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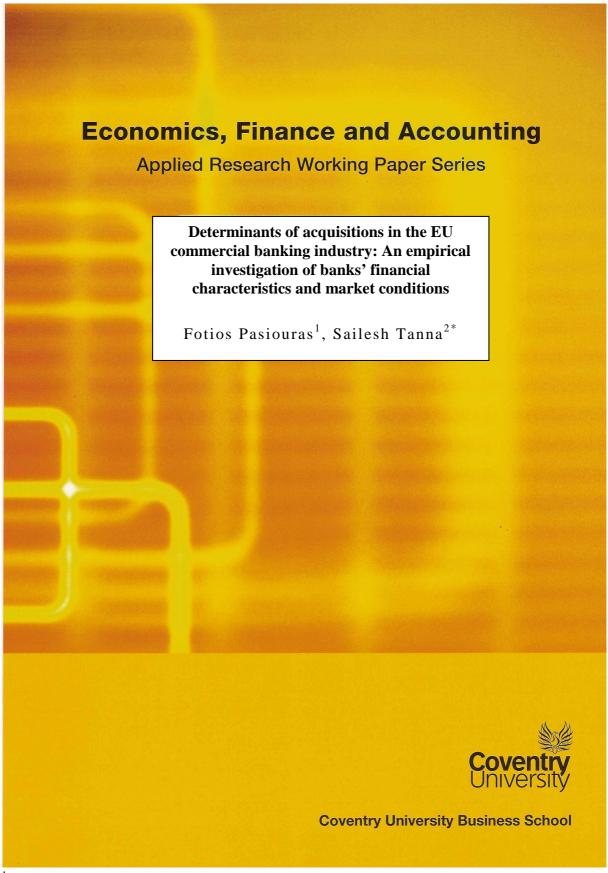
Determinants of acquisitions in the EU commercial banking industry: An empirical investigation of banks' financial characteristics and market conditions

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Abstract

In this paper we empirically investigate the determinants of acquisition likelihood in the EU banking industry, using a sample of 672 commercial banks operating in the EU, 168 of which were acquired between 1998 and 2002. Using industry-adjusted financial ratios, we evaluate the relative influence of bank-specific and market characteristics by estimating a logistic regression model both with and without the additional factors that reflect the market environment in which banks operate. The results indicate that banks with less risky asset portfolios, and banks that are less profitable and less efficient in terms of expenses management, are more likely to be acquired. With regard to the market characteristics, the factors having a significant impact on the acquisition likelihood are the growth of the market, as measured by the annual change in total assets, the change in the country's overall economic environment, the level of concentration in the banking industry, and the location of the bank in one of the 5 principal EU banking sectors.

1. Introduction

Mergers and Acquisitions (M&As) have significantly transformed the European banking industry in recent years. For example, the number of European banking institutions fell from 12,378 in 1990 to 8,395 in 1999 (European Central Bank - ECB, 2000) while 18 of the 30 largest European banks emerged as a result of recent M&As (Belaisch et al., 2001). Beitel and Schiereck (2001) also point out that during the period 1998-2000 more M&As deals occurred in the EU banking industry than during the previous 14 years.

Nevertheless, empirical evidence related to bank M&As in the EU is in general limited. Recent studies have examined the influence of M&As on the scale and operating efficiency of the merging institutions (Vander Vennet, 1996, 1998; Huizinga et al., 2001; Diaz et al., 2004; Altunbas and Ibanez, 2004), the effect of M&A announcements on the share prices of the financial institutions (Tourani Rad and Van Beek, 1999; Cybo-Ottone and Murgia, 2000; Beitel and Schiereck, 2001; Beitel et al., 2004; Lepetit et al., 2004), and the impact on the takeover premium paid (Dunis and Klein, 2005). With the exception of a few recent studies[1] there has been limited research on the investigation of the determinants of bank M&As in the EU countries, and thus our knowledge of acquisition likelihood characteristics that may be distinguished as bank specific or market related comes mostly from studies conducted for the US banking industry (Hannan and Rhoades, 1987; Moore, 1996; Hadlock et al., 1999; Wheelock and Wilson, 2000, 2004).

According to the literature on corporate control, M&As may occur because of the desire for the acquirer to increase market power, replace inefficient management, achieve economics of scale and scope, or diversify risk, among others. Hence, bank specific

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[1]A study of the determinants of bank acquisitions has recently been examined for Italy (Focarelli et al., 1999) and Greece (Pasiouras and Zopounidis, 2006). Vander Vannet (1998) also investigates some of the causes and consequences for EU banks, and finds that targets are smaller and less efficient than acquiring banks. Some recent studies have also examined barriers influencing international cross-border M&As (Focarelli and Pazzolo 2001; Buch and DeLong, 2004; Rossi and Volpin, 2004). Our study focuses on bank M&As in the European Union, with a majority of commercial bank acquisitions in our sample being domestic rather than cross-border.

characteristics that could potentially influence bank acquisition likelihood include managerial efficiency (e.g. profits maximization or costs minimization considerations), size (i.e. potential economies of scale and scope, too-big to fail incentives, too-big to be acquired incentives), market share, loan activity, asset quality, and capital strength. Of course non-financial characteristics such as corporate governance characteristics and managerial incentives could be particularly important as well, due to non-value maximizing motives for M&As.

The empirical evidence from previous studies, however, is not conclusive. For example, Moore (1996), Focarelli et al. (1999), and Wheelock and Wilson (2000) find evidence of an association between poor performance (measured either in terms of profits or cost management or both) and acquisition likelihood, in contrast to Hannan and Rhoades (1987) and Pasiouras and Zopounidis (2006) who reveal no such effect. Hannan and Rhoades (1987) and Moore (1996) also find the effect of size to be insignificant, while Wheelock and Wilson (2000, 2004) and Focarelli et al. (1999) document a significant relationship. Hannan and Rhoades (1987) find growth to be positively related to inside market acquisitions and negatively related to outside market acquisitions (albeit insignificant in the latter case), in contrast to Moore (1996) who finds a negative relationship between growth and acquisition in both in-market and out-of market acquisitions.

Apart from bank specific characteristics, there are various external factors that can influence bank M&As, including industry concentration, market liquidity, market profitability, financial regulation, financial deepening, and the size and growth of the banking industry (e.g. Berger et al., 1999; Group of Ten, 2001; Focarelli and Pozzolo, 2001; Buch and DeLong, 2004; Rossi and Volpin, 2004; Wheelock and Wilson, 2004; Harford, 2005; Giovanni, 2005). However, with the exception of Wheelock and Wilson (2004), most of the US studies have focused on investigation of bank specific characteristics with only a limited range of external factors included (mainly concentration and market growth). Our empirical investigation considers a set of 22 financial variables representing 8 bank-specific characteristics, and 9

variables representing different aspects of market characteristics comprising the banking industry[2]. By examining these influences for a sample of commercial banks covering 15 EU countries, we hope to shed light upon the determinants of bank acquisition activity in the EU as a single market.

Our examination of the determinants of commercial bank acquisition likelihood in the EU is important for several reasons. First, such studies in the banking industry have in general been neglected (Cyree et al., 2000; Wheelock and Wilson, 2000). Although there is ample empirical evidence linking the relationship between financial characteristics and acquisition likelihood of industrial firms (e.g. Levine and Aaronovitch, 1981; Harris et al., 1982; Hasbrouck, 1985; Ambrose and Megginson, 1992; Powell, 1997), it has been claimed that bank managers may be involved in M&As for reasons different than those of non-bank managers (Hannan and Rhoades, 1987). Furthermore, some proxies typically employed in empirical studies of M&As for industrial firms (i.e. current ratio) may not be meaningful for banks (Fields, 2004), and the need to investigate various bank specific characteristics affecting the likelihood of bank acquisition is therefore important.

Second, the European banking industry differs from that of the US in many respects (Tourani Rad and Van Beek, 1999; Beitel and Schiereck, 2001), not least because it is more heterogeneous due to cultural, legal and economic differences between the EU member states, but there have traditionally also been restrictions on both geographic and product expansion in the US, whereas the universal banking structure in the EU offers greater opportunity for a wider range of products (Cybo-Ottone and Murgia, 2000; Diaz et al., 2004). Another aspect in which EU differs from the US is the social environment where powerful European labor unions and laws offer more protection to employees, making it almost impossible to lay off

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[2] Table 2 below outlines the set of variables grouped according to these characteristics, which typically represent the banking industry.

employees immediately after completion of merger, which delays cost savings. Obviously, such differences between the two markets make it difficult to extrapolate any conclusions drawn from US studies onto the EU ones (Cybo-Ottone and Murgia, 2000; Huizinga et al., 2001; Diaz et al., 2004).

