regulatory and environmental factors across countries.¹²

Variables

Table II summarises the set of 21 independent variables we use in the regressions below, classified for the purpose of discussion below as bank specific, regulatory and market related variables.

[Insert Table II Around Here]

Bank specific variables

Seven bank specific ratios are chosen to represent the dimensions of capital strength, profitability, expenses management, loan activity, liquidity, size and growth. Capital strength is measured by the equity to total assets (*EQAS*) ratio, while profitability is measured with return on average equity (*ROE*). Efficiency in expenses management is represented by the cost to income ratio (*COST*), with higher values indicating less

¹² Studies that use an unmatched sample include Hannan and Rhoades (1987), Lennox (1999), Jayaraman et al. (2002), Worthington (2004), Pasiouras and Zopounidis (2008) among others.

efficient management. Loan activity is captured through the bank's net loans to total assets ratio (*LOANS*). Liquidity is measured with the liquid assets to customer & short term funding ratio (*LIQ*), which indicates the percentage of customer and short term funding that could be met if they were withdrawn suddenly. The higher this ratio the more liquid the bank is. Size is measured by the logarithm of total assets (*SIZE*), while the annual change in bank's total assets is used as a measure of growth (*GROWTH*).

Regulations and supervisions related variables

To examine the impact of the regulatory framework we use seven measures obtained from the World Bank database (Barth et al., 2001) and the Heritage foundation. Briefly, we capture for the extent of capital requirements (*CAPRQ*) on the basis of seven yes/no questions from Barth et al. (2001). Theoretically, *CAPRQ* takes values between 0 and 7 with higher values indicating more capital requirements. Restrictions on the activities that banks can undertake are represented by *ACTRS*, depending on whether securities, insurance and real estate activities are unrestricted, permitted, restricted or prohibited. We use *LIQDIV* to capture the degree to which banks are encouraged or restricted with respect to liquidity as well as asset and geographical diversification. It is determined on the basis of three yes/no questions and can theoretically take values between 0 and 3, with a higher value indicating greater liquidity and diversification. *DEPINS* captures the type of the deposit insurance regime a country has chosen to adopt, determined on the basis of three yes/no questions, with higher values indicating more deposit insurer power. *DISCRQ* measures the accounting and information disclosure requirements in the banking sector, and can take values between 0 and 8 on the basis of eight yes/no

questions, with higher values indicating more information disclosure requirements. *OFFDISPR* measures the official disciplinary power of the supervisory agency, indicating whether the authorities can take specific actions to prevent and correct problems in the banking industry. *OFFDISPR* can range between 0 and 14, with higher values indicating more power of the authorities. *ECFR* is the Heritage Foundation Economic Index that indicates the extent of economic freedom in each country. *ECFR* can take values from 1 to 5, where a score of 1 signifies an economic environment or set of policies that are most conducive to economic freedom, while a score of 5 signifies a set of policies that are least conducive to economic freedom.

Market specific variables

A further set of seven variables is chosen to control for various aspects of the market environment. We measure market profitability (*MROE*) with the average return on equity of the commercial banking industry within a country, and market liquidity *MLIQ* with the ratio of average liquid assets to customer & short term funding. *C5* is the measure of concentration in the banking sector, calculated as the total assets held by the five largest commercial banks in the country divided by the total assets of all commercial banks in the country. *MACGDP* is the stock market capitalization to gross domestic product (GDP) ratio that measures financial deepening. The size of the banking system is captured by *CLAIMS*, calculated as bank claims on the private sector over GDP. *GDPGR* is the annual growth of GDP, and serves as a proxy of a country's overall economic development. Finally, we use a dummy variable to capture location effects. As the European Central Bank (2000) points out in its report on M&As in the banking sector, the

process of industry concentration and consolidation seems to have taken place at faster pace and earlier in some of the smaller member states than in the larger ones. To capture the importance of such differences we introduce a dummy variable that indicates whether banks operate in one of the 5 large EU banking sectors¹³ ($5EU=1$) or not ($5EU=0$).

Methodology

We estimate a weighted multinomial logit model of the form:¹⁴

$$P(Y_i = l) = \frac{e^{\beta_l X}}{\sum_{l=0}^2 e^{\beta_l X}} \quad \text{for } l = 0, 1, 2$$

where $P(Y)$ is the probability of occurrence of the dependent variable in year t . X is a vector of variables representing the influence of bank specific, market specific and country specific characteristics in year $t-1$, and β_l are the coefficients to be estimated relating to each outcome. The categorical dependent variable takes the value zero if the bank is non-involved (reference group), one if the bank is acquired, and two if the bank is an acquirer. Hence, coefficients are reported and discussed relative to the group that is omitted (reference group). For example, a positive (negative) coefficient indicates that an increase in the corresponding explanatory variable is associated with an increase

¹³ The 5 largest EU banking sectors are: France, Germany, Italy, Spain and UK.

¹⁴ The estimation of a logit model can be problematic when there are a few observations from one outcome (i.e. targets and/or acquirers) relative to another (i.e. non-involved banks). The reason is that the “information content” of such a sample for model estimation is quite small, leading to relatively imprecise parameter estimates (Palepu, 1986). While a matched sample avoids this problem, the appropriate solution for an unmatched sample is to weight the data and compensate for differences in the sample. The following formula is used: Weighting for Group 0 (Non-involved) = $(1/N_0) * [(N_0 + N_1 + N_2)/3]$, Weighting for Group 1 (Acquired) = $(1/N_1) * [(N_0 + N_1 + N_2)/3]$, Weighting for Group 2 (Acquirers) = $(1/N_2) * [(N_0 + N_1 + N_2)/3]$. For a more detailed discussion on logistic regression and rare events data, see King and Zeng (2001).

(decrease) in acquisition likelihood, whether as target or acquirer relative to non-involved banks.

Our base specification can be stated as follows:

$$\beta' X = \beta_0 + \beta_1' BANK + \beta_2' REGULATION + \beta_3' MARKET$$

where *BANK* represents the set of bank specific variables, *REGULATION* constitutes the set of country-specific regulatory and supervision variables, and *MARKET* makes up the remaining set of market related country-specific influences.

In what follows, we estimate only two versions of the base model: Model 1 which allows *BANK* variables only, and Model 2 which adds the influence of *REGULATION* and *MARKET* characteristics. By separating the influence of bank-specific factors from country-specific regulatory and environmental factors, we are able to assess the impact of the latter conditional on the internal, bank specific factors.

The models are estimated using annual data, as available for all the bank specific and market variables, as well as economic freedom (*ECFR*). However, since the Barth et al. (2001) database provides information only for one point in time, the rest of the regulatory variables (*CAPRQ*, *ACTRS*, *LIQDIV*, *DEPINS*, *DISCRQ*, *OFFDISPR*) are given the same value for each country over the time period of our estimation.¹⁵ Furthermore, we also adjusted all bank-specific variables by country to account for differences in average characteristics of banks across countries.¹⁶

¹⁵ By assigning same values we assume, as in previous studies making use of this dataset (e.g. Focarelli and Pozzolo, 2005, Demirguc-Kunt and Detragiache 2002, Buch and DeLong, 2004a,b, Fernandez and Gonzalez, 2005), that regulatory influences remain constant over limited periods of time. Barth et al. (2004) point out that such regulations change very little over time and control of these influences in their study did not alter their findings.