Third, as Altunbas and Ibanez (2004) point out, the process of banking integration in the EU is not yet complete and there are at least three factors that might alter the emerging structure of corporate control in the EU banking industry. First, many of the global forces underlying the need for banks to be competitive and efficient, such as deregulation, technological change and financial globalization, will continue to play an important role in asset allocation within the EU economy, thereby influencing the market for corporate control through M&As. Second, the number of banks per 1,000 inhabitants in the EU is almost double the number in the US, indicating significant scope for convergence as suggested by the literature on corporate control (Coffee, 1999; Rossi and Volpin, 2004). Third, there are significant differences in levels of concentration among the EU countries themselves. All these forces suggest the need to investigate bank specific and market characteristics likely to affect bank acquisitions in the EU, which is the focus of this paper.

The remainder of the paper is organized as follows: Section 2 discusses the research methodology, while Section 3 presents our empirical results. Finally, Section 4 outlines the concluding remarks and suggests some possible directions for future research.

2. Research Methodology

2.1. Sample Selection

Three data sources were used to provide our sample of information on banks acquisitions and bank-specific characteristics: Bankscope, and Zephyr databases of Bureau van Dijk's company, and BANKERSalamanac.com. Claessens et al. (2001) refer to Bankscope as the most comprehensive database that allows cross-country comparisons of

financial ratios. However, while Bankscope and BANKERSalmanac.com provide information about full acquisitions, we had to rely on Zephyr for the identification of banks subject to majority acquisitions (purchase above 50% of the ownership of the acquired bank but less than 100%). Hence, our list of majority acquisitions is based critically on the availability (as well as accuracy) of such information in Zephyr. To avoid comparison problems associated with different types of banks (e.g. co-operative, investment, etc) whilst providing coverage of 15 EU countries (the former EU15), we restricted our sample to commercial banks (as defined in Bankscope).

Data availability in the online version of Bankscope (to which we had access) is quite limited prior to 1995. In addition, we had to impose the requirement that banks had financial data for three years prior to the year of acquisition, in order to ensure adequate use of data in the years preceding the acquisition. Hence, our search for commercial bank acquisitions has to be limited to the period between January 1, 1998 and December 31, 2002 (the last complete year for which data was available when this study was carried out). This gave a total of 168 acquired commercial banks, each matched on the basis of the year of acquisition with three non-acquired (control) banks. A corresponding matched sample of 504 banks was therefore chosen randomly from 566 non-acquired banks that had financial data over the period 1995-2002[3].

Table 1 presents the coverage of acquired and non-acquired banks in the sample, classifying them by year and country. The estimation dataset comprises this pooled sample of 672 commercial banks on which we utilize a set of financial and market related ratios reflecting the motives and prior evidence to support acquisition likelihood in the banking

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[3] Matching criteria as considered in most studies can be based on time, size or industry. Among these, matching by time (i.e. year) is most common. Given that our sample of banks is drawn across different countries, an alternative criterion could be on the country basis. However, as Hasbrouck (1985) notes, once a variable is used as a matching characteristic, its effect will perforce be excluded from the analysis. Hence we ruled out matching the sample by country, since this would have purged country-specific effects and disallowed investigation of market characteristics. We also ruled out matching by size, since the literature suggests that size is an important explanatory variable influencing acquisitions and is therefore included as an independent variable in our model.

industry, with the dependent variable taking the value 1 for 168 banks acquired, and 0 for 566

banks non-acquired. Pooling of such data across several years to obtain the requisite sample

for estimation purposes has been a common practice followed in the literature (e.g. Harris et

al., 1982; Hasbrouck, 1985; Hannan and Rhoades, 1987; Ambrose and Megginson, 1992;

Hadlock et al., 1999; Powell, 1997; Focarelli et al., 1999; Pasiouras and Zopounidis, 2006).

However, what we estimate below is essentially a cross-sectional logit model where

appropriate observations for each bank in the sample enter only once[4].

Table 1 – Banks in sample by country and year

	1998		1999		2000		2001		2002		Total	
	AC Q	NAC Q	AC Q	NAC Q	AC Q	NAC Q	AC Q	NAC Q	AC Q	NAC Q	AC Q	NAC Q
Austria	2	2	0	3	0	4	1	4	1	5	4	18
Belgium	3	1	0	3	3	6	0	1	3	7	9	18
Denmark	0	5	2	11	2	10	3	5	3	1	10	32
Finland	0	0	0	0	1	0	1	1	0	2	2	3
France	10	20	9	26	7	41	3	23	6	18	35	128
Germany	3	13	3	15	4	30	5	11	1	12	16	81
Greece	0	1	3	1	4	2	0	0	1	1	8	5
Ireland	0	2	1	1	0	6	0	1	0	1	1	11
Italy	1	8	5	7	14	7	3	9	9	13	32	44
Luxembourg	1	5	1	6	7	19	7	7	2	11	18	48
Netherlands	0	2	1	4	1	9	0	2	0	4	2	21
Portugal	0	0	0	0	4	3	2	4	0	2	6	9
Spain	3	3	3	4	6	15	1	8	4	6	17	36
Sweden	0	1	0	0	0	1	1	1	0	0	1	3
UK	1	9	1	6	3	15	1	7	1	10	7	47
Total	24	72	29	87	56	168	28	84	31	93	168	504

Notes: ACQ = acquired; NACQ=non-acquired

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[4]The adoption of the universal banking model by the European Union under its second banking directive, implemented in 1992, and harmonization of banking laws in the single market provides a rationale for pooling of the data, although it is acknowledged

2.2 Variables

The covariates of the logit model represent bank specific financial characteristics as well as market characteristics that affect the probability of acquisition. Table 2 lists the set of explanatory variables reflecting those attributes of banks' performance associated with their acquisition likelihood.

2.2.1 Financial characteristics

Following Weelock and Wilson (2000, 2004), we consider numerous financial ratios to reflect capital strength, asset quality, expenses management, earnings and liquidity. However, there are inevitable restrictions on the type of ratios one can use in a pan-European setting, and to minimize possible bias arising from different accounting practices, only broad variable definitions as provided in Bankscope are used. Bankscope compiles all data on the basis of financial statements and notes found in audited annual reports. Each country in the Bankscope database therefore has its own data template, thus allowing for differences in the reporting and accounting conventions. The data are then converted to a "global format" using a standardized template derived from the country-specific templates. This global format contains standard ratios that are henceforth comparable across banks and countries. To adjust further for potential biases in comparing cross-sectional ratios spanning over several years and across countries, we used industry relative ratios (Platt and Platt, 1990; Barnes, 1990) by dividing the (raw) financial ratio for each bank by the average ratio for the commercial banking industry in the country, according to the formula

that these markets may not yet be well integrated. Hence, we also test our results with country-specific (and time) dummy variables to justify our approach.

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

Standardizing as such using country averages also controls for the mean shift in the cross-sectional ratios, particularly where such ratios are computed over different years for different banks[5].

The bank specific characteristics represented by the set of 22 industry relative financial ratios listed in Table 2 include, in addition to CAMEL-type attributes, other factors such as size, growth, and market share, as typically examined in previous studies (e.g. Hannan and Rhoades, 1987; Moore, 1996; Pasiouras and Zopounidis, 2006; Wheelock and Wilson, 2000, 2004). The discussion that follows briefly outlines their relation to some of the motives and associated evidence on bank M&As.

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[5]Since acquisitions often take some time to complete, we averaged all independent variables (financial and market measures) over two fiscal years prior to the acquisition year (assuming that financial characteristics that make a bank attractive are evident in the years prior to the acquisition). Thus, for acquisitions completed during year *t*, we used data on banks' and market characteristics averaged over years *t-1* and *t-2*.

Table 2 – List of variables

Banks' financial characteristics		
Capital Strength	Equity / Tot Assets	EQAS
	Equity / Net Loans	EQLOAN
	Equity / Cust & ST Funding	EQCUST
	Equity / Liabilities	EQLIAB
	Cap Funds / Liabilities	CAPLIAB
Size	TOTAL ASSETS	SIZE
Growth	Total Assets Change	GROWTH
Asset Quality	Loan Loss Prov / Net Int Rev	PROVIS
Profitability	Net Interest Margin	NIM
	Net Int Rev / Avg Assets	REVAS
	Oth Op Inc / Avg Assets	OTHOPINC
	Non Op Items & Taxes / Avg Ast	NOPITEMS
	Return On Avg Assets (ROAA)	ROAA
	Return On Avg Equity (ROAE)	ROAE
	Recurring Earning Power	RECEARN
Expenses management	Non Int Exp / Avg Assets	EXPASS
	Cost To Income Ratio	COSTINC
Liquidity	Net Loans / Tot Assets	LOANAS
	Net Loans / Cust & ST Funding	LOANFUND
	Liquid Assets / Cust & ST Funding	LIQFUND
Market power	Loan Market Share	LOANSHARE
	Deposits Market Share	DEPSHARE
Market Characteristics		
	Average Return on assets for commercial banking sector for each country	MPROF
	Annual change of commercial banking sector 's total assets	MGROW
	Average liquid assets to customer & short term funding ratio for commercial banking sector for each country	MLIQ
	Annual change of Heritage Economic Score	OENVCH
	Heritage Banking & Finance Factor	BENV
	Stock market capitalization to GDP	SMCGDP
	Bank claims on the private sector to GDP	CLAIMS
	Concentration of 5 largest commercial banks in the country	CONC
	Dummy variable taking the value of 1 for banks operating in one of the principal banking sectors, and zero otherwise	5EU

The data for the calculation of bank financial characteristics, as well as MPROF, MGROW, MLIQ and CONC were obtained from Bankscope Database. The data for OENVCH and BENV were obtained from Heritage Foundation. The data for the remaining external factors were obtained from Euromonitor International Database which uses sources such as International Monetary Fund's (IMF) International Financial Statistics (IFS), International Financial Statistics and World Economic Outlook/UN/national statistics and World Bank.

Capital strength

The importance of capital adequacy requirements for banks has long been emphasized by the Basel Committee on Banking Supervision. Therefore, not surprisingly, prior studies for the US suggest that capital strength may influence the acquisition decision, and invariably report a negative relationship between capital ratios and acquisition probability (Hannan and Rhoades, 1987; Moore, 1996; Wheelock and Wilson, 2000). Two possible explanations have been offered for this finding. First, a lack of capital strength tends to attract acquirers who can infuse capital into the acquired banks (Moore, 1996; Wheelock and Wilson, 2000). Second, acquirers are interested in the purchase of banks with skillful managers who are able to operate successfully with high leverage (Wheelock and Wilson, 2000).

In the present study, we consider a total of 5 capital ratios, intended to measure slightly different aspect of banks' capital strength, as commonly used in recent studies. The first is the equity to assets ratio (EQAS), which measures the amount of protection offered to the bank by its equity, and is one of the basic capital strength ratios whose use dates back to the early 1990s (Golin, 2001). The second ratio, equity to net loans (EQLOAN), measures the equity available to absorb losses on a bank's loan portfolio. The third, equity to customer & short term funding (EQCUST), provides a measure of the amount of permanent funding (i.e. equity) relative to short term potentially volatile funding (i.e. customer & short term funding). The fourth, equity to liabilities (EQLIAB), provides a slightly different picture of the equity funding of the balance sheet. Finally, capital funds to liabilities ratio (CAPLIAB), which is similar to EQLIAB but with hybrid capital and subordinated debt added to shareholders' equity as a proportion of liabilities (the denominator being common to both).

Size

A bank's size may have a negative influence on its acquisition likelihood for several reasons. First, large banks are generally more expensive to be acquired. Second, larger banks have

greater resources to fight an unwanted acquisition. Third, it is often seen to be more difficult for a large bank to be absorbed in the acquirer's organization. The empirical evidence on the U.S. literature, however, is mixed. Hannan and Rhoades (1987) and Moore (1996) find the effect of size to be insignificant. Wheelock and Wilson (2000), however, report that smaller banks are more likely to be acquired than larger ones, and Wheelock and Wilson (2004) find that the probability of engaging in mergers increases with bank size. Focarelli et al. (1999) reports a significant negative effect of size (measured by total assets) on acquisitions in Italy, while Pasiouras and Zopounidis (2006) find a negative, although not robustly significant, effect of size in Greece (using total assets or the number of bank's branches). In line with previous studies, we measure a bank's size by its total assets, and expect it to be negatively related to acquisition likelihood.

Asset quality

Asset quality refers mainly to the quality of the bank's earning assets, the majority of which make up its loan portfolio (credit risk), although securities portfolio (market risk) and off-balance sheet items are also considered. Golin (2001) argues that "*the challenge for bank management is to minimize the risk of loan defaults and to price loans so that returns are more sufficient to cover loan losses*" (p.166). This would seem to imply that prudent banks with less risky portfolios are less prone to takeovers. Again the evidence is inconclusive. Wheelock and Wilson (2000) found that U.S. banks with relatively high non-performing loan ratios were less attractive takeover targets over the period 1984-1993; whereas Wheelock and Wilson (2004) in their examination of US bank mergers over the period 1987-1999 found that risky asset portfolios had a positive impact on the probability of a bank engaging in mergers. In the present study, following Altunbas and Ibanez (2004), we use the ratio of loan loss

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provisions to net interest revenue[6] (PROVIS), highlighting the relationship between provisions in the profit and loss account and the net interest income over the same period.

Growth

Moore (1996) argues that a slow growing bank may attract a buyer seeking to increase the market value of its franchise and accelerate its growth. On the other hand, as Kocagil et al. (2002) point out, previous empirical research suggests that some banks with relatively high growth rates have experienced problems because their management and/or structure has not been able to deal with and sustain exceptional growth. Hence, it is possible that a troubled firm could itself be an attractive target for a firm with surplus resources or management available to help (Barnes, 1999). Hannan and Rhoades (1987) found growth to be positively related to inside market acquisitions and negatively related to outside market characteristics, although insignificant in both cases. However, Moore (1996) revealed a negative relationship between a bank's growth and the acquisition probability regardless of whether the acquisition was in-market or out-of-market, to support his argument about the slow growing firm being an attractive target. We represent the influence of a bank's growth by the annual change in the bank's total assets (GROWTH).

Liquidity

A bank must maintain its ability to meet current liabilities as they become due, otherwise it could be seen as ineffective in liquidity management. Hence, the liquidity position of a bank could be an additional 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. The conventional view is that banks are acquired because they have moved

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[6]Altunbas and Ibanez (2004) point out that non-performing loans have a more backward-looking perspective with missing data (as we also experienced) for several EU countries. Hence, we rely on

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). This latter view is supported by the results of Wheelock and Wilson (2000) who find that low liquidity makes banks less attractive targets.

We consider three possible measures of a bank's liquidity position. The first is the ratio of net loans to customers & short term funding (LOANFUND), a measure highlighting the association between comparatively illiquid assets (i.e. loans) and moderately stable funding sources (i.e. deposits and other short term funding). In other words, this measure reflects the extent to which the bank has lent its deposits in illiquid form: obviously, the lower this ratio, the more liquid the bank is. The European Central Bank report (2004) on the stability of the EU banking sector indicate that the share of customers' loans in total assets was 50.57% in 2003, while in the same year the share of customers and other credit institutions deposits in total liabilities was 62.29%, thus highlighting the importance of this ratio.

The second measure is the ratio of liquid assets to customers & short term funding (LIQFUND). The liquid assets in this measure are generally short-term assets that can be easily converted into cash, such as cash itself, deposits with the central bank, treasury bills, other government securities and interbank deposits among others. Thus, this ratio measures the percentage of customer & short term deposits that can be met on demand: obviously, the higher this ratio, the more liquid the bank is. Hence, this measure can be considered as a counterpart to the first measure.

The third measure is the ratio of net loans to total assets (LOANASS) and indicates the percentage of bank assets tied up in loans. This measure of liquidity has been commonly

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the loan loss provisions to net interest revenue ratio that is most widely and publicly available for the EU countries, as a proxy for asset quality.

employed in previous studies albeit with mixed effect. Hannan and Rhoades (1987) find a negative effect on the acquisition likelihood (although not significant). Their argument for testing this effect has been that, on the one hand, a high level of loans would seem to indicate aggressive behavior by the target bank, while, on the other, 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. Moore (1996) also finds a negative (and significant) effect in both in-market and out-of-market acquisitions (using loan to assets ratio excluding small firms loans). The results of Wheelock and Wilson (2000, 2004) are somewhat mixed (using total loans to total assets ratio), with negative (but not significant) effect on the probability of acquisition in some cases, and positive but not always significant in other cases.

Profitability and expenses management

A well known hypothesis relating to M&As is that acquisitions serve to drive out bad management (Manne, 1965). Hannan and Rhoades (1987) test this hypothesis for US banks arguing that poorly managed banks are likely targets for acquirers who believe that they can manage more efficiently the assets of the acquired banks and thereby increase profitability. They find no evidence to support this hypothesis, however. Lack of support for the inefficient management hypothesis is also confirmed by Hadlock et al. (1999), and Pasiouras and Zopounidis (2006) for Greece. On the contrary, Moore (1996), Focarelli et al. (1999) and Wheelock and Wilson (2000) reveal a negative effect of profitability on the acquisition likelihood. Focarelli et al. (1999) and Wheelock and Wilson (2000) also find that acquisition probability declines with cost inefficiency.