¹⁶ This follows the practice in earlier studies that calculated industry-relative ratios to account for industry specific differences (Platt and Platt, 1990; Barnes, 1990). In our case, standardizing by country averages

IV. RESULTS

We first describe the data characteristics and the base results obtained for the total number of observations shown in Table I. To test for the robustness of our base results, we then redo our regressions on sub-samples of data, determined on the basis of size (large and small banks), location of operation (whether in the principal banking sectors or not), and over three successive two-year time periods (1997-98, 1999-00, 2001-02). Although the results reported below ignore time and country specific dummies, we performed all the regressions with appropriate dummies in order to test for data poolability, and these confirmed the applicability of our panel data approach.¹⁷

Base results

Table III presents summary descriptive statistics, revealing apparently minor mean differences in the variables among the three categories of banks, the exceptions being *SIZE* and *GROWTH*. However, it is worth noting that despite recent efforts to harmonize bank regulations across the EU market, the data do in fact reveal significant cross-country differences in bank regulatory and supervisory practices. For example, *CAPRQ* ranges between 2 (Sweden) and 7 (Belgium, Denmark, Spain), and *ACTRS* takes values between 1 (Germany) and 2.333 (Belgium, Greece, Italy). *DISCRQ* ranges

deflates raw values and expresses all variables in relation to the average in the country. Also because values of the ratios were computed over different years, standardizing also controls for the mean shift in the ratios from year to year. Variables are adjusted as follows: Bank's Country-Adjusted value of ratio X in year t = Bank's raw value of ratio X in year t / Average value of ratio X in the commercial banking industry of the country where the bank operates in year t. Average values for each one of the 15 commercial banking industries were calculated from Bankscope, for each year of our analysis.

¹⁷ We believe that the use of industry (country) relative data and the inclusion of country specific influences in model 2 is sufficient to make the joint effect additional country-specific dummies (other than 5EU) insignificant. The extended set of results is available from the corresponding author upon request.

between 4 (Austria, Denmark, Germany, Ireland, Netherlands, Portugal) and 7 (Italy), while *OFFDISPR* takes values between 3 (Sweden) and 12 (Austria, UK). Finally, the average values of *ECFR* for each country over the entire period are between 1.60 (Ireland) and 2.95 (Greece). Table IV reports the correlations among the variables, showing values lower than 0.6 (those between 0.5 and 0.6 indicated are in bold) implying that they can be included individually for estimation without particular concerns in terms of multicollinearity¹⁸.

[Insert Tables III and IV Around Here]

Table V presents the results of the multinomial logit estimation for the full sample. Both models have significant chi-square values, allowing us to reject the null hypothesis that all coefficients are zero. The McFadden's R^2 increases from 0.11 (Model 1) to 0.15 (Model 2) with the significance of some market related and regulatory factors in the EU banking industry, especially for the acquiring banks.

[Insert Table V Around Here]

Among the bank-specific characteristics, the influence of *COST* and *SIZE* is significantly positive while that of *EQAS* is negative on both targets and acquirers. The direction of these influences on both models uniformly indicates that both targets and acquirers were larger, less well-capitalized and less efficient in expenses management

¹⁸According to Judge et al. (1988), correlations below 0.8 should not be too harmful as far as multicollinearity is concerned.

relative to non-involved banks. In addition, looking at the magnitude of these influences, it appears that both size and cost efficiency have a greater impact on acquirers than on targets. The influence of *GROWTH* and *ROE* is also significant, being negative on targets and positive on acquirers. Thus, acquired banks were less profitable with lower growth prospects than non-involved banks, while acquirers tended to be more profitable with higher growth (in total assets). Note also that coefficients of these bank-specific influences alter very little in magnitude with the addition of regulatory and market related factors. In addition, the effect of *LIQ* is negative and significant on the probability of being acquired, indicating that high (low) liquidity made targets less (more) attractive; in contrast to the results of Wheelock and Wilson (2000) for the US, who reported that low liquidity makes banks less attractive targets. The influence of *LOANS* is broadly insignificant in the full sample.¹⁹

Among the effects that proxy for the requirements and policies of regulatory and supervisory authorities, only *CAPRQ*, *OFFDISPR* and *ECFR* have a significant impact on bank acquisition likelihood for both targets and acquirers. The signs on these coefficients suggest that banks operating in countries with higher capital requirements²⁰, lower disciplining power of the authorities, and authorities that are more conducive to economic freedom, are more likely to engage in acquisitions. In contrast, the significance of the coefficients on *ACTRS*, *LIQDIV*, *DEPINS* and *DISCRQ* (for acquirers) suggest that regulatory environments which support lower restrictions on banks' activities, lower

¹⁹ *LOANS* is significant on acquirers in model 2 (only at 10% level), the opposite being the case for *LIQ*. However, the correlation between these two variables is 0.56 (see Table 2), which is highest among the bank specific variables.

²⁰ The positive influence of *CAPRQ* does not hold in the sub-samples; in fact, this effect is not significant for smaller banks and for banks operating in the non-principal banking sectors as noted below.

liquidity requirements, more accounting and disclosure requirements, and higher deposit insurer power tend to increase the likelihood to engage as an acquirer, not as a target.

Turning to the effects of market conditions we observe from the significance of coefficients on *MROE*, *C5*, *MLIQ* and *CLAIMS* that (from the point of view of both targets and acquirers) market environment supporting higher profitability, lower concentration, lower liquidity, and lower industry size tended to increase banks' likelihood to engage in acquisition. Furthermore, the significantly negative coefficient on *5EU* dummy suggests that operation in a principal banking sector reduced the acquisition likelihood for both targets and acquirers. In contrast, acquisition activity has not been influenced by the proxy for financial deepening, the size of the stock market as measured by its capitalisation relative to GDP (*MACGDP*); whereas *GDPGR* has a significant impact on acquirers, suggesting that lower economic activity raised their probability to acquire other banks as a means to restructure.

Robustness tests

Large versus small banks

As Fields et al. (2004) point out, large banks typically have much more complex financial profiles and more sources of liquidity than small banks, as well as considerably different risk profiles. Demsetz and Strahan (1997) also show that large bank holding companies are allowed to operate with lower capital ratios and typically engage in more risky activities. Hence, it is not surprising that size is frequently mentioned among the reasons for acquisitions related to both shareholder wealth maximization (e.g. economics of scale, economies of scope) and managerial motives (e.g. empire building), which also suggests

that other determinants of acquisitions may vary according to the size of the banking institutions. The European Central Bank (2000) also points out that with regard to the rationale for M&As there is a need to differentiate according to the size of the institutions involved and reports that small bank M&As are mostly being carried out for cost efficiency reasons and to achieve a size that allows survival. Larger bank M&As often have an element of strategic re-positioning and, like small bank M&As, are driven by scale economies. Furthermore, M&As between small institutions outnumbers those of large institutions by far.

In view of these considerations, we sought to re-estimate the models on samples distinguished between large and small banks. Banks were classified accordingly by comparing their total assets with the average total assets of the banking industry in which they operate, in the corresponding year. Thus we constructed two sub-samples, one with 32 targets, 33 acquirers and 744 yearly observations of non-involved large banks, and another with 166 targets, 57 acquirers and 5,242 yearly observations of non-involved small banks²¹. This reveals, as one would expect, that our full sample contained a much larger proportion of smaller banks²². The results for the sub-samples are shown in Table VI.

[Insert Table VI Around Here]

²¹ A bank is classified as “large” if its total assets are higher than the average total assets of the banking industry where it operates, and “small” otherwise. Obviously, such an approach does not consider medium sized banks. However, attempting to classify banks into more groups would result in only a few acquired and acquiring banks in each group.

²² Note that the criterion for splitting the sample on the basis of small-large banks is relative to the country in which the bank operates, and so this does not preclude investigation of the overall effect of bank size (total assets) on the probability of acquisition.