In this study, we employ seven measures of profitability and two cost efficiency measures as proxies for management performance (see Table 2). The profitability measures are: (i) net interest margin (NIM) which is the net interest income expressed as a percentage of earning assets, and reflects the profitability of a bank's interest-earning business, (ii) the

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ratio of net interest income to average total assets (REVAS), similar to NIM, but expressed as percentage of average total assets rather than earning assets, (iii) the ratio of other operating income to average assets (OTHOPINC) indicating the extent to which non-interest income represents a greater percentage of bank's operating income, (iv) NOPITEMS which measures non-operating items & taxes as a percentage of average assets, (v) return on average assets (ROAA), calculated as net profit divided by average total assets and is used to measure the overall profitability of a bank, (vi) return on average equity (ROAE), calculated as net profit divided by average shareholders equity, and (vii)recurring earning power (RECEARN), calculated as profit before tax minus other income[7] plus loan loss provisions all divided by average assets.

The two cost efficiency ratios are: (i) overheads[8] plus loan loss provisions as a proportion of total assets (EXPASS), signaling the efficiency of bank's management performance regarding expenses relative to owned assets, and (ii) expenses as a proportion of operating income (COSTINC), a variant of EXPASS that excludes loan loss provisions from the nominator and uses income as the denominator. Obviously, higher COSTINC and EXPASS signal less efficient banks in terms of expenses management.

Market Share

A recent study of the Group of Ten (2001) points out that market power, interpreted as an increase in market share, is one of the most important motives for within-country, within-segment mergers in the financial sector. Moore (1996) argues that market power can influence the probability of acquisition in several ways. First, there may not be in-market acquirers large enough to acquire a bank with a significant market share. Second, regulatory concerns about potential anticompetitive effects could reduce the probability of acquisition for banks with

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[7]Other income corresponds to income from participating interests in affiliated enterprises, participating interests in other enterprises, other shares held as financial fixed assets and Extraordinary items (net) (i.e. extraordinary income minus extraordinary charges).

high market share. Third, in a banking market where only banks with large market share can effectively compete, a bank with small share is likely to be acquired, since its assets will become more valuable after its merger with a larger bank. Finally, in a similar manner, and consistent with the inefficient management hypothesis mentioned above, a bank's small market share could reflect a lack of success in the market. The empirical results are mixed. Hannan and Rhoades (1987) find market share to be significant and positively related to the out-of market acquisitions, but not statistically significant in within-market acquisitions. Moore (1996) and Pasiouras and Zopounidis (2006), on the other hand, find market share to be statistically significant and negatively related with the acquisition likelihood. We incorporate two measures of a bank's market share, one based on deposits (DEPSHARE) and the other on loans (LOANSHARE), both expressed as a proportion of the total deposits/loans of the banking sector in the country where the bank operates.

2.2.2 Market Characteristics

In addition to the banks' financial characteristics discussed above, we consider nine control variables as proxies for market characteristics reflecting the environment in which banks operate. Explanations of the influence of the market on the probability of acquisition are based on neoclassical and behavioral corporate finance theory. Under the neoclassical theory, proposed by Gort (1969) (and more recently examined by Mitchell and Mulherin (1996) among others), corporate managers react to technological, regulatory or economic shocks by reallocating assets through mergers and acquisitions. Under the behavioral approach, rational managers take advantage of consistent pricing errors in the market by purchasing real assets with overvalued stock[9] through mergers and acquisitions.

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[8]Overheads are the costs of running business, such as staff salaries and benefits, rent expenses, equipment expenses and other administrative expenses.

[9] The idea that stock market valuations shape merger activity dates back to Nelson (1959), but more recent studies emphasizing the behavioural approach are Stein (1988, 1989, 1996), Morck et al.

To determine the influence of market characteristics, we consider the following measures: (i) the market return on average assets (MPROF), (ii) market growth (MGROW), (iii) market liquidity (MLIQ), (iv) the relative openness of the banking sector, as indicated by the Heritage Banking & Finance factor (BENV), (v) the change in the overall economic freedom, as represented by the annual change in the Heritage Economic Index score (OENVCH), (vi) bank claims on the private sector (CLAIMS), (vii) stock market capitalization (SMCGDP), (viii) the degree of market concentration within the banking sector (CONC), and (ix) a dummy variable (5EU) indicating whether or not the banks operate in one of the five principal EU banking sectors (i.e. France, Germany, Italy, Spain, UK).

MPROF is an indicator of market profitability as represented by the average ROAA of the commercial banking industry within a country (Buch and DeLong, 2004). The rationale for its inclusion is based on the argument that industry level shocks affecting market profitability may lead to higher levels of acquisitions through restructuring. Support for this argument is provided by Christensen and Montgomery (1981) who show that firms in profitable industries tend to make more related acquisitions, while those from less profitable sectors turn towards unrelated inter-industry acquisitions in an effort to improve their profit potential. Alternatively, as pointed out by Ali-Yrkkö (2002), the entire banking industry may undergo restructuring in the event of deep banking crisis as witnessed in the 1990s. Finally, Harford (2005) documents the existence of abnormally high changes in profitability prior to merger waves.

MGROW is a measure of market growth, calculated as the annual change of total assets in the commercial banking industry within each country. Historical evidence seems to suggest that firms make acquisitions within industries with high growth rates (Chirstensen and Montgomery, 1981; Audretch, 1989; Schoenberg and Reeves, 1999). Additionally, as in the

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(1990), Shleifer and Vishny (1990), Baker and Wurgler (2000, 2002, 2004), Baker et al. (2003), Jenter (2005), Polk and Sapienza (2003).

case of low profitability, low industry growth may suggest the need for industrial restructuring. In the banking sector, Hannan and Rhoades (1987) find that market growth is negatively (albeit insignificantly) related to in-market acquisitions and positively (but in most cases insignificantly) related to out-of-market acquisitions. Pasiouras and Zopounidis (2006) also find market growth to be negatively (but not significantly) related to the probability of acquisition. Finally, Harford (2005) reports abnormally high growth measures (e.g. employees, sales) prior to waves.

MLIQ is the average liquidity in the market, calculated by the ratio of liquid assets to customer & short term funding for the commercial banking sector in each country. Harford (2005) supports the neoclassical explanation that mergers occur in response to specific industry shocks that require large-scale reallocation of assets, but the shocks are not enough on their own. A corollary to this view is that when capital liquidity is high industry-specific shocks would predict merger waves. Shleifer and Vishny (1992) make a similar argument in their study of asset liquidity, showing that in order for transactions to occur, buyers who intend to employ the asset in its first-best use must be relatively unconstrained. Schlingemann et al. (2002) show that industry-specific asset liquidity is important in determining which assets will be divested.

OENVCH is the annual change in the Heritage Foundation Economic Index score for each country. The index takes values[10] from 1 to 5, signifying an economic environment or a set of policies ranging from those most conductive to economic freedom (score 1), to least conductive (score 5). The empirical literature on the determinants of bank mergers generally supports the hypothesis that deregulation has a substantial impact on merger decisions

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[10] According to the Heritage Foundation the score for each country, is determined on the basis of 50 variables, that fall into following 10 main categories: (1) banking and finance, (2) trade policy, (3) fiscal burden of government, (4) government intervention in the economy, (5) monetary policy, (6) capital flows and foreign investment, (7) wages and prices, (8) property rights, (9) regulation, and (10) informal market activity.

(Jayaratne and Strahan, 1998; Saunders, 1999). Schoenberg and Reeves (1999) also find that deregulation has a positive impact on acquisition activity within UK industries.

BENV is a score measure based on the Heritage Banking and Finance Factor, reflecting the relative openness of a country's banking and financial system. Banks operate in a highly regulated industry and therefore the banking and regulatory environment can have an important impact on their decisions. The score takes the values 1, 2, 3, 4 or 5 that correspond to: very low, low, moderate, high and very high restrictions on banks, respectively[11].

CLAIMS is the ratio of bank claims on the private sector to GDP, typically used to capture the size of the banking system (Focarelli and Pozzolo, 2001; Buch and DeLong, 2004; Diaz et al., 2004). Buch and DeLong (2004) in their examination of cross-border M&As find that the size of the target country's banking system has a negative impact on the probability of bank mergers suggesting that banks do not invest in markets that have established a relatively large banking sector.

SMCGDP is the stock market capitalization to GDP ratio that measures financial deepening (Demirguc-Kunt and Levine, 1999; Manchin, 2004; Giovani, 2005). Giovani (2005) points out that financially deep markets can provide firms with access to capital necessary to undertake investment projects, which might be used to good effect in international M&As. Le Bras and Rawcliffe (2004) argue that a slowdown in stock markets might not only put pressures on banks revenues but also affect their ability to raise capital for acquisitions.

CONC is a 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

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[11] This score is based on the examination of the following factors: (1) whether foreign banks and financial services firms are able to operate freely, (2) how difficult it is to open domestic banks and other financial services firms, (3) how heavily regulated the financial system is, (4) the presence of state-owned banks, (5) whether the government influences the allocation of credit, and (6) whether banks are free to provide customers with insurance and invest in securities. The values of the Banking and Finance Factor are not continuous, as in the case of the Economic Index, and we rarely observe any differences from one year to another. We therefore used the assigned scores, to capture the degree of regulation, rather than the annual change.

all commercial banks in the country. Regulatory concerns about potential anticompetitive consequences suggest that market concentration would have a negative effect on the probability of being acquired. Hannan and Rhoades (1987) find a negative and significant effect of concentration on the probability of in-market acquisitions, and a positive but insignificant effect on out-of market acquisitions. Moore (1996) finds no relationship between concentration and acquisition likelihood for in-market acquisitions, but a positive and significant one for out-of market acquisitions. Wheelock and Wilson (2004) and Pasiouras and Zopounidis (2006) both find a negative relationship between concentration and acquisition likelihood.

Finally, we incorporate a dummy variable (5EU) indicating whether the bank is operating in one of the 5 large EU banking sectors (5EU =1) or not (5EU=0). This distinction is drawn on two considerations. First, the study of Group of Ten (2001) indicates that the nature of acquisition activity and the main motivations for acquisition may differ between countries. Second, the European Central Bank (2000) reports that specific developments in individual EU countries or regions influence M&As. Since the development of the banking sectors in the 5 principal banking sectors (i.e. France, Germany, Italy, Spain, UK) differs to a large extent from the smaller sectors of the EU, inclusion of the intercept dummy in the logistic regression allows for the influence of unobserved characteristics different from those that are generally common to both sets of countries.

2.3 Estimation

A binomial logistic regression model of the following form is estimated to examine the determinants of acquisition in a multivariate environment, where the probability of acquisition is given by:

$$P(y=1) = \frac{\exp(b_0 + b_1 x_1 + b_2 x_2 + ... + b_n x_n)}{1 + \exp(b_0 + b_1 x_1 + b_2 x_2 + ... + b_n x_n)}$$

where b_0 is the intercept term, b_1, b_2 ,..., b_n are the regression coefficients of independent variables, x_1, x_2, ..., x_n are the values of the independent variables. As noted earlier, the dependent variable y is equal to zero if the bank is non-acquired ($y=0$) and one if it is acquired ($y=1$).

The estimation of a logit model can be problematic when there are a few observations from one outcome (i.e. acquired banks) relative to the other (i.e. non-acquired banks), because the "information content" of such a sample is then small biasing the parameter estimates (Palepu, 1986). Hence, we have proportionately weighted the observations to correct for the imbalance in the choice based sample[12].

3. Empirical results

Table 3 presents descriptive statistics (mean and standard deviation) and the results of a Kruskal-Wallis test of means differences between acquired and non-acquired banks.

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[12] The following formula is used: Weighting for Group 0 (Non-acquired) = $(1/N_0)$ * $[(N_0 + N_1)/2]$. Weighting for Group 1 (Acquired) = $(1/N_1)$ * $[(N_0 + N_1)/2]$. Hence, the weight for non-acquired banks is $(1/504)$ * $[(504+168)/2]$ = 0.67, and the one for acquired banks is $(1/168)$ * $[(168+504)/2]$ = 2.

Table 3 – Descriptive statistics and Kruskal-Wallis test

	Acquired		Non-acquired		Kruskal-Wallis	
	Mean	Stdev	Mean	Stdev	Chi-square	p-value
Panel A: Bank's financial characteristics						
EQAS	1.879	2.083	2.241	2.546	6.572	0.010
EQLOAN	3.029	4.496	4.425	11.582	1.536	0.215
EQCUST	2.138	3.628	2.648	7.161	2.761	0.097
EQLIAB	2.278	3.518	2.908	7.753	6.639	0.010
CAPLIAB	1.780	2.481	2.195	4.646	9.137	0.003
SIZE	0.912	2.568	0.933	3.518	0.016	0.898
GROWTH	1.384	39.377	3.401	22.878	8.134	0.004
PROVIS	0.874	1.575	0.998	1.921	1.455	0.228
NIM	1.597	1.152	1.775	1.667	0.508	0.476
REVAS	1.635	1.192	1.807	1.671	0.571	0.450
OTHOPINC	1.391	2.679	1.714	3.035	1.001	0.317
NOPITEMS	-0.404	3.050	0.238	14.633	1.571	0.210
ROAA	-0.200	13.161	2.361	10.799	18.112	0.000
ROAE	0.025	7.177	0.880	3.867	11.404	0.001
RECEARN	0.897	1.263	1.635	2.695	10.616	0.001
EXPASS	1.691	1.432	1.716	1.645	0.384	0.536
COSTINC	1.144	0.442	0.975	0.432	30.722	0.000
LOANAS	1.012	0.562	1.028	0.581	0.082	0.774
LOANFUND	0.974	0.573	0.979	0.673	0.201	0.654
LIQFUND	1.216	1.648	1.277	1.212	1.209	0.272
LOANSHARE	1.190	3.151	1.373	4.983	0.474	0.491
DEPSHARE	1.372	3.634	1.381	5.146	0.961	0.327
Panel B: Market characteristics						
MPROF	0.563	0.312	0.532	0.271	0.475	0.491
MGROW	9.941	9.480	12.729	9.937	7.932	0.005
MLIQ	28.435	8.593	28.324	6.566	0.88	0.348
OENVCH	-0.010	0.025	-0.005	0.026	3.945	0.047
BENV	2.255	0.227	2.195	0.215	4.064	0.044
CLAIMS	1.909	4.903	2.072	5.480	3.37	0.066
SMCGDP	0.977	0.911	1.171	1.155	4.163	0.041
CONC5	67.200	17.196	68.168	17.019	0.673	0.412

Panel C: Categorical variables

	Acquired	Non-acquired
5EU	107	336
Non-5EU	61	168

Notes: Variables are defined in Table 2

The Kruskal-Wallis test reveals the existence of significant differences between the financial characteristics of acquired and non-acquired banks in terms of capital strength, growth, profitability, and expenses management. More specifically, acquired banks are less well capitalized as revealed by their relatively high mean values of EQAS, EQLIAB and CAPLIAB. Additionally, GROWTH is significantly lower for the acquired banks, indicating

that these slow growing banks may have attracted acquirers seeking to increase their market value (Moore, 1996). Acquired banks have also significantly lower means for ROAA, ROAE and RECEARN, indicating that they have under-performed in terms of these profitability ratios. Also COST is higher on average for the acquired banks, indicating relative cost inefficiency in terms of expenses management. Turning to measures of market characteristics, five of the nine ratios have significantly different means values. First, MGROWTH is lower for the acquired banks, suggesting that these banks may be facing acquisitions as a means of restructuring the corporate control market. Second, OENVCH is higher for the acquired banks (in absolute terms), suggesting that banks in countries with higher changes in economic freedom are more likely to be acquired. Fourth, restrictions in the banking industry (BENV) appear to be higher for acquired banks. Finally, bank claims on the private sector to GDP (CLAIMS) and stock market capitalization to GDP (SMGDP) are also significantly lower for the acquired banks. We also observe that the proportion of the acquired banks in the five banking sectors is lower than in the other ten banking sectors (31.85% in the former corresponding to 36.31% in the latter, as a percentage of the non-acquired banks in the same sector)[13].

A comparison of the sample means has revealed some useful insights into the characteristics distinguishing the two categories of banks, but to assess the significance of factors affecting the likelihood of bank acquisition requires estimation of a logistic regression model. Prior to estimation, we employed principal component analysis (PCA) with varimax rotation on the set of 22 bank specific ratios in order to eliminate the effects of multicolinearity and the overlapping nature of some of these variables[14]. Table 4 shows the

[13]Although we have no reason to believe that our sample is biased towards the inclusion of less (more) acquired banks from the large (small) banking sectors and the opposite for non-acquired banks, any potential biases should be kept in mind while interpreting the results.