All the regressions have significant chi-squares values with McFadden's R^2 being higher for model 2 given the significant influence of many of the country-specific factors. Among the bank specific factors, the positive influence of *COST* persists through both sub-samples, even after controlling for the environment in which banks operate (model 2), suggesting that cost efficiency has been a critical factor in influencing a bank, large or small, to engage in acquisition, as target or acquirer. In addition, its impact is greater on the acquirers among the small banks, resembling the full sample results. The coefficients of *EQAS* and *ROE* are also significant for the small banks. Moreover, in the large banks sample, their influence is significant on targets' probabilities rather than on acquirers', which may seem plausible as large banks need not be profitable or less well capitalised to acquire others.²³

Comparing the results of model 1 across the two sub-samples, we observe that, apart from *EQAS*, *ROE* and *COST*, the effect of bank *SIZE* is positive and significant to both targets and acquirers in the large banks sample, and to the acquirers in the small banks sample where its effect is higher in magnitude. By contrast, *GROWTH* is significant to both targets and acquirers among the smaller banks, but only to the targets among the larger banks. The effect of *SIZE* remains significant in model 2, confirming that irrespective of the environment bank size matters more for the large banks, as target or acquirer, and considerably more to the acquirers among the smaller banks, thus supporting the results of Wheelock and Wilson (2004) who found that the probability to engage in acquisition increased with bank size. Furthermore, size does not seem to

²³ The influence of *ROE* is marginally significant in model 2 for the acquirers among the large banks, although not for model 1. While this suggests that large banks may or may not be more profitable to acquire less profitable banks, the insignificance of *EQAS* seems to suggest that large banks need not be less well capitalized to acquire others, or the insignificance may be attributed to the relative smallness of the sample size.

matter to the targets among the small banks. In contrast, growth matters more to the smaller banks, as target or acquirer, and also partly to the targets among the large banks (whose negative effect confirms that targets are those with lower growth opportunities). However, large banks' tendency to acquire other banks does not seem to be influenced by higher growth opportunities.

As with the full sample, the influence of *LIQ* is significant and negative in the small banks sample, confirming that higher liquidity makes small banks less inclined to engage in acquisition, as targets or acquirers. This effect does not necessarily hold for the large banks though. In contrast to the full sample results, the influence of *LOANS* is now significant to the acquirers, being negative for small banks but positive (with higher magnitude) for large banks. This result suggests that higher loan activity increases the tendency for large banks to acquire others, the opposite being the case for small banks, and presumably explains its insignificance in the full sample.

Among the external factors, only *CLAIMS* is significant (and negative) for both targets and acquirers in both samples, confirming that the size of the banking industry influences negatively bank acquisition likelihood for both targets and acquirers, large or small. Although *5EU* is also significant, it has a perversely positive impact on the large banks' target group, implying that this group's targets and acquirers react differently depending on whether they operate in a non-principal banking sector or not. However, *ACTRS*, *DISCRQ* and *DEPINS* continue to be significant to acquirers in both samples, confirming that acquirers, large or small, tend to be influenced by lower restrictions on banks' activities, more accounting and disclosure requirements, and higher deposit insurer power. But the negative influence of *LIQDIV* prevails only for the acquirers

among the large banks, albeit with higher magnitude. Of the remaining factors, there are more differences in their impact on targets and acquirers across the two sub-samples although greater consistency is observed between the results of the full and small banks samples. For example, *CAPRQ*, *OFFDISCPR* and *MROE* effects persist in both small and full samples with similar magnitude and signs, while *ECFR* is only significant for the targets. However, the small-large banks sample split also unravels the apparent insignificance of some external effects in the full sample, since they appear with opposite signs in the sub-samples. For example, *ACTRS*, *DISCRQ* and *DEPINS* were found insignificant to the targets group in the full sample, although in the sub-samples their effects are significant but with opposite signs, revealing that these regulatory influences appear to affect the targets among the large and small banks differently. Similarly, *MACGDP* is significant to the acquirers, large or small, although its opposite sign in the two sub-samples may be the reason for its insignificance in the full sample. On the contrary, the significance of *C5* in the full sample owes much to its significance to the large banks, rather than to the small banks. Likewise, the significance of *GDPGR* to the acquirers in the full sample is due much to its impact on the small banks.

In summary, the results for the small and large banks appear to confirm the importance of bank specific factors, in particular *COST*, *EQAS*, *ROE*, *SIZE* and *GROWTH*, in influencing the acquisition probabilities of both targets and acquirers. These effects are more or less significant after conditioning upon the external factors, which tend to vary in their impact on targets and acquirers, large or small.

Large versus small banking sectors

The significance of the *5EU* dummy in the large-small bank samples indicates that the motives for acquisitions might differ between the five principal banking sectors and the rest of the EU. Indeed, the Group of Ten (2001) report argues that the nature of acquisition activity may differ between countries and the European Central Bank (2000) report goes far to suggest that there are specific developments in individual countries or regions affecting the motives for acquisition. For example, it argues that the acquisitions opportunities are likely to be different in a country where there have already occurred a number of acquisitions than in a country where there has been little or no acquisition activity in the recent past. Since the development of the banking sectors in the five larger EU countries differs to a large extent from that in the smaller countries, we can determine whether banks in these sectors have characteristics that indicate different motives for acquisitions.

Table VII presents the estimation results with sub-samples constructed on the basis of whether the banks operate in one of the five principal EU banking sectors (*5EU*) or not²⁴. The first sub-sample accordingly consists of 129 targets, 49 acquirers and 3,998 yearly observations of non-involved banks operating in the five large markets (*5EU*). The second sub-sample consists of 69 targets, 41 acquirers and 1,988 yearly observations of non-involved banks operating in the rest of the EU-15 (*non-5EU*). Accordingly our full sample comprised nearly twice as many banks in *5EU* compared to *non-5EU* (see Table I).

[Insert Table VII Around Here]

²⁴ Note that with this sample split we had to drop the dummy variable *5EU* from the regressions to obtain estimable results.

As before, the significant and positive influence of both *COST* and *SIZE* holds in both sectors for both targets and acquirers, even after controlling for the regulatory and environmental factors.²⁵ *EQAS* and *ROE* are also robustly significant and with expected signs for both groups in 5EU, and particularly for the targets in non-5EU. *GROWTH* is significantly negative on targets and positive on acquirers, particularly in non-5EU. The influence of *LIQ* remains negative in both banking sectors (but significant only on targets), while that of *LOANS* is significant in non-5EU but with opposite signs on targets and acquirers.

While controlling for the environment in which banks operate (model 2) does not alter the significance of these bank-specific characteristics, there appears to be a great deal of variation in the impact of the external factors across the two banking sectors, specifically in relation to the earlier results. For example, the influence of *CAPRQ* is now negative (and significant for 5EU); as opposed to its positive impact found earlier (Tables V and VI). A possible explanation for this might be that capital requirements have adversely affected the risk-taking incentives of banks to engage in acquisition, partly as a result of other regulatory and supervision restrictions which seem to have affected targets and acquirers more differently in 5EU than in the rest of the EU. Most significant in 5EU is the positive impact of economic freedom (*ECFR*) on acquirers' tendency to engage in acquisitions, and their behaviour is positively associated with the degree to which they are influenced with regard to liquidity and diversification guidelines

²⁵ *SIZE* appears insignificant to the targets group in model 2, but not when we estimate this model by adding a large-small banks dummy, whose effect is also significant for the targets group but its inclusion does not result in higher overall explanatory power of the model. In general, we estimated all the models here (as well as the full sample model) with a large-small banks dummy and obtained broadly similar results (except for model 1 in non-5EU, where its effect as with model 2 is significant on targets but its inclusion, by making the effect of *GROWTH* insignificant, actually contributes to loss of fit).

(as shown by the positive impact of *LIQDIV*); this tendency is of course partly offset by the requirements on capital (*CAPRQ*). In contrast, acquirers in non-5EU have been more significantly influenced by restrictions on accounting transactions (*ACTRS*). Targets and acquirers in 5EU also seem to have reacted differently to market specific forces. In general, regulatory influences appear to have been more significant in determining acquisition likelihood for banks operating in 5EU, whereas market related influences are more prevalent among the non-5EU banks. Nevertheless, both targets and acquirers have been influenced by market concentration (*C5*) and stock market capitalisation (*MACGDP*) in 5EU, and additionally by industry size (*CLAIMS*) and market profitability (*MORE*) in non-5EU²⁶.

Regression over sub-periods

Pooling of sample across years in effect assumes that the determinants of acquisitions remain stable over time. However, previous studies that examine sub-samples find acquisition characteristics to change over different periods (Harris et al., 1982; Powell, 1997; Ali-Yrkko et al., 2005). In order to determine whether our estimates are consistent over time, we performed re-estimations by splitting the full sample according into three sub-periods of acquisition activity (1997-98, 1999-00, 2001-02). This partitioning was conveniently chosen to maintain a balanced sample size across the three sub-periods, and does not necessarily suggest that economic or industry factors changed significantly over the whole period. However, according to Table I, acquisition activity in terms of the ratio of involved to non-involved banks was more intense in 1999-00 (0.06), followed by

²⁶ C5 also has a perversely positive impact on 5EU, in contrast to its negative impact in non-5EU, and this may be associated with the perverse effects of *CAPRQ*, *ACTRS* and *LIQDIV* in this sample.

2001-02 (0.05), and 1997-98 (0.03), and therefore it seems appropriate to investigate whether there are specific causal factors explaining these differences.

[Insert Table VIII Around Here]

Table VIII presents the results for the three sub-periods. Once again the influence of *COST*, *EQAS*, *SIZE* and *GROWTH* is significant throughout in the absence of country-specific factors (model 1), and in most cases remains robust after controlling for the latter (the only exceptions being *SIZE* and *GROWTH* in 2001-02). The influence of *ROE* is also significant to acquirers (albeit with negative sign in 1999-00) and targets in at least two of the three sub-periods. The effects of *LIQ* and *LOANS* are more significant on targets than on acquirers, their negative impact in the last two sub-periods being consistent with earlier results.

Turning to external factors, the specific time period under study seems to play a significant role in determining which of these country-specific factors affect targets and acquirers. For example, among the regulatory factors, *CAPRQ* and *ACTRS* affect acquirers in the first two sub-periods, and targets in the last sub-period, although their directional impact is consistent with the full sample results. Similarly, *LIQDIV*, *DEPINS* and *DISCRQ* have varying effects on targets and acquirers. However, *OFFDISCPR* negatively influences both targets and acquirers in all three sub-periods, and this result also prevails in the full sample, suggesting that higher disciplinary power of the supervisory authorities has adversely affected bank acquisition likelihood. Finally, *ECFR* stands out as highly significant in 1999-00, and its positive influence was also found in

the full sample, implying that economic freedom, along with the official disciplinary power of the authorities, have been important factors in determining bank acquisition likelihood over this period of more intense acquisition activity.

From the measures that proxy for the market environment, only *CLAIMS* and *C5* have significant effects on targets and acquirers for at least two of the three sub-periods, although these are not uniformly negative as in the full sample. Nevertheless, their overwhelming significance across the other sub-samples suggests that industry concentration and size are additional market attributes that have influenced bank acquisition likelihood to a degree. The remaining variables have generally mixed affects, and their impact is not uniform on targets or acquirers across the sub-periods.

V. CONCLUSIONS

We use financial and industry level data for a sample of over 1400 commercial banks drawn from EU-15 countries to identify the major determinants of acquisitions in the EU banking industry. In contrast to recent studies that provide evidence on cross-border acquisitions or evidence relating to EU-25 (e.g. Hernando et al., 2009, Lanine and Vander Vennett, 2007 and Koehler, 2008), our study concentrates on bank M&As within the EU-15 where such deals have been largely domestic. However, we extend previous empirical investigations that focused on banks' financial and market characteristics by incorporating the influence of regulatory and supervision framework on acquisition likelihood, using a broad range of measures including capital adequacy requirements, the level of accounting and information disclosure requirements, the degree of official

disciplinary power, an index of economic freedom, and a measure of liquidity diversification in the industry. Some of these industry level characteristics have not been investigated in the previous literature on EU banking.

The main focus of this study has been to evaluate the relative influence of bank level financial and industry level regulatory and market characteristics in attempting to estimate the probability of bank acquisition, as targets or acquirers relative to non-acquired banks. Using a multinomial logit model we sought to identify those characteristics that most consistently influenced targets and acquirers in estimations involving the full sample as well as sub-samples distinguished by large and small banks, principle and non-principle banking sectors, and over sub-periods of the analysis. The results indicated that both targets and acquirers were significantly larger in size, less well capitalized and less cost efficient, in comparison with non-involved banks. Furthermore, targets were less profitable banks with lower growth opportunities, whereas acquirers were more profitable with higher growth prospects. Whereas bank size as a motive of acquisition had a significant influence on larger banks, among smaller banks it mattered even more to the acquirers but less to the targets. By contrast, growth affected acquisitions mainly among the smaller banks. As for other bank specific influences, higher liquidity made smaller banks less likely to engage in acquisitions; whereas higher loan activity influenced bank acquisitions mainly in the non-principal banking sectors of the EU, with a negative effect on targets and positive on acquirers.

These findings regarding bank level characteristics affecting the probability of acquisition are consistent with the neoclassical, value-maximising motives and their effects are significant even after controlling for regulatory and environmental differences

across the EU countries. In particular, the finding that underperforming banks are more likely to be acquired by better performing banks is consistent with the commonly suggested efficiency hypothesis, and underlies the belief that anticipated post-merger X-efficiency gains are greater as a result. Furthermore, M&As among the larger and more leveraged banks may have been inspired by economies of scale or scope considerations with anticipated benefits in terms of yielding synergies, product diversification or entry into new markets. Alternatively, M&As among the larger banks may have reflected a desire to gain market power given that banking groups in many European countries have been consolidating their positions within national borders following a process of consolidation in the EU single market (Campa and Hernando, 2006). Our evidence in this regard is in line with the academic literature (see, e.g. Hernando et al, 2009).

With regard to the influence of regulatory factors, we also found that banks operating in countries with higher disciplining power of the authorities were less likely to engage in M&As. To some extent, this was also the case for banks that needed to satisfy higher capital adequacy standards. These findings are plausible since greater toughness of the supervisory system and the requirements for greater safety and soundness of the banking industry may prevent full exploitation of potential gains associated with M&As, and thereby affect banks' incentive to engage in M&As. On the other hand, M&As might be the desirable means for banks to restructure or recapitalise themselves in situations where the supervisory power is weak or where such authorities lack the power to control banks' risk taking activities. Other regulatory influences, such as lower restrictions on accounting transactions, higher deposit insurer power, lower disclosure requirements and diversification guidelines mainly influenced the acquirers' tendency to

engage in acquisition. From a policy perspective, these regulatory mechanisms may also be seen as barriers supplementing antitrust policies in cases where authorities may want to influence the overall acquisition activity in the banking industry. Additionally, industry level characteristics, such as market profitability, market liquidity, market concentration and industry size were also significant, specifically in the less advanced economies of the EU. On the whole, although regulatory barriers were found to be more significant in the more advanced EU countries, and market influences more prevalent in the less advanced EU countries, the role of the external environment in affecting bank consolidation is not clear-cut, and our empirical evidence suggests that the specific characteristics of banks have played a more significant role in driving M&As in the European banking industry.