[14]Principal Component Analysis (PCA) and Factor Analysis (FA) are two classic ways, commonly used in finance and accounting, of reducing a high number of correlated variables down to a new reduced set of uncorrelated variables. FA produces factors while PCA produces components, although the processes are similar except in preparation of the observed correlation matrix for extraction and the underlying theory (Tabachnick and Fidell, 2001). This is why researchers usually do not distinguish

loadings of the PCA that resulted in the extraction of seven components with eigenvalues greater than unity. These components explain about 74% of the total variance in the sample and appear to represent the dimensions of capital strength, interest margin, market power, liquidity, profitability, expenses management and asset quality. There are two possible ways of incorporating the results of PCA in the logistic regression model. The first is to select the individual variables from each of the seven components that have the highest loadings. The second is to use the principal components scores, essentially a reduced set of seven uncorrelated variables representing the aforementioned dimensions. We rely on the second approach, as in Poon et al. (1999), Fields et al. (2004) and Gaganis et al. (2006), for four reasons. First, since principal component scores are weighted combinations of correlated variables, they are likely to be more reliable, and generally of higher quality than the individual variables (Fielder, 1993). Second, we avoid the judicious but arbitrary selection of individual variables. Third, the information content of the scores is obviously more representative than that of the individual variables. Fourth, we can be confident that the principal components are uncorrelated, whereas the individual variables making up the components might still be correlated to some degree.

PCA from FA. Mathematically, the difference between PCA and FA is in the variance that is analyzed. In PCA all the variance in the observed variables is analyzed, while in FA only the shared variance is analyzed. Examples of previous studies that used PCA or FA are: Pinches et al. (1973), Barnes (1990), Poon et al. (1999), Emel et al. (2003), Fields et al. (2004), Gaganis et al. (2006).

Table 4- Principal Component Analysis (PCA) of financial variables

	Components						
	1	2	3	4	5	6	7
CAPLIAB	**0.979**	0.067	-0.024	-0.064	0.039	0.018	-0.003
EQLIAB	**0.976**	0.038	-0.023	-0.059	0.039	0.014	-0.015
EQCUST	**0.951**	0.052	-0.016	-0.090	-0.001	-0.068	-0.004
EQAS	**0.815**	0.165	-0.098	-0.131	0.140	0.027	-0.031
NIM	0.115	**0.916**	-0.083	0.220	0.032	-0.096	-0.052
NETINTRE	0.103	**0.909**	-0.091	0.238	0.024	-0.110	-0.059
EXP	0.131	**0.772**	-0.058	-0.110	0.238	0.379	0.172
MARKDEP	-0.045	-0.056	**0.964**	0.014	-0.004	-0.007	-0.012
MARKLO	-0.038	-0.053	**0.956**	0.054	0.000	-0.016	-0.018
TA	-0.047	-0.068	**0.808**	0.023	-0.003	-0.007	0.033
LOANASS	-0.019	0.283	-0.013	**0.860**	-0.032	-0.073	0.047
LOANCUST	0.113	0.241	0.016	**0.811**	-0.030	-0.092	0.136
LIQCUST	0.293	-0.008	-0.025	**-0.669**	0.082	0.008	0.064
EQLOAN	0.159	0.102	-0.070	-0.605	0.020	-0.155	0.091
ROA	0.147	-0.052	-0.016	-0.002	**0.843**	-0.001	-0.083
OTHOPE	0.139	0.256	-0.021	-0.292	**0.740**	0.223	0.146
ROE	-0.036	-0.031	0.035	0.027	**0.691**	-0.019	-0.109
RECUR	0.001	0.383	-0.043	-0.045	0.674	-0.354	0.104
COST	-0.078	0.087	-0.005	-0.135	-0.172	**0.756**	-0.283
NOPITEMS	0.056	-0.094	-0.029	0.157	0.115	0.573	0.303
PROV	-0.007	0.183	0.083	-0.007	-0.155	-0.099	**0.784**
TACHA	-0.032	-0.088	-0.040	-0.010	0.027	0.047	0.516

Note: Loadings above 0.65 (in absolute terms) are denoted with bold.

To consider the relative influence of bank specific and market characteristics, we estimate two versions of the logistic regression model, with results shown in Table 5. Model 1 includes the 7 principal component scores only, representing bank specific influences, while Model 2 allows for the additional influence of different market characteristics[15]. Because of the specific nature of the market characteristics measures it was desired to include them individually rather than their principal component scores, and doing so does not undermine the significance of bank specific effects. Indeed, the overall explanatory power (Nagelkerke R^2) increases from 7.5% (Model 1) to 13.7% (Model 2), and despite the insignificance of some measures, the chi-square values confirm the overall significance of both regressions.

Among the bank specific influences, the first principal component (COMPONENT 1) corresponds to capital strength and has the expected negative sign in both regressions, although its effect is not significant as found in prior US studies (e.g. Hannan and Rhoades, 1987; Wheelock and Wilson, 2000). Thus, despite the mean differences in some of the capital strength measures, the overall influence is not strong enough to suggest that less well-capitalized banks in the EU are more likely to be acquired.

The coefficients of COMPONENT 2 (net interest margin), COMPONENT 3 (market power in terms of bank size and market share) and COMPONENT 4 (liquidity and loan activity) are also insignificant, and accord with the lack of significance in mean differences of the underlying variables in the sample for the two groups of banks. The apparent insignificance of the influence of market power and size is at odds with the view held by practitioners in the Group of Ten (2001) report which ranked these factors above others in

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[15]We also estimated both the models with country specific dummies and time dummies, and found them mostly insignificant, with little or no improvement in the explanatory power. Only time dummies for 2000 and 2002 were significant at the 10% level, with negative effect on acquisition likelihood. See footnote 16 below for summary of results with country dummies. The results are not reported but are available from the authors upon request.

their investigation of M&A trends in some of the EU countries. But the insignificant influence of liquidity and loan activity is, consistent with the findings of Hannan and Rhoades (1987) and Pasiouras and Zopounidis (2006).

COMPONENTS 5 (profitability), 6 (expenses management) and 7 (asset quality) are all significant, with profitability and asset quality being negatively and expenses management positively related to bank acquisition likelihood. Hence, our results show that less profitable and less cost efficient banks are more likely to be acquired, which is at odds with the results of Hannan and Rhoades (1987) and Hadlock et al. (1999), but consistent with others that find support for the inefficient management hypothesis (e.g. Moore, 1996; Wheelock and Wilson, 2000). Cyree et al. (2000) also find a negative and significant impact of labour costs (salary expenses) on the growth of US banks. Furthermore, Focarelli et al. (1999) finds profitability to be negatively and cost efficiency to be positively related to the acquisition probability of Italian banks, although Pasiouras and Zopounidis (2006) find neither of these influences significant with Greek banks. Finally, the negative and significant influence of asset quality indicates that EU banks with less risky asset portfolios are more likely to be acquired, consistent with Wheelock and Wilson (2000) who report that US banks with relatively high non-performing loan ratios were less attractive takeover targets.

Table 5- Logistic Regression Results

	Model 1		Model 2	
	Coefficient	Wald	Coefficient	Wald
Constant	-0.069	0.739	1.217	2.212
COMPONENT 1	-0.116	1.281	-0.099	0.942
COMPONENT 2	-0.097	1.124	-0.041	0.179
COMPONENT 3	-0.006	0.005	-0.027	0.09
COMPONENT 4	0.030	0.116	0.001	0.000
COMPONENT 5	-0.436	12.055***	-0.426	11.522***
COMPONENT 6	0.362	13.481***	0.336	11.504***
COMPONENT 7	-0.194	4.75**	-0.191	4.536**
MPROF			0.423	1.072
MGROW			-0.030	9.669***
MLIQ			-0.002	0.017
OENVCH			-8.228	5.471**
BENV			0.229	2.353
CLAIMS			-0.049	2.957*
SMCGDP			-0.148	1.505
CONC			-0.015	3.918**
5EU			-0.645	5.411**
Chi-square	39.152		72.584	
Nagelkerke R^2	0.075		0.137	

Notes: Variables are defined in Table 2. *** Statistical significant at the 1% level,
** Statistical significant at the 5% level, *Statistical significant at the 10% level

Turning to measures of market characteristics, we find that concentration (CONC) has a significantly negative influence on bank acquisition likelihood, consistent with most US studies (and Pasiouras and Zopounidis (2006) for Greece). A possible explanation for this might be, as suggested by Wheelock and Wilson (2000, 2004), that regulatory concerns about potential anticompetitive consequences might be having an adverse impact on acquisition attempts. The significantly negative influence of MGROW may support the neoclassical assertion that acquisitions serve as a means of restructuring the EU banking sectors with relatively low growth. The significant negative influence of OENVCH suggests that banks operating in countries that experience greater economic freedom are less prone to acquisition. However, acquisitions do not seem to be directly affected by regulatory restrictions in the banking sector[16] (BENV). The significance of the 5EU dummy seems to suggest that banks

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[16] This interpretation should be treated with some caution. As previously mentioned, BENV take the values of 1,2,3,4, 5 and is not a continuous variable. Furthermore, it represents an aggregate index that captures several regulations. Hence the values do not significantly change from year to year or from country to country and may no allow the proper investigation of the influence of regulations on

operating in the 5 large banking sectors are less prone to be acquired, consistent with the view that banks tend not to invest in markets with large banking sectors (Buch and De Long, 2004)[17]. While this may be surprising at first instance, it is in fact consistent with our choice based sample. Finally, stock market capitalization (SMCGDP) and market liquidity (MLIQ) do not have a significant impact on the acquisition likelihood while CLAIMS is significant only at the 10% level.