VI. REFERENCES

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Table I- Observations in sample by country, status and year of acquisition

		1997	1998	1999	2000	2001	2002	Total
Austria	Targets	0	2	0	0	1	1	4
	Acquirers	0	5	0	0	0	0	5
	Non-involved	40	39	46	46	49	45	265
Belgium	Targets	0	3	0	3	0	3	9
	Acquirers	0	1	0	0	1	0	2
	Non-involved	40	41	31	35	28	30	205
Denmark	Targets	1	0	2	2	3	3	11
	Acquirers	1	0	0	0	1	4	6
	Non-involved	57	56	59	57	56	50	335
Finland	Targets	0	0	0	1	1	0	2
	Acquirers	0	0	0	1	0	0	1
	Non-involved	6	6	6	4	5	3	30
France	Targets	4	12	10	10	3	7	46
	Acquirers	4	3	3	3	1	3	17
	Non-involved	234	231	214	198	187	178	1,242
Germany	Targets	2	4	4	4	6	1	21
	Acquirers	2	1	4	3	3	1	14
	Non-involved	187	182	176	174	161	151	1,031
Greece	Targets	0	0	3	4	0	1	8
	Acquirers	0	0	0	2	0	0	2
	Non-involved	9	11	11	11	11	14	67
Ireland	Targets	0	0	1	0	0	0	1
	Acquirers	0	0	0	0	0	2	2
	Non-involved	20	22	24	26	29	28	149
Italy	Targets	3	2	5	14	3	9	36
	Acquirers	1	0	2	3	1	2	9
	Non-involved	82	94	95	110	94	104	579
Luxembourg	Targets	0	1	1	7	7	2	18
	Acquirers	1	0	1	5	6	3	16
	Non-involved	104	99	92	89	86	73	543
Netherlands	Targets	0	1	1	1	0	0	3
	Acquirers	1	0	0	1	1	0	3
	Non-involved	44	41	41	37	34	31	228
Portugal	Targets	0	0	0	6	2	0	8
	Acquirers	0	0	0	1	1	0	2
	Non-involved	26	24	24	20	18	12	124
Spain	Targets	0	3	3	6	1	4	17
	Acquirers	0	0	0	1	2	2	5
	Non-involved	83	84	75	74	72	78	466
Sweden	Targets	2	1	1	0	1	0	5
	Acquirers	0	1	0	1	0	0	2
	Non-involved	6	6	6	7	9	8	42
UK	Targets	1	2	1	3	1	1	9
	Acquirers	0	2	2	0	0	0	4
	Non-involved	111	119	120	117	113	100	680
Total	Targets	13	31	32	61	29	32	198
	Acquirers	10	13	12	21	17	17	90

Non-involved	1,049	1,055	1,020	1,005	952	905	5,986
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Table II- List of independent variables

Variable	Category	Description	Source/Database
EQAS	Capital strength	Equity / Total assets	Bankscope
ROE	Profitability	Return on average equity	Bankscope
COST	Efficiency in managing expenses	Cost/ Income	Bankscope
LOANS	Loan activity	Net Loans / Total assets	Bankscope
LIQ	Liquidity	Liquid assets / Customer & Short term funding	Bankscope
SIZE	Size	Total assets	Bankscope
GROWTH	Growth	Annual change in total assets	Bankscope
CAPRG	Capital requirements	This variable takes values between 0 and 7, with higher values indicating grater stringency. It is determined by adding 1 if the answer is yes and 0 otherwise, for each one of the following seven questions: (1) Is the minimum required capital asset ratio risk-weighted in line with Basle guidelines? (2) Does the ratio vary with market risk, (3) Is subordinated debt allowable (required) as part of capital? (4) Is the fraction of revaluation gains that is allowed to count as regulatory capital lower than 0.75? (5) Are market value of loan losses not realized in accounting books deducted? (6) Are unrealized losses in securities portfolios deducted? (7) Are unrealized foreign exchange losses deducted?	World Bank Database, Barth et al. (2001)
ACTRS	Restrictions on banks activities	The score for this variable is determined on the basis of the answers in three questions (1) What is the level of regulatory restrictiveness for bank participation in securities activities (the ability of banks to engage in the business of securities, underwriting, brokering, dealing, and all aspects of mutual fund industry?) (2) What is the level of regulatory restrictiveness for bank participation in insurance activities (the ability of banks to engage in insurance underwriting and selling)? (3) What is the level of regulatory restrictiveness for bank participation in real estate activities (the ability of banks to engage in real estate investment, development, and management)? The answer to each one of the above questions is quantified on a scale of 1 to 4 depending on whether the answer is: Unrestricted =1: full range of activities can be conducted directly in the bank; Permitted = 2: full range of activities can be conducted, but some or all must be conducted in subsidiaries; Restricted = 3: less than full range of activities can be conducted in the bank or subsidiaries; and Prohibited = 4: the activity cannot be conducted in either the bank or subsidiaries. For the purposes of the present study, we use an overall index by calculating the average value over the three categories. Obviously, a higher value indicates greater restrictiveness.	World Bank Database, Barth et al. (2001)

LIQDIV	Liquidity/ Diversification index	This variable captures the degree to which banks are encouraged or restricted with respect to liquidity as well as asset and geographical diversification. The index is based on the following three questions: (1) Are there explicit, verifiable, and quantifiable guidelines for asset diversification? (2) Are banks prohibited from making loans abroad? (3) Is there a minimum liquidity requirement? The score is calculated on the basis of yes/no questions, by adding 1 to yes for questions (1) and (3) and no for question (2) since this response is associated with greater diversification. The variable takes values between 0 and 3, with a higher value indicating greater liquidity and diversification.	World Bank Database, Barth et al. (2001)
DEPINS	Deposit insurance scheme	This variable is determined by adding 1 if the answer is yes and 0 otherwise for each one of the following questions: (1) Does deposit insurance authority make the decision to intervene a bank? (2) Can deposit insurance agency take legal action against bank directors/officials? (3) Has the deposit insurance agency even taken any legal action against bank directors/officials? The variable takes values between 0 and 3, with higher values indicating more deposit insurer power.	World Bank Database, Barth et al. (2001)
DISCRQ	Accounting and disclosure requirements	This variable is calculated by adding 1 if the answer is yes and 0 otherwise, for each one of the following nine questions: (1) Does income statement contain accrued but unpaid interest/principal while loan is non-performing? (2) Are consolidated accounts covering bank and an non-bank financial subsidiaries required? (3) Are off-balance sheet items disclosed to supervisors? (4) Are off-balance sheet items disclosed to public? (5) Must banks disclose risk management procedures to public? (6) Are directors legally liable for erroneous/misleading information? (7) Have penalties been enforced? (8) Do regulations require credit ratings for commercial banks? ACCREQ can therefore take values between 0 and 9, with higher values indicating more information disclosure requirements.	World Bank Database, Barth et al. (2001)
OFFDISPR	Official disciplinary power of the supervisory agency	This variable is determined by adding 1 if the answer is yes and 0 otherwise, for each one of the following fourteen questions: (1) Are there any mechanisms of cease-desist type orders whose infraction leads to automatic imposition of civil & penal sanctions on banks directors & managers? (2) Can the supervisory agency order directors/management to constitute provisions to cover actual/potential losses? (3) Can the supervisory agency suspend director's decision to distribute dividends? (4) Can the supervisory agency suspend director's decision to distribute bonuses? (5) Can the supervisory agency suspend director's decision to distribute management fees? (6) Has any such action taken in last 5 years? (7) Can the supervisory agency supercede bank bank shareholder rights and declare ban insolvent? (8) Does banking law allow supervisory agency to suspend some or all ownership rights of a problem bank? (9) Does the law establish pre-determined levels of solvency deterioration which forces automatic actions such as intervention? (10) Regarding bank restructuring & reorganization, can supervisory regime or any other governmental agency supercede shareholder rights? (11) Regarding bank restructuring & reorganization, can supervisory regime or any other governmental agency remove and replace management? (12) Regarding bank restructuring & reorganization, can supervisory regime or	World Bank Database, Barth et al. (2001)

any other governmental agency remove and replace directors? (13) Regarding bank restructuring & reorganization, can supervisory regime or any other governmental agency forbear certain prudential regulations? (14) Regarding bank restructuring & reorganization, can supervisory regime or any other governmental agency insure liabilities beyond any explicit deposit insurance scheme? OFFDISPR can range between 0 and 14, with higher values indicating more disciplining power of the authorities.

ECFR	Economic freedom	The Heritage Foundation Economic Index that can take values from 1 to 5, where a score of 1 signifies an economic environment or set of policies that are most conducive to economic freedom, while a score of 5 signifies a set of policies that are least conducive to economic freedom. To measure economic freedom and rate each country, the authors of the Index examine 50 economic variables that fall into the following 10 main categories: Trade policy, Fiscal burden of government, Government intervention in the economy, Monetary policy, Capital flows and foreign investment, Banking and finance, Wages and prices, Property rights, Regulation, and Informal market activity.	Heritage Foundation
MROE	Market profitability	Average Return on equity for commercial banking sector for each country	Bankscope
MLIQ	Market liquidity	Average liquid assets to customer & short term funding ratio for commercial banking sector for each country	Bankscope
C5	Concentration	concentration in the banking sector, calculated as the total assets held by the five largest commercial banks in the country divided by the total assets of all commercial banks in the country	Bankscope
MACGDP	Financial Deepening	Stock market capitalization to Gross domestic product	Euromonitor International
CLAIMS	Size of the banking sector	Bank claims on the private sector to Gross domestic product	Euromonitor International
GDPGR	Country's overall economic development	Real gross domestic product growth	Euromonitor International
5EU	Location	Dummy variable taking the value of 1 for banks operating in one of the principal banking (i.e. France, Germany, Italy, Spain, UK) sectors, and zero otherwise	Bankscope

Table III – Descriptive Statistics

	Acquired			Acquirers			Non-involved		
	Mean	Median	Stdv	Mean	Median	Stdv	Mean	Median	Stdv
EQAS	1.859	1.394	1.510	1.686	1.261	1.075	2.388	1.671	2.068
ROE	0.544	0.654	1.272	1.015	0.867	1.399	0.920	0.706	1.047
COST	1.116	1.102	0.315	1.097	1.022	0.382	0.976	0.974	0.345
LOANS	1.005	1.006	0.529	1.004	0.991	0.468	0.970	0.964	0.578
LIQRQ	1.146	1.019	0.898	1.182	0.952	0.793	1.312	1.054	1.093
SIZE	0.655	0.087	1.282	2.122	0.404	3.669	0.444	0.079	0.901
GROWTH	-0.985	0.190	5.200	2.201	0.484	6.961	1.193	0.382	4.389
CAPRQ	5.742	6.000	0.992	5.811	6.000	0.911	5.919	6.000	0.770
ACTRS	1.692	1.333	0.478	1.533	1.333	0.432	1.525	1.333	0.435
LIQDIV	2.131	2.000	0.802	2.289	2.000	0.753	2.249	2.000	0.702
DEPINS	0.702	1.000	0.627	0.600	1.000	0.632	0.682	1.000	0.650
DISRQ	5.202	5.000	1.007	4.922	5.000	0.915	4.963	5.000	0.931
OFFDISCPR	6.071	5.000	2.514	6.311	6.000	2.542	6.847	6.000	2.808
MROE	12.038	12.320	5.592	12.032	12.320	5.742	11.607	12.320	5.131
MLIQ	27.852	28.490	8.416	29.086	28.765	7.723	28.289	28.990	7.080
C5	68.053	63.120	16.737	67.261	65.790	19.419	68.141	65.790	17.012
EFCR	2.253	2.263	0.226	2.176	2.238	0.245	2.190	2.238	0.236
MACGDP	0.950	0.700	0.922	1.021	0.700	0.959	1.178	0.700	1.226
CLAIMS	1.322	0.324	3.491	2.301	0.363	5.218	2.378	0.363	6.780
GDPGR	3.094	2.840	1.915	3.295	2.840	2.307	3.043	2.800	1.971
5EU*	129			49			3998		

Notes: Variables are defined in Table II. The value shown in the case of 5EU corresponds to the number of observations from the principal banking sectors

Table IV – Correlation analysis

	EQAS	ROE	COST	LOANS	LIQ	SIZE	GROWTH	CAPRQ	ACTRS	LIQDIV	DEPINS	DISCRQ	OFFDISPR	ECFR	MROE	MLIQ	C5	MACGDP	CLAIMS	GDPGR	5EU	
EQAS	1.00																					
ROE	-0.13	1.00																				
COST	-0.11	-0.35	1.00																			
LOANS	-0.15	0.10	-0.08	1.00																		
LIQ	0.19	0.00	0.07	-0.56	1.00																	
SIZE	-0.26	0.10	-0.06	0.05	-0.11	1.00																
GROWTH	-0.06	0.01	0.00	0.01	-0.05	0.03	1.00															
CAPRQ	0.06	-0.03	-0.01	0.03	-0.14	-0.03	0.06	1.00														
ACTRS	-0.06	-0.05	0.06	-0.02	-0.04	0.04	-0.03	-0.11	1.00													
LIQDIV	0.00	0.06	-0.01	0.09	-0.17	0.05	0.08	0.52	-0.37	1.00												
DEPINS	0.05	0.05	-0.04	0.09	-0.16	-0.07	0.04	0.23	0.16	-0.02	1.00											
DISCRQ	-0.01	0.00	0.09	-0.03	0.11	0.03	-0.05	-0.27	0.54	-0.35	0.00	1.00										
OFFPR	0.05	-0.15	-0.05	-0.11	0.06	0.00	0.00	0.23	-0.08	-0.03	-0.30	-0.13	1.00									
ECFR	0.03	0.07	0.05	0.15	-0.19	-0.04	0.02	0.01	0.26	-0.11	0.60	0.01	-0.44	1.00								
MROE	-0.05	-0.27	0.04	-0.10	0.00	0.07	0.11	0.04	0.18	-0.03	-0.42	0.12	0.43	-0.39	1.00							
MLIQ	-0.06	-0.05	0.05	-0.03	-0.14	0.06	0.10	0.16	-0.07	0.10	0.09	0.03	-0.23	-0.01	0.28	1.00						
C5	0.05	-0.05	-0.10	0.03	-0.06	-0.10	0.00	0.06	0.10	-0.24	0.13	-0.51	0.25	0.21	-0.04	-0.39	1.00	-0.48				
MACGDP	0.02	-0.11	0.00	-0.11	0.12	0.06	0.05	-0.03	-0.21	0.01	-0.42	0.36	0.48	-0.57	0.56	0.25	-0.48	1.00				
CLAIMS	-0.10	-0.04	0.11	-0.07	0.01	0.11	0.03	0.04	-0.13	0.30	-0.30	0.03	-0.13	-0.31	0.27	0.50	-0.59	0.34	1.00			
GDPGR	-0.09	-0.10	-0.02	-0.05	-0.07	0.10	0.12	0.04	0.09	0.29	-0.04	-0.06	0.04	-0.27	0.50	0.39	-0.28	0.24	0.42	1.00		
5EU	0.13	0.07	-0.01	0.07	0.02	-0.10	-0.01	0.10	-0.18	-0.17	0.59	0.36	-0.13	0.39	-0.39	-0.09	-0.16	0.09	-0.38	-0.43	1.00	

Note: Variables are defined in Table 2; With bold are correlations above 0.50 (in absolute terms)

Table V – Multivariate logit results (Full sample: N = 6,274)