4. Conclusions

The EU banking industry has experienced a large number of M&As during the last fifteen years. Yet, apart from a few exceptions relating to specific countries, the literature associated with this development in the EU has so far been limited on the investigation of specific determinants of M&As, focusing instead on the impact of M&As on the operating performance of banks, the effect of M&A announcements on the share prices of the merger banks, and the impact on the takeover premium. The present paper contributes to the literature by investigating the determinants of acquisition likelihood of commercial banks operating in the EU banking industry, distinguishing between bank-specific and market related factors. In doing so, we regard the EU banking industry as essentially operating in the single market and ignore factors affecting cross-border M&As, such as information costs and asymmetries (Focarelli and Pozzolo, 2001; Buch and De Long, 2004), regulatory and accounting differences influencing shareholder protection (Rossi and Volpin, 2004), and technological shocks (Harford, 2005).

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banks M&As. A more appropriate approach would be to disaggregate this index into the several components used for its calculation and examine individually each one of them.
[17]With individual country specific dummies included in place of the 5EU, we found that CONC, CLAIMS and OENVCH became insignificant, whereas dummies for Belgium, Finland and Greece were significant (with a positive sign) only at the 10% level. Otherwise, there were no significant differences in the results.

Our sample consisted of 168 banks acquired over the period 1998-2002 combined with 504 non-acquired ones, operating in 15 EU countries that represented the single market during the sample period of study. An initial set of 22 financial variables measuring various aspects of banks' performance and 9 variables covering basic market characteristics were initially considered. The financial variables were subject to principal component analysis in order to reduce the effects of multicollinearity and the overlapping nature of some of the variables. Seven principal components were extracted, representing the dimensions of capital strength, interest margin, market power, liquidity, profitability, expenses management, and asset quality. Two versions of a logistic regression model were estimated: the first using only the 7 principal component scores, and the second adding the 9 variables measuring market characteristics. .

Our results are consistent with Wheelock and Wilson (2000) in that banks with less risky portfolios are more likely to be acquired. We also find that less profitable and less cost efficient banks are more likely to be acquired, which accord with the inefficient management hypothesis (Moore, 1996; Wheelock and Wilson, 2000) and what Focarelli et al. (1999) also found for Italian bank acquisitions. Moreover, industry concentration (CONC) has a negative impact on bank acquisition likelihood, consistent with most US studies (Hannan and Rhoades, 1987; Hadlock et al. 1999); Wheelock and Wilson, 2000, 2004) and what Pasiouras and Zopounidis (2006) also found for Greece. We find a significant negative influence of market growth (MGROW), supporting the neoclassical interpretation that acquisitions serve as a means of restructuring those EU banking sectors with lower growth. Our finding, however, show that acquisitions do not seem to be affected by regulatory restrictions in the banking sector, the level of stock market capitalization, industry liquidity or market profitability, while the size of the banking sector had only marginal effects on bank acquisitions.

Future research could extend our study in several directions. First, the present study has, with respect to banks' specific characteristics, restricted itself to the use of financial

variables, owing to data availability. It is hoped that future research will take into account non-financial factors, such as management experience or quality. Second, given that banking is considered of the most regulated industries it would be worthwhile to investigate further the impact of regulatory restrictions on M&As. While the aggregated index that we used in our study was not significant, examination of individual factors such as restriction on bank activities, regulations on entry, diversification guidelines, and government ownership could perhaps affect our results differently. Third, we propose to estimate separate models for several larger EU banking sectors in order to determine factors influencing cross-border M&As, possibly with a sufficiently large sample size that could also make possible the estimation of models for large and small banks. Finally, a comparison of the determinants of cross-border banks acquisitions incorporating countries, such as the US, Asia and Australia, over a common sample period would be worthwhile extension to our study.

References

Ali-Yrkko J. 2002. Mergers and acquisitions-reasons and results. The Research Institute of the Finnish Economy, Discussion papers No. 792, ISSN 0781-6847.

Altunbas Y., Ibanez D. 2004. Mergers and Acquisitions and Bank Performance in Europe: The role of strategic similarities. European Central Bank, Working Paper Series (No. 398), October.

Ambrose B., Megginson W. 1992. The Role of Asset Structure, Ownership Structure and Takeover Defenses in Determining Acquisition Likelihood. *Journal of Financial and Quantitative Analysis* **27** (4): 575-589.

Audretsch D. 1989. The determinants of conglomerate mergers. *American Economist* **33**: 52-60.

Baker M., Wurgler J. 2000. The equity share in new issues and aggregate stock returns. *Journal of Finance* **55**: 2219-2258.

Baker M., Wurgler J. 2002. Market timing and capital structure. *Journal of Finance* **57**: 1-32.

Baker M., Wurgler J. 2004. A catering theory of dividends. *Journal of Finance* **59** (3): 1125-1165.

Baker M., Stein J., Wurgler J. 2003. When does the market matter? Stock prices and the investment of equity-dependent firms. *Quarterly Journal of Economics* **118**: 969-1005.

Barnes P. 1990. The prediction of takeover targets in the U.K by means of multiple discriminant analysis. *Journal of Business Finance & Accounting* **17** (1): 73-84.

Barnes P. 1999. Predicting UK Takeover Targets: Some methodological Issues and an Empirical Study. *Review of Quantitative Finance and Accounting* **12** (3): 283-301.

Bauer W., Ryser M. 2004. Risk management strategies for banks. *Journal of Banking and Finance* **28**: 331-352.

Beitel P., Schiereck D. 2001. Value creation at the ongoing consolidation of the European banking market. Presented at the X international conference on banking and finance, Tor Vergata University Rome, December 5-7

Beitel P., Schiereck D., Wahrenburg M. 2004. Explaining the M&A-success in European Bank mergers and acquisitions. *European Financial Management*, **10** (1): 109-139.

Belaisch A., Kodres L., Levy J., Ubide A. 2001. Euro-Area Banking and the Crossroads. IMF Working Paper, WP 01/28.

Berger A., Demsetz R., Strahan P. 1999. The consolidation of the financial services industry, causes, consequences and implications for the future. *Journal of Banking and Finance* **23**: 135-194.

Buch C.M., DeLong G. 2004. Cross-border bank mergers: What lures the rare animal?. *Journal of Banking and Finance* **28**: 2077-2102.

Carletti E., Hartmann P., Spagnolo G. 2002. Implications of the Bank Merger Wave for Competition and Stability. In Risk Measurement and Systemic Risk, Proceedings of the Third Joint Central Bank Research Conference (Board of Governors of the Federal Reserve System, Bank of Japan, European Central Bank), 38-50.

Christensen H.K., Montgomery C.A. 1981. Corporate economic performance: diversification versus market structure. *Strategic Management Journal* **2**: 327-343.

Claessens S., Demirguc-Kunt A., Huizinga H. 2001. How does foreign entry affect domestic banking markets. *Journal of Banking & Finance* **25** (5): 891-911.

Coffee J. 1999. The future as history: the prospects for global convergence in corporate governance and its implications. *Northwestern University Law Review* **93**: 641-708.

Cybo-Ottone A., Murgia M. 2000. Mergers and shareholder wealth in European banking. *Journal of Banking and Finance* **24** (6): 831-859.

Cyree K.B., Wansley J.W., Boehm Th.P. 2000. Determinants of bank growth choice. *Journal of Banking and Finance* **24** (5): 709-734.

Demirguc-Kunt A., Huizinga H. 1999. Determinants of commercial bank interest margins and profitability: Some international evidence. *World Bank Economic Review* **13**: 379-408.