	Model 1		Model 2	
	Acquired	Acquirers	Acquired	Acquirers
Intercept	-0.148 (0.729)	-1.767*** (93.744)	-1.152 (1.173)	-0.361 (0.126)
EQAS	-0.167*** (61.144)	-0.131*** (33.752)	-0.171*** (58.57)	-0.114*** (23.592)
ROE	-0.208*** (62.649)	0.074** (6.145)	-0.200*** (35.802)	0.082*** (6.597)
COST	0.833*** (60.424)	1.527*** (192.038)	0.931*** (66.02)	1.605*** (192.766)
LOANS	-0.028 (0.154)	0.021 (0.078)	-0.014 (0.034)	0.140* (2.955)
LIQ	-0.218*** (27.760)	-0.080* (3.460)	-0.194*** (18.437)	-0.038 (0.677)
SIZE	0.150*** (25.202)	0.404*** (215.329)	0.141*** (19.441)	0.445*** (223.217)
GROWTH	-0.099*** (155.561)	0.039*** (43.319)	-0.089*** (126.013)	0.035*** (32.119)
CAPRQ			0.196*** (7.042)	0.279*** (14.320)
ACTRS			-0.118 (0.142)	-2.453*** (57.897)
LIQDIV			-0.102 (1.382)	-0.354*** (14.324)
DEPINS			-0.038 (0.046)	1.290*** (50.328)
DISCRQ			0.132 (0.811)	0.718*** (25.343)
OFFDISPR			-0.176*** (55.222)	-0.127*** (31.586)
ECFR			0.920*** (9.039)	0.734** (5.718)
MROE			0.045*** (13.664)	0.072*** (31.493)
MLIQ			-0.027*** (11.035)	-0.031*** (13.407)
C5			-0.012** (6.439)	-0.019*** (15.693)
MACGDP			0.122 (2.124)	0.119 (2.197)
CLAIMS			-0.099*** (62.227)	-0.110*** (107.199)
GDPGR			0.048 (2.062)	-0.147*** (22.571)
5EU			-0.767* (3.821)	-3.372*** (72.035)
χ^2	1491.659***		2048.904***	
McFadden R ²	0.108		0.149	

Notes: Variables are defined in Table II. Model 1 is developed with financial variables; Model 2 is developed with financial variables and country-specific characteristics; Wald test in parentheses; *** Statistically significant at the 1% level, ** Statistically significant at the 5% level, * Statistically significant at the 10% level

Table VI - Multivariate logit results (Large vs Small banks)

	Small banks (N=5465)				Large banks (N=809)			
	Model 1		Model 2		Model 1		Model 2	
	Acquired	Acquirers	Acquired	Acquirers	Acquired	Acquirers	Acquired	Acquirers
Intercept	0.031 (0.027)	-1.978*** (104.622)	-4.281*** (11.992)	-2.557** (4.381)	-1.812*** (6.602)	-5.121*** (39.531)	16.307*** (15.443)	-3.580 (0.921)
EQAS	-0.183*** (62.319)	-0.049** (4.645)	-0.208*** (72.301)	-0.041* (2.958)	-0.611** (5.771)	-0.075 (0.121)	-1.110*** (12.718)	0.027 (0.015)
ROE	-0.165*** (25.677)	0.093*** (9.306)	-0.168*** (23.202)	0.098*** (8.941)	-0.597*** (21.393)	0.041 (0.155)	-0.761*** (25.801)	0.207* (2.921)
COST	0.720*** (42.032)	1.732*** (243.395)	0.856*** (48.452)	2.004*** (267.375)	2.196*** (21.910)	1.989*** (16.353)	1.495** (6.499)	2.036*** (13.789)
LOANS	-0.007 (0.008)	-0.205*** (6.905)	-0.008 (0.011)	-0.186** (4.943)	0.457 (2.366)	1.131*** (11.596)	1.075*** (7.006)	1.409*** (16.321)
LIQ	-0.209*** (24.322)	-0.141*** (11.045)	-0.198*** (16.888)	-0.103** (4.755)	-0.328 (2.662)	0.444** (5.454)	-0.668*** (6.847)	0.316 (1.741)
SIZE	0.015 (0.006)	2.351*** (158.74)	-0.207 (0.925)	2.453*** (147.998)	0.275*** (22.335)	0.459*** (63.604)	0.338*** (21.863)	0.567*** (62.901)
GROWTH	-0.101*** (145.225)	0.046*** (58.583)	-0.087*** (110.451)	0.046*** (53.137)	-0.091*** (10.644)	-0.003 (0.020)	-0.008 (0.067)	-0.041 (2.38)
CAPRQ			0.312*** (14.983)	0.271*** (11.118)			0.388 (1.428)	0.900*** (10.018)
ACTRS			-0.817** (5.245)	-2.557*** (49.585)			4.933*** (13.218)	-3.615*** (9.92)
LIQDIV			-0.114 (1.473)	0.115 (1.278)			-0.244 (0.587)	-1.487*** (18.917)
DEPINS			0.023 (0.014)	0.979*** (23.595)			-2.135*** (8.106)	2.001*** (10.787)
DISCRQ			0.629*** (13.000)	0.797*** (20.643)			-2.426*** (15.247)	1.002* (3.768)
OFFDISCPR			-0.196*** (55.026)	-0.190*** (61.712)			-0.038 (0.209)	0.015 (0.030)
ECFR			0.886*** (6.699)	-0.018 (0.003)			-4.045*** (9.939)	2.110* (3.598)
MROE			0.048*** (13.153)	0.039*** (7.406)			-0.123** (4.427)	0.228*** (26.878)
MLIQ			0.002 (0.034)	-0.003 (0.082)			-0.004 (0.018)	-0.090*** (10.848)
C5			0.001 (0.066)	0.009 (2.178)			-0.077*** (13.952)	-0.090*** (33.567)
MACGDP			0.034 (0.131)	0.323*** (12.535)			-0.390 (1.874)	-0.965*** (9.418)
CLAIMS			-0.099*** (51.852)	-0.160*** (110.729)			-0.296* (3.273)	-0.063** (5.405)
GDPGR			0.071* (3.623)	-0.114*** (9.923)			0.030 (0.059)	-0.110 (1.979)
5EU			-1.136*** (6.616)	-2.914*** (42.551)			4.774*** (7.900)	-4.042*** (8.850)
χ^2	1126.846***		1864.287***		272.369***		524.696***	
McFadden R ²	0.094		0.155		0.153		0.295	

Variables are defined in Table II. Model 1 is developed with financial variables; Model 2 is developed with financial variables and country-specific characteristics; Wald test in parentheses; *** Statistically significant at the 1% level, ** Statistically significant at the 5% level, * Statistically significant at the 10% level

Table VII - Multivariate logit results (5EU vs non-5EU markets)

	5EU (N=4176)				Non 5EU (N=2098)			
	Model 1		Model 2		Model 1		Model 2	
	Acquired	Acquirers	Acquired	Acquirers	Acquired	Acquirers	Acquired	Acquirers
Intercept	-0.600*** 7.422	-1.83*** 63.472	0.054 (0.002)	-12.151*** (67.722)	0.979*** 10.216	-2.109*** 39.027	1.041 0.339	1.616 0.751
EQAS	-0.142*** 34.333	-0.219*** 58.737	-0.133*** (27.710)	-0.245*** (62.632)	-0.240*** 26.909	0.026 0.381	-0.268*** 24.997	0.124*** 7.464
ROE	-0.193*** 29.436	0.138*** 18.042	-0.194*** (25.898)	0.127*** (10.911)	-0.430*** 30.223	-0.083 1.060	-0.449*** 27.144	-0.174** 3.932
COST	0.818*** 34.382	1.825*** 159.851	0.87*** (35.801)	2.027*** (168.847)	0.663*** 13.748	1.227*** 43.234	0.682*** 10.366	1.524*** 48.925
LOANS	0.292*** 11.091	-0.12 1.642	0.159* (2.892)	-0.357*** (12.574)	-0.774*** 30.629	0.389*** 7.063	-0.568*** 12.616	0.624*** 14.648
LIQ	-0.162*** 10.605	-0.047 0.842	-0.21*** (13.554)	-0.205*** (11.669)	-0.258*** 11.165	-0.049 0.366	-0.242*** 8.587	-0.055 0.398
SIZE	0.172*** 22.488	0.407*** 144.775	0.142*** (14.846)	0.461*** (179.762)	0.098* 3.534	0.382*** 68.308	0.079 1.545	0.503*** 71.963
GROWTH	-0.109*** 133.009	0.011 2.228	-0.096*** (82.205)	0.038*** (16.152)	-0.074*** 23.877	0.083*** 51.521	-0.086*** 26.201	0.081*** 48.581
CAPRQ			-0.875** (6.247)	-1.509*** (16.476)			-0.194 0.820	-0.199 0.770
ACTRS			1.17*** (7.876)	0.656 (2.075)			0.541 1.649	-1.265*** 7.076
LIQDIV			0.883*** (15.348)	1.129*** (19.650)			1.041* 3.122	0.692 1.214
DEPINS			0.066 (0.047)	0.148 (0.212)			-0.770** 5.638	0.543* 3.149
DISCRQ			0.056 (0.387)	0.358*** (14.212)			-0.464 0.950	0.011 0.000
OFFDISCPR			-0.061 (0.966)	-0.138* (2.910)			-0.351*** 8.868	-0.181 2.102
ECFR			-0.501 (0.771)	4.546*** (53.716)			1.911*** 9.387	0.056 0.008
MROE			-0.027 (1.599)	0.057** (6.295)			0.044** 5.047	0.067*** 9.664
MLIQ			-0.032 (2.383)	-0.187*** (68.900)			-0.021** 4.527	0.007 0.435
C5			0.044** (5.796)	0.118*** (34.979)			-0.018** 4.670	-0.024*** 7.765
MACGDP			0.347** (4.355)	0.392** (4.759)			0.334** 4.460	0.508*** 9.426
CLAIMS			-0.538 (2.171)	1.651*** (16.940)			-0.146*** 69.261	-0.169*** 104.491
GDPGR			0.051 (0.513)	-0.115 (2.262)			-0.043 0.875	-0.246*** 31.909
χ^2	1178.227***		1590.438***		503.962***		917.769***	
McFadden R ²	0.128		0.173		0.109		0.199	

Notes: Variables are defined in Table II. Model 1 is developed with financial variables; Model 2 is developed with financial variables and country-specific characteristics; Wald test in parentheses; *** Statistically significant at the 1% level, ** Statistically significant at the 5% level, * Statistically significant at the 10% level

Table VIII - Multivariate logit results (Sub-samples by time period)

	Period 1997-1998 (N = 2171)				Period 1999-2000 (N = 2151)				Period 2001-2002 (N = 1952)			
	Model 1		Model 2		Model 1		Model 2		Model 1		Model 2	
	Acquired	Acquirers	Acquired	Acquirers	Acquired	Acquirers	Acquired	Acquirers	Acquired	Acquirers	Acquired	Acquirers
Intercept	-2.412*** (47.906)	-2.107*** (40.106)	-14.270*** (12.494)	-14.989*** (10.831)	0.370 (1.454)	-1.514*** (22.742)	0.034 (0.000)	-11.926** (5.565)	0.155 (0.224)	-1.256*** (12.227)	-20.827*** (22.12)	24.799*** (9.752)
EQAS	-0.247*** (41.443)	-0.179*** (21.200)	-0.269*** (40.947)	-0.064 (1.942)	-0.206*** (28.219)	-0.153*** (14.369)	-0.201*** (24.151)	-0.088** (3.868)	-0.088** (5.415)	-0.096** (5.193)	-0.097** (5.293)	-0.097** (3.704)
ROE	-0.159*** (13.394)	0.163*** (14.453)	-0.206*** (15.688)	0.310*** (29.214)	-0.410*** (39.603)	-0.247*** (16.892)	-0.381*** (28.176)	-0.211*** (10.646)	-0.077 (1.316)	0.171** (6.168)	0.030 (0.162)	0.389*** (18.410)
COST	1.652*** (75.500)	1.726*** (86.529)	1.728*** (55.163)	2.249*** (83.347)	0.586*** (10.518)	1.651*** (85.283)	0.894*** (19.047)	1.976*** (85.804)	1.155*** (26.499)	1.003*** (18.091)	1.247*** (24.582)	1.269*** (21.141)
LOANS	0.984*** (45.432)	0.243** (2.901)	1.142*** (40.629)	0.155 (0.767)	-0.126 (0.893)	-0.146 (1.062)	-0.299** (4.026)	-0.101 (0.374)	-0.533*** (18.064)	-0.081 (0.347)	-0.560*** (16.901)	-0.170 (1.190)
LIQ	0.252*** (9.1880)	-0.001 (0.000)	0.296*** (8.326)	-0.304*** (9.291)	-0.213*** (8.143)	-0.103 (1.780)	-0.247*** (8.499)	-0.377*** (15.097)	-0.526*** (51.839)	-0.143* (3.586)	-0.655*** (54.066)	-0.102 (1.105)
SIZE	0.117*** (8.612)	0.293*** (66.616)	0.194*** (15.366)	0.464*** (89.147)	0.222*** (14.696)	0.528*** (91.303)	0.125** (4.578)	0.605*** (111.800)	0.143** (6.000)	0.441*** (68.238)	0.064 (0.985)	0.648*** (87.853)
GROWTH	-0.324*** (79.291)	-0.154*** (21.695)	-0.463*** (81.719)	-0.271*** (35.123)	-0.087*** (59.939)	0.019* (3.406)	-0.074*** (42.320)	0.072*** (28.606)	-0.118*** (67.497)	0.040*** (16.859)	-0.114*** (57.004)	0.016 (2.140)
CAPRQ			-0.237 (1.049)	0.428* (2.810)			0.247 (1.694)	2.302*** (17.914)			1.574*** (40.283)	0.354 (0.993)
ACTRS			-0.321 (0.133)	-1.726* (2.837)			1.070 (2.605)	-7.573*** (40.081)			-4.383*** (18.370)	5.278 (2.383)
LIQDIV			0.416** (4.528)	0.108 (0.268)			-0.285 (1.424)	-6.007*** (64.495)			-2.059*** (41.000)	-1.484*** (17.546)
DEPINS			-2.005*** (12.774)	-3.449** (6.643)			0.148 (0.065)	-3.392** (4.418)			-0.174 (0.073)	0.936 (1.538)
DISCRQ			0.946** (5.209)	1.180** (5.928)			-0.543* (2.906)	0.263 (0.296)			2.171*** (19.734)	-4.920** (6.704)
OFFDISCPR			-0.113** (4.952)	-0.120** (5.701)			-0.332*** (20.654)	-1.291*** (36.726)			-0.094 (1.882)	-0.947** (5.624)
ECFR			-0.773 (0.543)	0.257 (0.047)			2.195*** (7.936)	10.678*** (56.324)			7.963 (32.775)	0.293 (0.051)
MROE			-0.002	-0.233***			0.046	0.481***			-0.063*	0.134***

	(0.003)	(19.746)	(2.030)	(51.733)	(2.787)	(8.361)
MLIQ	-0.019	-0.056*	-0.044**	-0.431***	-0.209***	-0.085
	(0.443)	(3.456)	(4.506)	(53.603)	(26.044)	(2.411)
C5	0.120***	0.154***	-0.031***	-0.032	0.038**	-0.087***
	(20.993)	(28.299)	(7.466)	(1.537)	(6.086)	(10.954)
MACGDP	-0.792***	0.323	0.667***	0.485	-0.247	-0.182
	(13.262)	(1.045)	(9.578)	(2.543)	(0.527)	(0.106)
CLAIMS	0.103**	0.163***	-0.131***	-0.222***	0.927***	0.553
	(6.226)	(9.791)	(24.173)	(34.225)	(33.861)	(1.832)
GDPGR	0.541***	-0.092	0.063	2.856***	0.054	-0.160***
	(16.349)	(0.453)	(0.103)	(30.909)	(1.029)	(8.117)
5EU	4.915***	1.881	-0.768	6.373**	-2.770**	2.172
	(20.199)	(0.981)	(0.447)	(6.051)	(3.624)	(0.554)
χ^2	561.520***	1247.345***	561.566***	1114.708***	584.592***	1094.135***
McFadden R ²	0.118	0.261	0.119	0.236	0.136	0.255

Notes: Variables are defined in Table II. Model 1 is developed with financial variables; Model 2 is developed with financial variables and country-specific characteristics; Wald test in parentheses; *** Statistically significant at the 1% level, ** Statistically significant at the 5% level, * Statistically significant at the 10% level

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