Dermine J., 2000. Bank Mergers in Europe: The Public Policy Issues. *Journal of Common Market Studies* **38** (3): 409-425.

Diaz B.D., Olalla M.G., Azorfa S.S. 2004. Bank acquisitions and performance: evidence from a panel of European credit entities. *Journal of Economics and Business* **56** (5): 377-404.

Dunis C., Klein T. 2005. Analysing mergers and acquisitions in European financial services: an application of real options. *The European Journal of Finance* **11** (4): 339-355.

Emel A., Oral M., Reisman A., Yolalan R., 2003. A credit scoring approach for the commercial banking sector. Socio-Economic Planning Sciences **37**(2): 103-123.

European Central Bank, 2004. EU Banking Sector Stability. November, available   at: www.ecb.int/pub/pdf/other/eubankingsectorstability2004en.pdf

European Central Bank-ECB., 2000. Mergers and Acquisitions involving the EU banking industry-Facts and implications. December.

Fielder J., 1993. Market Figmentation: Clustering on Factor Scores versus Individual Variables. AMA Advanced Research Techniques Forum, June 14.

Fields L., Fraser D., Wilkins M. 2004. An investigation of the pricing of audit services for financial institutions. *Journal of Accounting and Public Policy* **23:** 53-77.

Focarelli D., Panetta F., Salleo C., 1999. Why Do Banks Merge?. Paper No. 361, Banca d' Italia Research Department.

Focarelli D., Pazzolo A. 2001. The patterns of cross-border bank mergers and shareholdings in OECD countries. *Journal of Banking and Finance* **25**: 2305-2337.

Gaganis C., Pasiouras F., Doumpos M. 2006. Probabilistic neural networks for the identification of qualified audit reports. *Expert Systems with Applications*, (Forthcoming), available on-line in sciencedirect.com since 27 December 2005.

Giovanni J. 2005. What drives capital flows? The case of cross-border M&A activity and financial deepening. *Journal of International Economics* **65**: 127-149.

Golin J. 2001. *The Bank Credit Analysis Handbook: A Guide for Analysts, Bankers and Investors*. John Wiley & Sons: New York.

Gort M., 1969. An economic disturbance theory of mergers. *Quarterly Journal of Economics* **83**: 623-642.

Group of Ten, 2001. Report on Consolidation in the Financial Sector. January 25, available at http://www.imf.org/external/np/g10/2001/01/Eng/.

Hannan T., Rhoades S. 1987. Acquisition Targets and Motives: The Case of the Banking Industry. *The Review of Economics and Statistics* **69** (1): 67-74.

Hadlock Ch., Houston J., Ryngaert M. 1999. The role of managerial incentives in bank acquisitions. *Journal of Banking & Finance* **23**: 221-249.

Hasbrouck J. 1985. The Characteristics of Takeover Targets: q and Other Measures. *Journal of Banking and Finance* **9** (3): 351-362.

Harford J. 2005. What drives merger waves?. *Journal of Financial Economics* **77**: 529-560.

Harris R., Stewart J., Carleton W. 1982. Financial Characteristics of Acquired Firms, In: Keeman, M., White, L. (Eds), Mergers and Acquisitions: current problems in perspective, N.Y University, Lexington Books, pp. 223-241.

Huizinga H., Nelissen J., Vander Vennet R. 2001. Efficiency Effects of Bank Mergers and Acquisitions in Europe. Tinbergen Institute Discussion Paper, 2001-088/3.

Jayaratne J., Strahan P. 1998. Entry restrictions, industry evolution, and dynamic efficiency: Evidence from commercial banking. *Journal of Law and Economics* **41**: 239-273.

Jenter D. 2005. Market timing and managerial portfolio decisions. *Journal of Finance* **60** (4): 1903-1949.

Kocagil A., Reyngold A., Stein R.., Ibarra E., 2002. Moody's RiskCalc[TM] Model For Privately-Held U.S. Banks, Moody's Investors Service. Global Credit Research, July.

Le Bras A., Rawcliffe, G., 2004. M&A Activity in the European Banking Sector: is cross-border consolidation finally on the cards?. Special Report, 15 March, Fitch Ratings.

Lepetit L., Patry S., Rous P. 2004. Diversification versus specialization: an event study of M&As in the European banking industry. *Applied Financial Economics* **14** (9): 663-669.

Levine P., Aaronovitch S. 1981. The financial characteristics of firms and theories of merger activity. *The Journal of Industrial Economics* **30** (2): 149-172.

Manchin M. 2004. Determinants of European cross-border mergers and acquisitions. Paper No. 212, September, Directorate-General for Economic and Financial Affairs, European Commission.

Manne H. 1965. Mergers and the market for corporate control. *Journal of Political Economy* **LXXIII** (1): 110–120.

Mitchell M., Mulherin J., 1996. The impact of industry shocks on takeover and restructuring activity. *Journal of Financial Economics* **41**: 193-229.

Moore R. 1996. Banking's Merger Fervor: Survival Of the Fittest?. Financial Industry Studies, Federal Reserve Bank of Dallas, December, 9-15.

Morck R., Shleifer A., Vishny R. 1990. The stock market and investment: is the market a sideshow?. *Brookings Papers on Economic Activity* **2**: 157-215.

Nelson R. 1959. Merger Movements in the American Industry. NBER, New York.

Palepu K.G. 1986. Predicting Takeover Targets: A Methodological and Empirical Analysis. *Journal of Accounting and Economics* 8: 3-35.

Pasiouras F., Zopounidis C. 2006. Consolidation in the Greek banking industry: Which banks are acquired?. *Managerial Finance* (forthcoming).

Pinches G., Mingo K., Caruthers J. 1973. The Stability of Financial Patterns in Industrial Organizations. *Journal of Finance*, June, 389-396.

Platt H., Platt M. 1990. Development of a Class of Stable Predictive Variables: The Case of Bankruptcy Prediction. *Journal of Business Finance and Accounting* **17**: 31-51.

Polk C., Sapienza P. 2003. The real effects of investor sentiment. *CEPR Discussion Papers*, No. 3826.

Poon W., Firth M., Fung H. A multivariate analysis of the determinants of Moody's bank financial strength ratings. *Journal of International Financial Markets, Institutions and Money* **9**: 267-283.

Powell R. 1997. Modelling Takeover Likelihood. *Journal of Business Finance and Accounting* **24** (7&8): 1009-1030.

Rossi S., Volpin P. 2004. Cross-country determinants of mergers and acquisitions. *Journal of Financial Economics* **75**: 277-304.

Saunders A. 1999. Consolidation and universal banking. *Journal of Banking and Finance* **23**: 693-695.

Schlingemann F., Stulz R., Walkling R. 2002. Divestitures and the liquidity of the market for corporate assets. *Journal of Financial Economics* **64**: 117-144.

Schoenberg R., Reeves R. 1999. What Determines Acquisition Activity within an Industry?. *European Management Journal* **17** (1): 93-98.

Shleifer A., Vishny R., 1992. Liquidation values and debt capacity. *Journal of Finance* **32**: 337-347.

Stein J., 1988. Takeover threats and managerial myopia. *Journal of Political Economic* **96**: 61-80.

Stein J., 1989. Efficient capital markets, inefficient firms: a model of myopic corporate behavior. *Quarterly Journal of Economics* **104:** 655-669.

Stein J., 1996. Rational capital budgeting in an irrational world. *Journal of Business* **69**: 429-455.

Shleifer A., Vishny R., 1990. Equilibrium short horizons of investors and firms. *American Economic Review Papers and Proceedings* **80**: 148-153.

Tabachnick B., Fidell L.. 2001. *Using Multivariate Statistics*. 4th edition, Allyn & Bacon: USA.

Tourani-Rad A., Van Beek L. 1999. Market Valuation of European Bank Mergers. *European Management Journal* **17** (5): 532-540.

Vander Vennet R., 1996. The effect of mergers and acquisitions on the efficiency and profitability of EC credit institutions. *Journal of Banking and Finance* **20** (9): 1531-1558.

Vander Vennet R. 1998. Causes and consequences of EU bank takeovers, In Eijffinger S., Koedijk K., Pagano, M, Portes, R. (Eds.), The Changing European Landscope, Centre for Economic Policy Research, Brussels, pp. 45-61.

Wheelock D.C., Wilson P.W. 2000. Why do banks disappear? The determinants of US bank failures and acquisitions. *Review of Economics and Statistics* **82**: 127-138.

Wheelock D.C., Wilson P.W. 2004. Consolidation in US banking: Which banks engage in mergers?. *Review of Financial Economics* **13:** 7-39.